Interaction Design Degree Project Stage II

Futuristic Computing Device For Women

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Approval Sheet

The Interaction Design Project entitled ‘Futuristic Computing Device For Women’ by Sachin Ghodke is approved in partial fulfillment of requirements for the postgraduate degree in Interaction Design.

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Chairperson: ----------

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Sachin T Ghodke.
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1. Abstract

Future is not about the Personal Computers but it is about the power of ubiquitous computing, which makes information available anywhere at any time. It allows collaboration among the users to share and co-operate the data. We are living in the information age which has revolutionized the way we connect to the people as well as business. Radical rethinking is needed in the design of the new generations of computing devices which will be far more compact, mobile, reliable and efficient in all ways than the PC.

The project went through the in-depth understanding of each aspects of user lifestyle which majorly depends on whether the woman is a housewife or working woman. The responsibility and user need differs in each case. After need identification, keywords are generated to build the concepts based on the future technologies to enhance the user experience.
The intent of the project was to design the **intimate virtual space** which will help working women
- To stay connected with the love ones without actually invading the personal space.
- To share & communicate messages and experiences in more personal and intimate ways using the new or existing technology.

2. Introduction

Future is not about the Personal Computers but it is about the power of ubiquitous computing.
The ubiquitous computing is a radical idea which makes information available anywhere at any time. It allows collaboration among the users to share and co-operate the data. It makes user do task more effectively, flexibly, economically, which results into luminous opportunities to do the work.
Now PC's are changing their skin and rather than a product, they are becoming the part of product. The new generations of devices are emerging, which are computer inside but with different form and doing specific functions.
The aim of this project was to design the system which will help user to stay connected and enhance the intimacy between the family members who wish to be in contact through feeling the presence of other without invading ones personal space.
The system is helpful for the working women to know and feel the presence of the kids alone at home. The device opens the new possibilities of communication using new and existing technologies, in a very subtle and intimate ways in terms of emotions and activities.
The system also takes care of the privacy and personalization of user and kids, so that it will motivate frequent users to use and share the virtual space collaboratively.

4. Background Study

4.1 PC Era

(Fig.4.1a)Apple II

(Fig.4.1b) The Commodore PET

(Fig.4.1c) TRS-80

Personal computer has changed the society and our lives totally. In modern sense computer was started developing around 1940's, which was mainly for scientific purposes.

The real breakthrough happened in 1976 when Apple has introduced its first personal computer 'The Apple II'(Fig.4.1a), at very controversial price of $666. After that, the Commodore PET (Fig.4.1b), TRS-80 (Fig.4.1c) , came into the picture which has changed the global scenario completely and has given birth to the huge, multi-billion dollar industry, making Personal computer into everyones reach. (R4.1a)

After 1980's the evolution of PC's, it has given quantum leap to the development of industrialization and world market. The development of PC's in the field of communication and collaboration has taken productivity to next level which has change the way each segment of the market works.

In 1990's, the growth in PC market was leaded by a company called Dell which is owned by Michael Dell. The company runs on a very interesting business model which is totally consumer oriented allows customers to customize the PC's during making the order itself. In 1997, this business model made Dell, a leading PC seller company.

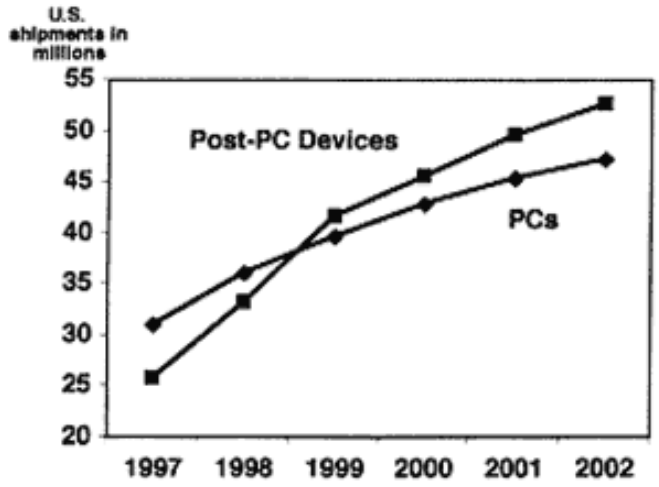
In 1991, Tim Berners-Lee had developed the World Wide Web and launches its first web server. The concept basically got developed in late 50's and early 60's by MIT, which was to connect the large number of people to a single computer via remote terminal.

Within 3 years, the growth rate of service traffic was found to be 341,634%. (R4.1b)

4.2 Post PC Era

I believe; Internet is the main reason to enhance the growth of PC market. Internet has given flexibility and flow to the information, which is job fulfilling in all respect. With internet user can connect to the universities, huge libraries, banks and etc. It has entered into each and every part of our life.
We are living in the information age which has revolutionized the way we connect to the people as well as business.
Future is not about the Personal Computers but it is about the power of ubiquitous computing and networking, which makes information available anywhere at any time. It is about accessing the data from any workstation connected to network. It allows collaboration among the users to share and cooperate the data. (R4.2a)
It makes work do more effectively, flexibly, economically, which results into dynamism in business. Also creates luminous opportunities to do the work.
The ubiquitous computing is a radical idea because, now we are not restricted to use a single personal computer but we use many, when we are at home, when we are at office, when we are on the move or at friends house. With networking we can assess all the data and information at everywhere and without networking things will be so rigid and static.

> Steve Jobs :
> "Radical rethinking [of computing] will happen in Post-PC devices."



(Fig.4.2a) Data of U.S. shipments of PC and Post PC devices

Now PC's are changing their skin and rather than a product, they are becoming the part of product. The new generations of devices are emerging, which are computer inside but with different form and doing specific functions (R4.2b). They are more user friendly with cool interfaces having a touch of something new. And that is what user wants to have! Simple and compact devices!

If we try to see and understand the data (Fig.4.2a) which taken during 1999- 2002 in America, it is very clear that the acceptance of the smart devices is increasing (R4.2c). It is mainly because, These devices are very simple and reliable. User do not want a sophisticated engineer to install and set-up the device, they want simple 'Plug & Play' devices with extended feature of networking.

The initiative is already been taken by the technology developing countries like Korea to maintain its leadership in the field of Information & Technology (R4.2b). In 2004, Korean Ministry of Information & Communication has issued the strategy IT839 and the Post PC era initiative, which is mainly dealing with

- Wearable computing,
- Wireless and broadband everywhere,
- RFID sensors to track the users

The above discussed things clearly reveals that the radical thinking is needed in the design and development of the new generations of the smart devices.

4.3 Post PC Devices

Post PC devices are nothing but changing the layer of PC technology. They run on the PC technology but they are more mobile, universal, instantaneous and easy to use.
So unlike PC, they are not general purpose machines. They are limited use machines, designed for solving specific purpose.
PC makes things immobile, static, larger, more general purpose, which makes it less efficient & less productive and more complex.
Post PC devices are tightly integrated hardware and software which makes it more effective and efficient; in addition to that they are simpler and more reliable. They are designed for particular user group and specific task which makes them more user centric on one part and small & handy on the other. (R4.3a)
If we try to note down the user expections then they are,

- Networking & connectivity
- Mobility
- Plug and Play
- Simple & reliable
- Compact devices
- Small & handy
- Cool Interfaces

Post PC devices are designed to give great user experience as user & task are well defined, For example, like if we see in case of X-Box, its complete gaming console for Game lovers. (Fig.4.3a)

i-Pod

(Fig.4.3a) X-Box

Apple TV

Microsoft Surface

4.4 Technology Trends

Trends & forecasts

2001-2010
- Ear mounted telephones are now available and will become even more lightweight and low-powered. They will connect to the net themselves or through a personal digital assistant.
- The development of flexible LCD screens will replace bulky laptop screens with ultra-portable roll-up displays. Home entertainment centers could also use this technology to replace conventional TV and computer monitor displays.
- Faster computer processors will allow for 3-D holographic images to be processed in real time.
- Speech recognition will become a necessity in mobile electronic devices.
- Special pens that capture writing and digitize your messages are available today. They will become more accurate and will connect to personal digital assistants and computers.
- Future personal digital assistants (PDA) will use “rudimentary artificial intelligence”. The digital assistants will be highly customized, connected to the net and will communicate with other computers and earphones.
- Future PDAs will have fingerprint, voice, or retinal identification capabilities. They will start to replace ID numbers, credit card numbers and passwords. PDAs will also perform secure e-cash transactions.
- Eyewear will darken and lighten as voltage is sent thought variable-tint lens coatings. Eyewear will shield users from the hectic outside world and contain earpieces that can cancel noise or play sound.
- Cinema films will feature near-perfect animated replications of actors that are alive or already dead.
- Distanced colleagues, relatives and an increasing popularity of videophone sex will drive sales of videophones and internet videophones.
- Motorola is developing on-board vehicle supercomputers that will increase automobile engine efficiency up to 20%.

Continue on the next page...

Sourses: (R4.4a)
- Parsons, Paul. 21st Century Toys. T3 Magazine, January 2000. pg. 82-92.
- Nussbaum, Bruce. Welcome to 2010. Business Week. March 13, 2000. pg. 68- 76.

Mr. Nussbaum’s article was based on a study named “Project 2000” by the design firm IDEO, based in Palo Alto, California. They are the designers of the Palm V and Visor. Also Paul Parsons is a writer for T3 magazine in London. T3 specializes in trend setting gadgets and electronics.

Trends & forecasts:
The trends and forecast for the future is divided into the three era, 2001-10, 2010-50, 2050-2100. The first era mentioned about the concepts which are already in development in labs and will available for commercial market in next few decades.
The next era, 2010-50, talks about the concepts that could become a part of our lives within the next 50 years. The last era, 2050-2100, is far-reaching look to challenge our own visions of the future.

- Cyberpets, like Sony's AIBO, will perform useful tasks and grow in popularity starting around 2004.
- Analog TV transmissions will be completely replaced by digital broadcasts by 2010. Personal flying cars are currently being developed. They will cost about the same as a Ferrari by around 2006 and could become popular by 2020. Initial models will require only basic training and will provide adequate safety.
- A second-generation swing-wing Concord jet should arrive by 2010. It will attain speeds up to Mach 2.4.

2010-2050

- Quantum encryption will be used to safeguard data. Eavesdroppers will automatically alter a message just by listening to it, revealing their intrusion.
- A "sober-up pill" could be available by 2015. The pill would stop certain chemical reactions of the brain that cause intoxication.
- Communication systems could regularly use virtual reality interfaces by 2030. TVs will also incorporate holography and virtual reality programming.
- Internal combustion engines could be heavily taxed or become outlawed by 2040. Land transport will rely on environmentally friendly alternatives.

2050-2100

- Telepathy helmets will record your feelings and thoughts and broadcast them to a friend wearing a similar setup. Note: Basic telepathy is currently being used to restore muscular communication to paralysis patients.
- Electronic call-girls and call-boys will offer virtual reality sex that realistically stimulates the five senses.
- Quantum computer enabled video games will "achieve new heights of reality". Virtual reality games will tap directly into the brain's sensory system. Suits and helmets won't be necessary.
Note: See the offbeat movie, Existenz, recently released on video.
- Teleporting machines could transport objects and live people atom by atom. Note: Teleportation of individual atoms through short trips was achieved in 1999. Also, you can read Michael Chrichton's book, Timeline.

(R4.4a)

The major driving forces to new design & innovation trends are
- Technology
- Economy
- Competitiveness
- Social trends
- Environmental issues

The user wants new products which gives them more efficient output , more productivity, more usability and great experience. So the demand for the new design is always there. It replaces the outdated products with the advance one. The same thing we can see in(Fig.4.4a), where it shows the trend in music players and Apple's dominance in the same.

This is where the designers and the manufactures come into picture, where one new product create the paradigm which forces the rest of the industry to follow the trend. This competitiveness results into the innovation of the new and great products and technologies.
For Ex.
Apple Inc. had created i-Phone which is a great example of the well integrated hardware and software device, which was nearly 5 years ahead of any of the competitor companies. It has created the trend in the mobile phone industry and all the other companies are now creating the products on the similar lines.
The new products and technology continue to push the industry forward through the competition.

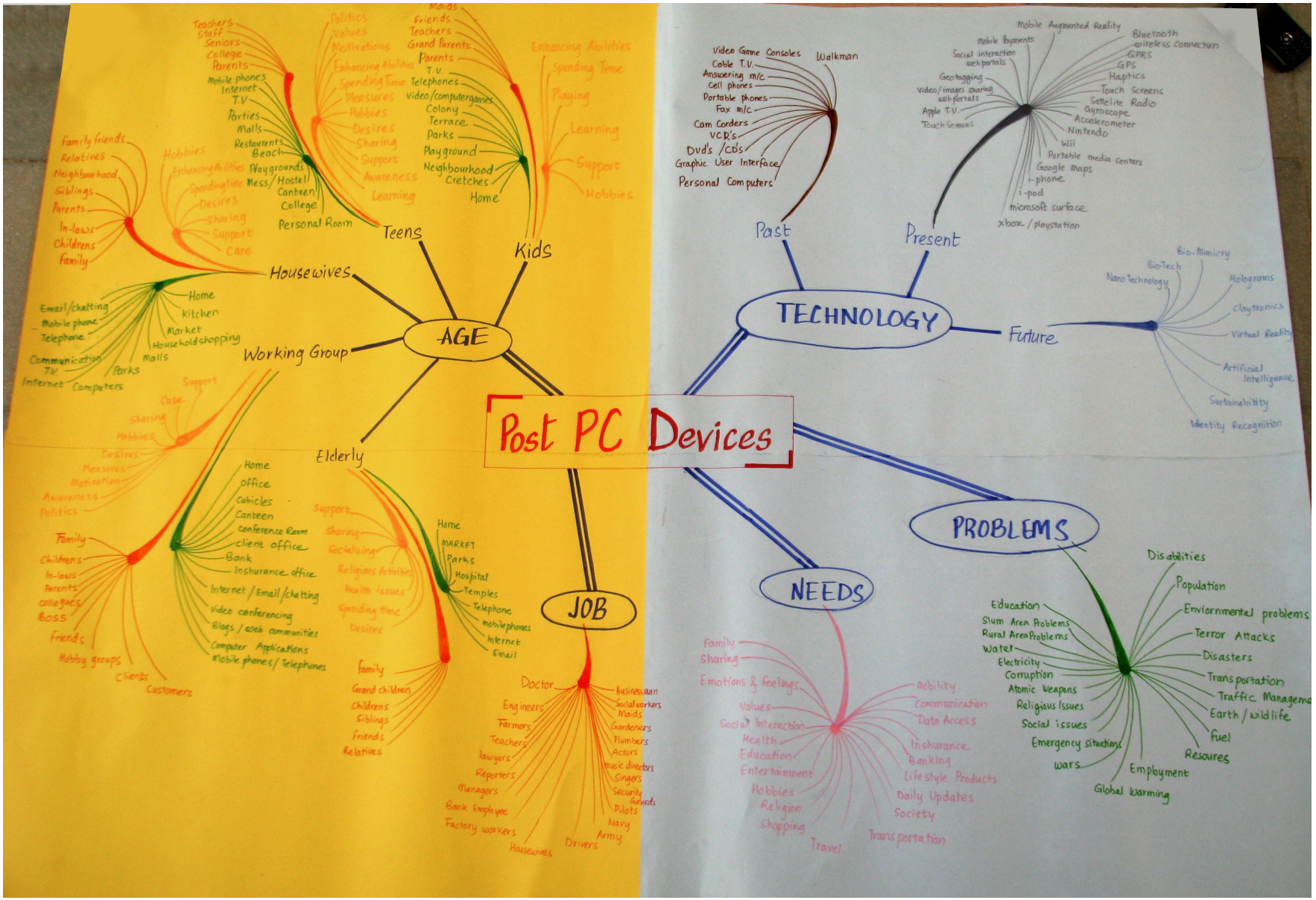
(Fig.4.4) Trend in music players

4.5 Brainstorming

After selecting the topic, I decided to brainstorm on the post PC devices. It was little difficult, because, It was very important to choose the specific user group.
I wanted to work on particular user group where very less attention has been given by the designers and technology developers.
So I started with the brainstorm on the user groups. The brainstorm was age wise classified, because it is very easy to identify the user needs & task which changes as the age progresses [next page(Fig.4.5a)].
Each age group brings different problems and further can be molded into design solutions. Here, profession and job wise classification is also important, because it brings different issues and perspective to the study.

The whole brainstorm revolve around the study of Post PC devices, so it was important to include the technology involvement and common problems faced by the today's generation like environmental issues, population, terror attacks, global warming...Etc.
So the birds view of the total brainstorm includes,

- User groups
- User needs
- Technologies
- Today's problems



(Fig.4.5a) Brainstorm for user groups

And if we try to see it in details then the user groups were classified into,

- Kids
- Teens
- Housewife
- Working people
- Elderly
- Job wise classification

To have in-depth understanding about each user group, it was important to understand the emotional and physical environments and the media used by them.

so each user group was further brainstormed on,

- Emotional environment
- Physical environment
- Media used by user

I also studied the future technologies like,

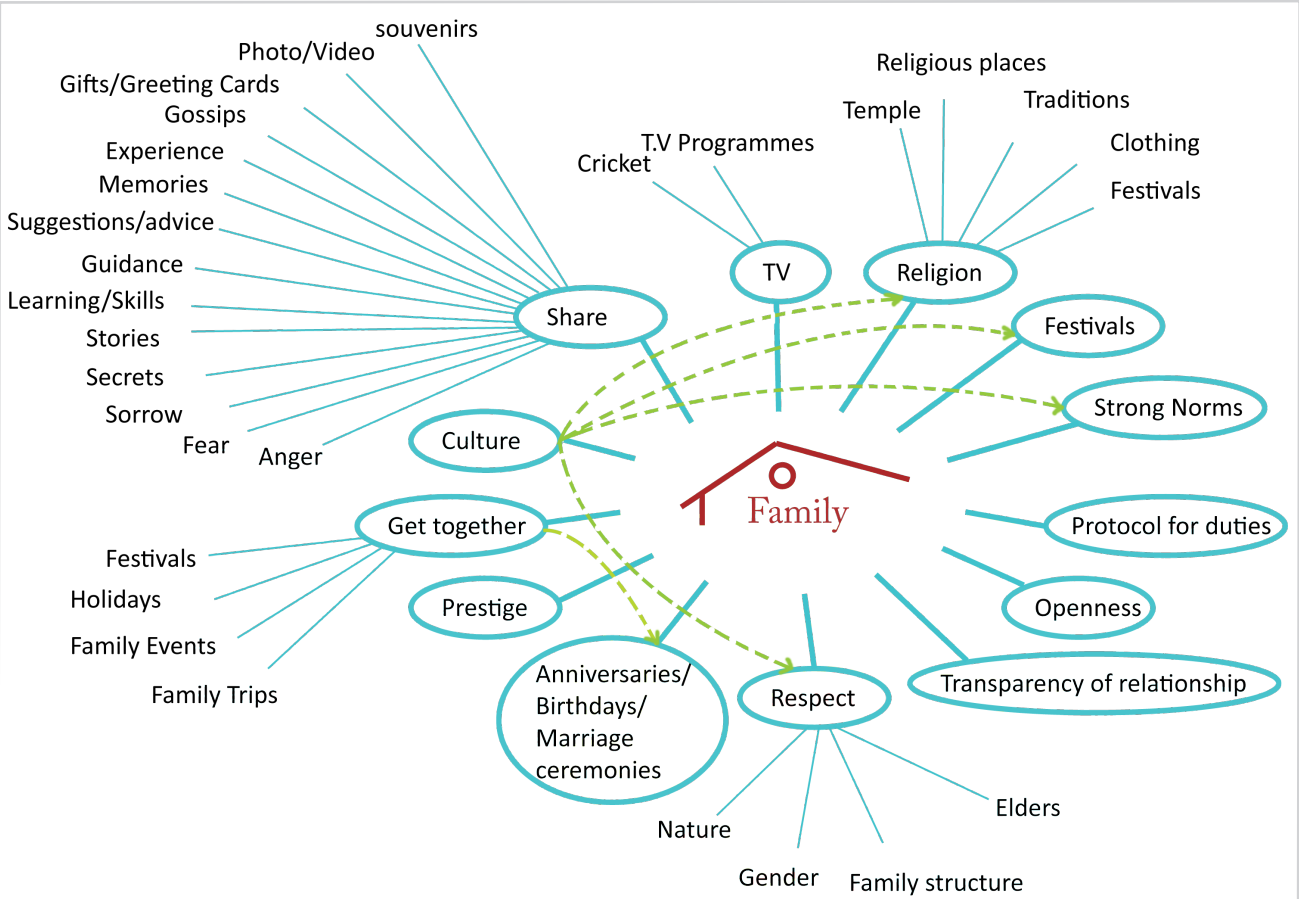
- Nano-Tech
- Bio-Tech and Bio-Mimicry
- Holograms
- Artificial intelligence

This has given me the bird’s eye view about every user group, user needs, user environments, media used by the user, technologies, the environments and the problems.

The next step was to select the user group to focus project into right direction.

5. Understanding User

5.1 Cultural Context



(Fig.5.1a) Brainstorm for cultural aspects of user

I decided to select the women as user group because as women they have to perform wide role in family varies from family, kids, relatives and society.

To understand each aspect of women's life, I decide to start with understanding the cultural context.

If we try to understand the Indian culture, family has been given the utmost importance. It is also called as the fundamental social group (R5.1a). Women are the centre of family. They play important role in decision making, home management and share equal responsibilities on each part. They work as a homemaker to take care of kids and family members on the other part men do the job and earn money. They help imparting the values & traditions to children. And most important thing is that they fulfil the emotional & psychological needs of family. (R5.1b)

So It started with the brainstorm on the cultural context of traditional Indian family.

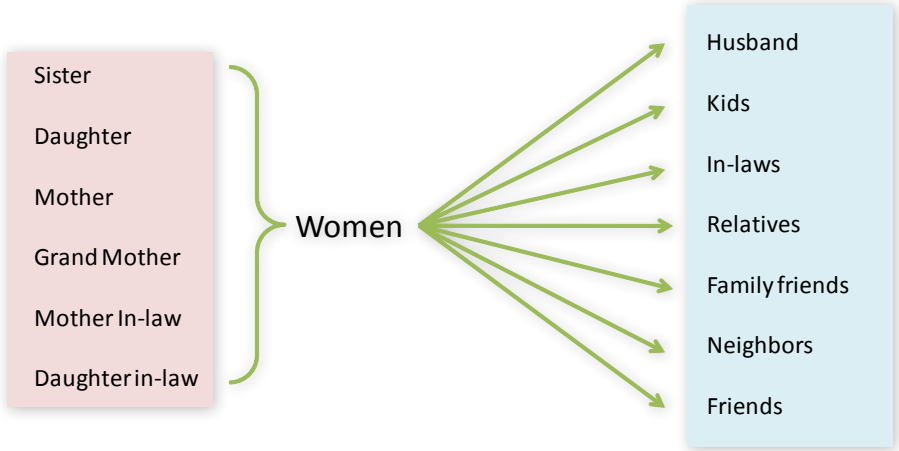
The findings of the brainstorm was then mapped with Family as a centre (Fig.5.1a). The inter connections shows the effect of culture on each part of life. The findings had also helped me to understand the importance of sharing in Indian traditional context. It also answers; what, how and when sharing happens.

6. User Group

The women have to perform multi-dimensional role throughout their life (Fig.6a). They also act as connecting bond between many segments of family and In-laws. At personal level they take care of relationships and at social level to take care of prestige and status of family.

If we see closely, the role of women changes with respect to the type family. In case of joint family, they are more emotionally as well physically supported as the work distribution happens within families. But at the same time, it brings extra responsibilities at many level and in case of nuclear family the scenario is completely different. Therefore, the major classification is between working women and housewives, in each case, they go through different responsibilities,

- Housewives
- Working women



(Fig.6a) Role of women in family

6.1. Housewives

6.1.1. Findings

Responsibilities

Take care of kids	- help in studies, teach them social & moral values
Cooking food for family	
Take care of family member during unhealthy health conditions	
Shopping	- Daily need things, other shopping
Cleaning & decorating the house	
Cleaning utensils & clothing	
Reminding or paying bills	- electricity, telephone bills...etc.
Take care of pets	

(Fig.6.1a) Responsibilities taken by the user

So I started with understanding the housewife as user group.
It is a user group, where other than consumer products very less attention has been given by the designers.
Housewife or Homemaker is a person whose primary role is to take care of family and household activities.
Traditionally, the responsibility of management is predominantly fulfilled by the women. They are natural homemaker.
If we see it from Indian tradition, a woman is called as Griha Swamini and man is called as Griha Swami. It shows that they both have the equal status in family.
In the old days, women were restricted to work within the house but with social development, the scenario is changing.
Study conducted by the leading news paper in major 8 Indian cities with more than 1000 respondents, about half were 20-30yrs. and the rest 31-40yrs. old. While answering to the question, whether the women's career is more important than the family? Over one thirds said that the family is more important than the career and less than the one forth said that career is the priority (R6.1.1a). It clearly shows that the current cultural flow in Indian society But the scene is changing slowly.
Indian women prefers or chooses to become housewives, I think it is because, so they can support the kid's physical, intellectual and emotional development in better way. If they are working, at least they prefer to leave their job, in early years of kid or until they joins the kindergarten. Under many situations they have to sacrifice on their personal ambitions and goals. They have to put their career aside to play the role of full time parenting.
If we try to understand the responsibilities taken by the housewives (Fig.6.1a). The primary role is to take care of the kids, cooking food for

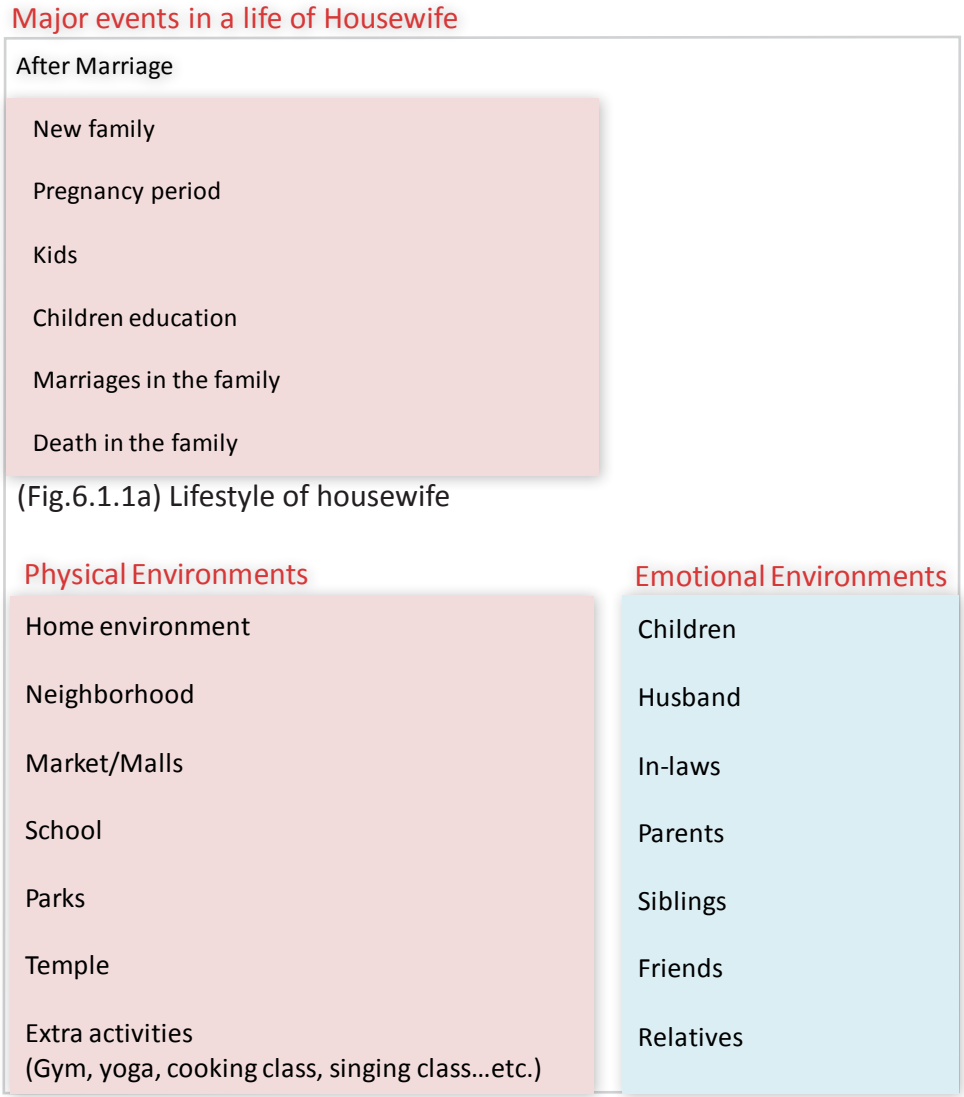
family, cleaning and decorating the house also shopping daily need items and money management

To have in-depth understanding about the user group, I conducted user studies. The Interviews were related to the routine activities. The aim was to understand the user's likes and dislikes, emotional and physical environment. Collectively, understand the lifestyle of housewives.

The results were noted and documented, so those can be further used while development of design. The interviews were mainly related to the daily routine work. Questions asked were mainly open ended which had helped me to get the user's opinion in detail (Fig.6.1.1a).

Other than the home and neighborhood, market and shopping malls fall under the physical environment. Also some users take kids to school, parks and temple. They are also participate with hobby clubs where they can learn new things and enhance their talents of singing and dancing.

They are mainly attached to their family and In-laws, They fall under emotional environment also the siblings, parent family and relatives come under the same (Fig.6.1.1b).



(Fig.6.1.1a) Lifestyle of housewife

(Fig.6.1.1b) Environments

Likes		Dislikes	
Surprises	- Gifts (jewelry, cloths) - Dinner, movie	Health problems	- Health problems to any family members, - Drinking, smoking
Kids	- Good in study, - kids performing in school events	Safety issues	- Night driving
Shopping		Kids	- Bad in studies - Called in school due to children's bad performance
Attending Marriages	- meeting relatives	Insults	
Festivals	- Diwali		
Summer holidays	- Family trips		

(Fig.6.1.1c) Likes and dislikes of user

Needs	Ways of information access	Products
Good Food	Gossips	T.V
Education	neighborhood	Telephone
Responsibility	Kitty parties	Computer
Care	Family functions & meetings	Mobile phone
Sharing	Marriages	Music players, i-Pod
Shopping	Parties	Calculator
Health issues	Trips	Cars, Mopeds
Comfort	Shopping	Microwave oven
Savings	Temple	Washing machine
Insurance		Refrigerator
Social interaction	T.V News	Food processors
Safety & Security	Telephone	Other kitchen gadgets
Show off	Newspaper	Kitchen utensils & containers
Prestige	Internet	Life style products
Jealousy	Mobile phone	
Maintenance	Calendar	
Cleanliness	Reading books, magazines	
Home decoration		
Clothing & jewelry		

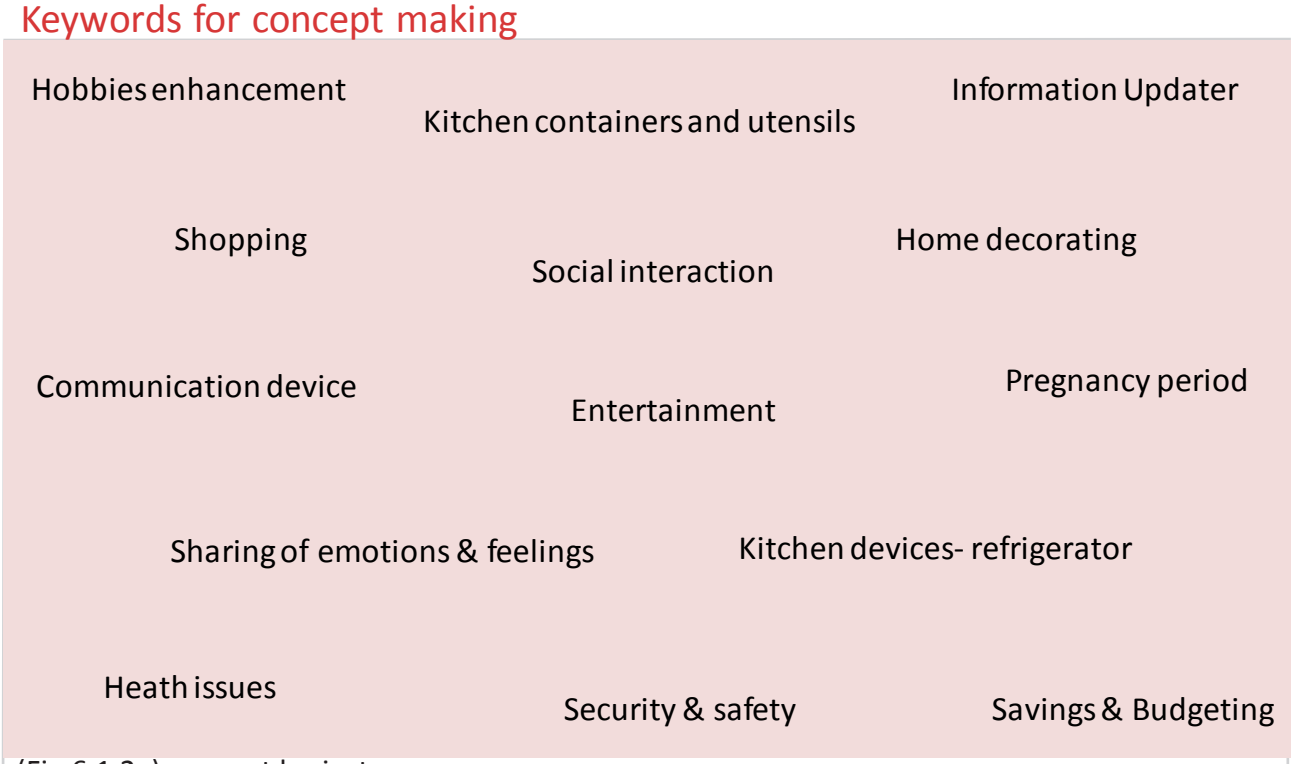
(Fig.6.1.1c) User needs, ways of info. access, products

I also tried to understand, what user likes and dislike, the insights I tried to put in the table see (Fig.6.1.1c).
I also tried to understand the needs of the user, the way they get access to the information and the products used by them in routine life. All the findings are noted and mapped (Fig.6.1.1c).

6.1.2. Brainstorming

After that I did the brainstorm for concepts.
All the keywords were extracted from above documented maps collected in the form of map (Fig.6.1.2a).
The needs were identified and the initial concepts were developed based on the daily life interaction of user with the physical and emotional environment and they are,

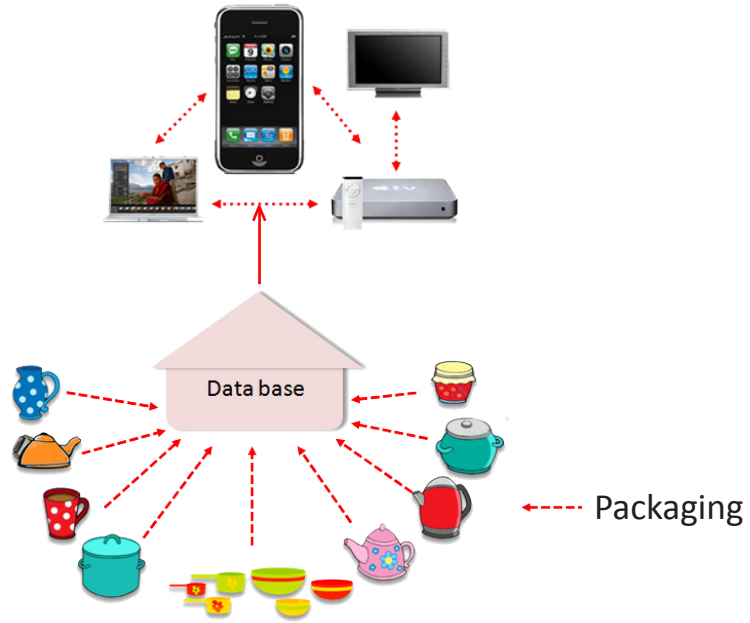
- Interactive kitchen utensils and pots
- Virtual shopping mall
- Home decoration
- Sharing of emotions



(Fig.6.1.2a) concept brainstorm

6.1.3. Concepts

Painted/ Printed Circuits in the form of graphics



(Fig.6.1.3a) concept framework

Concept 1:

Utensils and pots are the most important part of the kitchen and user's physical environment. They help in storing the daily need things and food.

The concept was of the interactive utensils & pots on which, the electronic circuits will be painted/printed. The digital sensor circuits will act like

- Weight sensor
- Touch sensor
- Temperature sensor

This sensors will be connected the network, updating information about the quantity of storage. That information can be further sent to the home database. And that database can be assessed by many other computing devices like shown in (Fig.6.1.3a).

The information of the stored food item can be taken from the food packaging by touching it to the pots and utensils (may be RFID tech.)

The tagged information like

- Item name
- Quantity
- Manufacturing & expiry date

can be transferred to the kitchen utensils/pots and further send to the database. From this database user will know about the

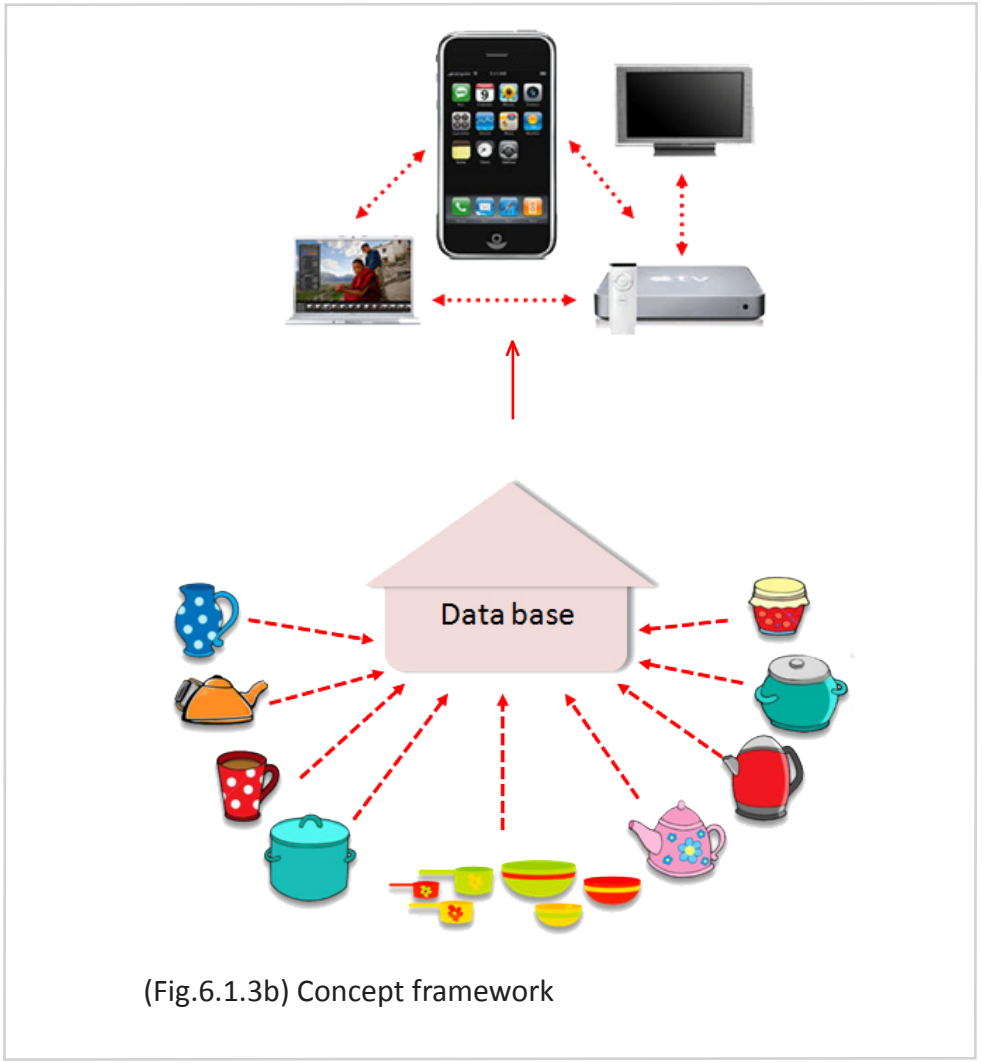
- Inventory in stock
- Level of food inside the container
- Temperature of the content
- Expiry date

In case of key children, working parents will know that kid had taken his food or not and also how much food he has consumed.

6.1.3. Concepts

Concept 2:

The above mentioned concept was further extended (Fig.6.1.3b).
The concept was to use the inventory information from database, to prepare the auto shopping list. This shopping list can be available on any personal devices, so user can use this information while on the move.
All the pots and utensils are connected to database, continuously updating the amount of food item inside it. The rate of consumption can be use to predict the unavailability of food item. So that user can take decision to go for shopping.
The concept was of a device on which user can log into **virtual shopping market** where user to see and turn the object in holographic virtual space. It will give them real life experience. They can actually move inside the shopping mall, counter by counter. Also user can drag and drop the product items into the virtual cart. The money transaction will happen online and the goods can be home delivered.
This concept is very helpful for pregnant women and women with small kids, in such cases it is very difficult for them to go for shopping.
The interface and technology used can be used in such a way that will give real life experience to the user.
It is also useful for the working women, where they can get the information on the device while on the way back to home from office. and User can shop the unavailable food items while travelling and so that things will be available, when user reach home.



(Fig.6.1.3b) Concept framework

(Fig.6.1.3c) Concept for sharing the emotions

Concept 3:

This concept was for the nuclear family housewife.
The concept was of a device will help user to share her emotions and feelings.
It was for a user who stay at home, busy with household activities. They go through the ups-downs of emotions throughout the day. They cannot share, their feelings and emotions with dear ones directly.
So there can be a device at home that will continuously monitor or sense the user and his emotional ups and downs. And after that the device will create the whole home ambience to the user, which will be a stress relief in one way and also it is representing user's mental state.
Also during dinner time, when all the family members in India sits together for dinner, device will create the ambience which will convey user's day scenario in interesting way, which in one way will help user to convey the unsaid things (Fig.6.1.3c).

6.1.3. Concepts

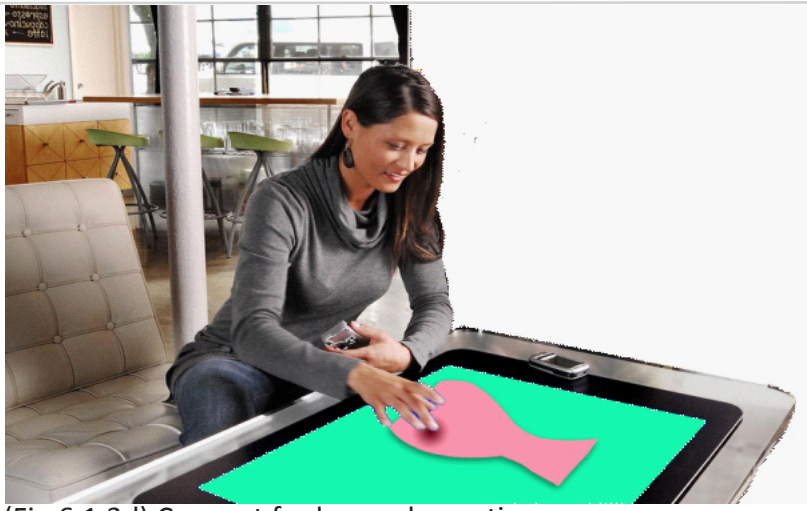
Concept 4:

Women are natural homemaker. They likes to keep their house clean and beautiful. They learn the trends and tips from watching TV and reading magazines.

The concept was of a device which will help user to decorate and clean the house (Fig.6.1.3d).

The concept was of a surface like device, which will be connected to the digital family of the home interior decoration gadgets. Device will be used to control them to create the environment which will suit user mood.

Using device user can change the color of wall (using Nano-tech) Or user can customized it according to user moods. User can also change home interior digital wall paintings. Also using claytronics, User can change the shape of flower pots/vase as it is shown in the figure. The device can also help user to command (programme) robots to clean the house. User can also get home decoration tips from the people who are using similar kind of device and wishes to share their interest. The same device can lead to the social communication platform based on interest.



(Fig.6.1.3d) Concept for home decoration

6.2. Working Women

6.2.1. Findings

The lifestyle between housewife and working woman is totally different. The life of working women is far more challenging than the housewives. Therefore, I also decided to work on working women as a user group to see for the opportunities for design (Fig.6.2.1a).

If we see the current scenario, statistics shows that (R6.2.1a),
- India has world's largest number of professionally qualified women.
- India has largest population of working women in the world.
- India has more number of doctors, surgeons, scientists, professors than the United States.

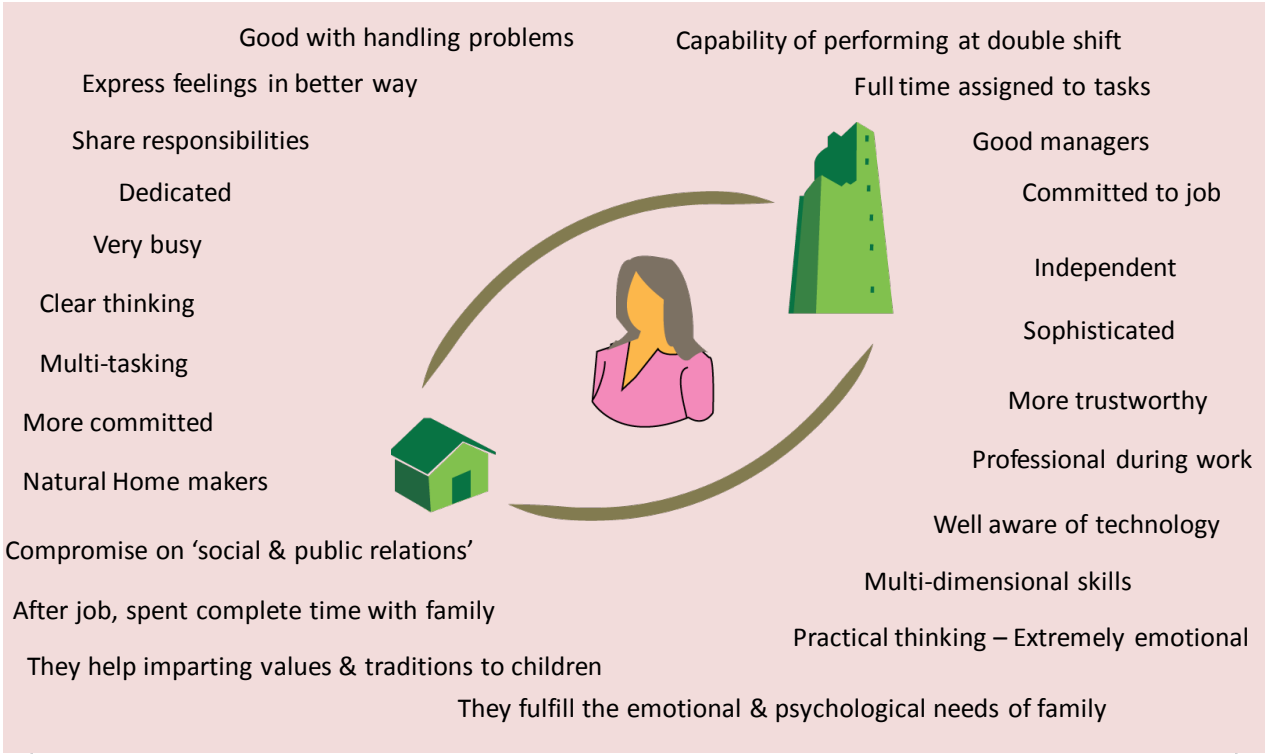
With the social reformation happening in the India, Indian women has started changing their lifestyle and achieving and excelling in every field like,
- Politics
- Sports
- Art & entertainment
- Literature
- Computer & IT
- Science
- Business & Corporate world.

We can see the very good examples in the above mentioned fields which were dominated by the Indian women successfully
For Ex. Indira Gandhi
Indian women are changing their lifestyle and started believing in personal independence which helped them to stand on their own.

Working women are more independent than the housewives. They have clear thinking and they are quite aware about the outside world.
They are committed to their job. They have to perform double shifts of work without complaining. Their schedule is full with tasks and busy throughout the day. They are very good at multi-tasking and handling the problems. That's why they are very good managers.

After office they spend their complete time with the family. It is not possible for them to take out some time for themselves. So they have to sacrifice on personal freedom and needs. Because of they get disconnected from the social and public relationships.
After that I tried to understand the working women lifestyle. For that, purpose I did few user interviews of working women.

Lifestyle of working women



(Fig.6.2.1a) Lifestyle of working women

6.2.1. Findings

The age group was selected between 25-30 years working women. It is because to understand the today's women perspective of looking at the things and understanding their way of living life. I also studied the articles from the leading newspapers which were published on the occasion of women's day 08th March 2009 (Fig.6.2.1b). The articles were based on the survey which was done throughout the India, interviewed more than 1000 women who are at different levels of society. (R6.2.1b)

This has helped me a lot, in understanding the user from very different perspective. All the finding are noted and documented, so that the needs can be identified based on that further design concepts can be generated.

The understanding from all the interviews and the article is that,

working women have very busy and hectic lifestyle. As working women they work at double shifts at home as well as at workplace. But the good thing I found is that the responsibilities are gets shared between husband and wife. Husband helps their wife, at many levels. They help in cooking, cleaning house. But still they need external assistant or maid to take care of the rest of the things.

(Fig.6.2.1b) Newspaper study

Findings

- Committed to job
- Work in double shifts
- Very busy and hectic life
- Unable to attain the family functions
- Feeling of to be in touch with family, friends and relatives
-Feel disconnected
- Sacrifices
- Feeling of guilt
- Compensate out of guilt
- Keeping balance between Home and work
- Most of the responsibilities are shared by both
- After job, they spend time together
- Evening & Weekends are most of time are spent to relax and shopping
- Need part time assistant (helper/maid)
- During pregnancy and after that, full time assistant (helper/maid)

(Fig.6.2.1c) Findings of the study

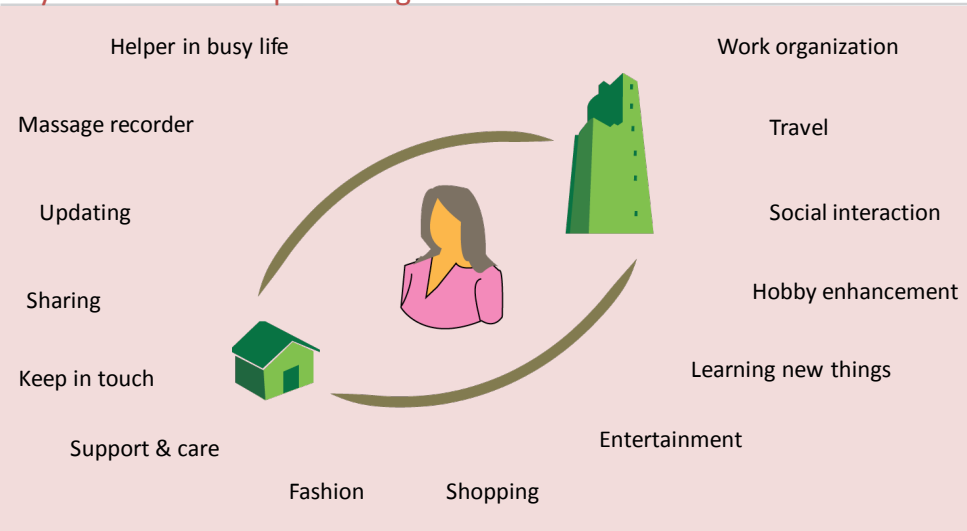
During the pregnancy period, they need full time assistant or maid, to take care of the daily household activity.
The couple is busy throughout the day so evening and weekend's time is spent for shopping and relaxing or visiting friends and relatives.
The real problem faced by working women is that to keep balance between the home and work, which sometimes throw them in the feeling of guilt. It happens when working mother cannot able to give time for their kids due to busy office schedule. So out of the feeling of guilt, they sometimes try to compensate, by taking kids to the small vacation or bring gifts, toys. It creates psychological bundlers for them due to the feeling that they are unable to fulfil the role of homemaker and taking care of the kids. This feeling is more prominent in females as compare to males.

It is natural tendency of females to be in touch with family and relatives. In case of working women, it is not that they do not want to stay in contact to their loved ones but the life style does not allow them to do that. Mainly it is because that after marriage they get connected to the new family. So they have to take extra responsibilities of taking care of the both sides of relationships. So the time gets divided into the both sides. and according to family traditions and priority it is decided to, either to spend holiday with In-laws or with parents or with family members or simply take rest (Fig.6.2.1c).

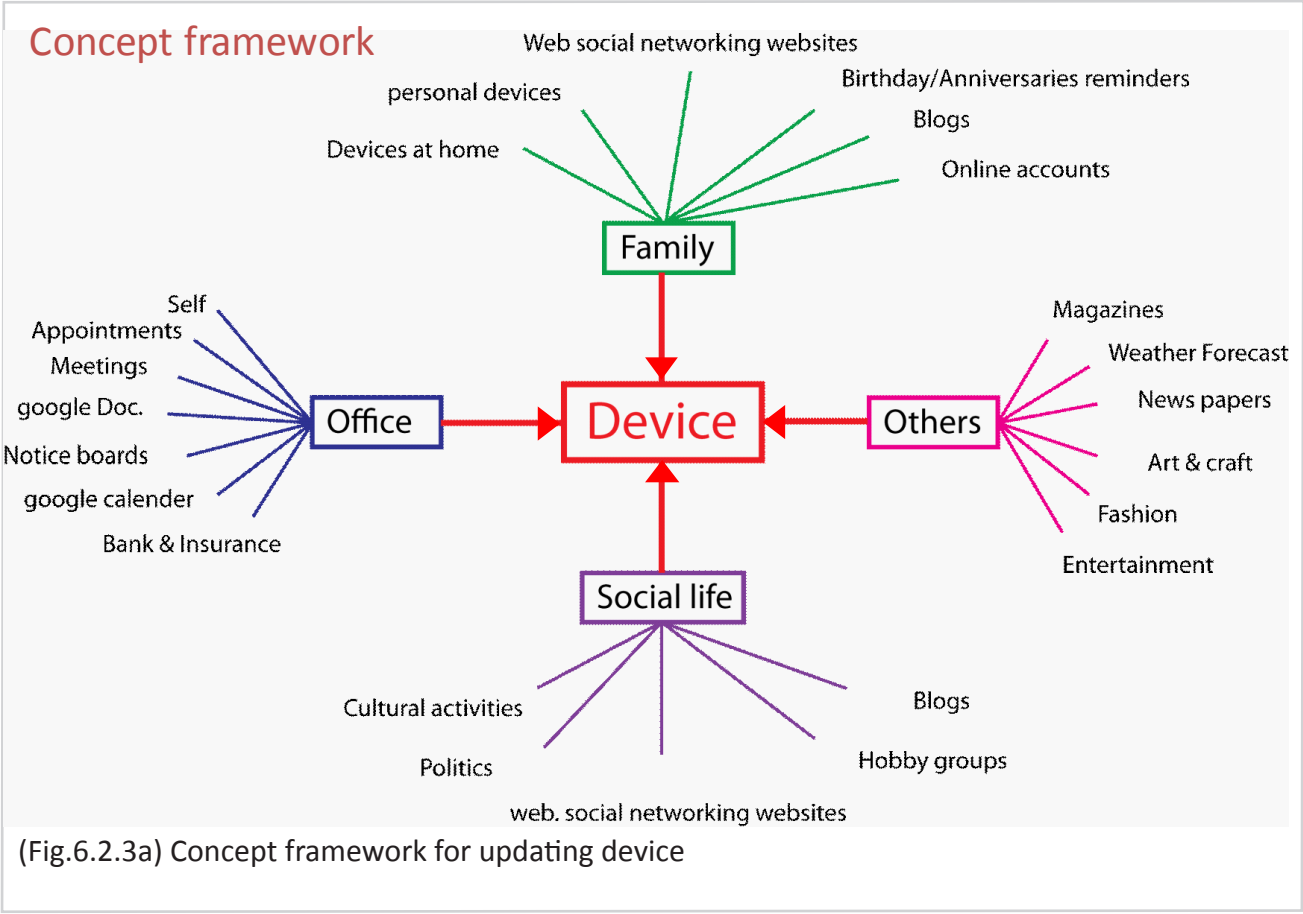
6.2.2. Concept Brainstorming

After the studying and analyzing of interviews, all the findings are noted and documented. All the keywords extracted from above documented maps and findings (Fig.6.2.2a).
The needs are identified and the initial concepts were developed based on it.

Keywords for concept making



(Fig.6.2.2a) Concept brainstorm



(Fig.6.2.3a) Concept framework for updating device

Concept 5:

This first concept was generated from the keywords,

- Keep in touch
- Get reminders & updates

The concept was of a device which will generate the need of communication by reminding about the dear ones and keep updated about them (Fig.6.2.3a).

It may not be a communicating device but it should simply buzz about the happenings in family and friends.

The busy life of user does not allow them to attain the family functions, gossips and get together, which is the rich source of information for women. So the device can help women to be updated.

As the concept frameworks shows, the device will pull data from different sources and present them in very subtle way.

Design for wearability

The device which will be synchronized with the personal web accounts and social networking web sites, therefore it has to be very personal and should take care of the privacy and security.
Therefore the device should be,

- Very personal-belongs to user
- Mobile
- Close to body
- Give subtle feedbacks
- Consider cultural aspects & user lifestyle
- Should take care of privacy and security

The above mentioned points had suggested that, the device should be very close to body so that the feedbacks of the incoming information can be given. Therefore it diverted me towards the wearable devices. Therefore I started studying the wearable devices. Wearable's suggests that the use of human body for supporting the product.
I had come across the report on wearability which suggests the guidelines for wearable products (Fig.6.2.3b)(R6.2.3a). It takes care about the dynamic and flexible nature and joints of body for prolonged use. The body areas suggested by the report which can be used for the wearable devices are,

- collar area
- rear of the upper arm
- forearm
- rear, side, and front rib cage
- waist and hips
- thigh
- shin
- Top of the foot

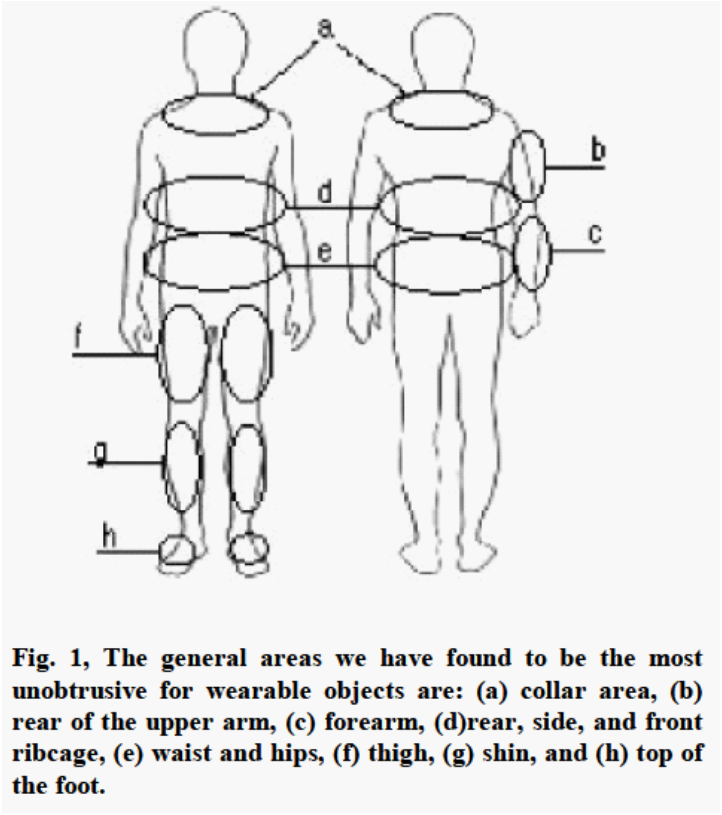
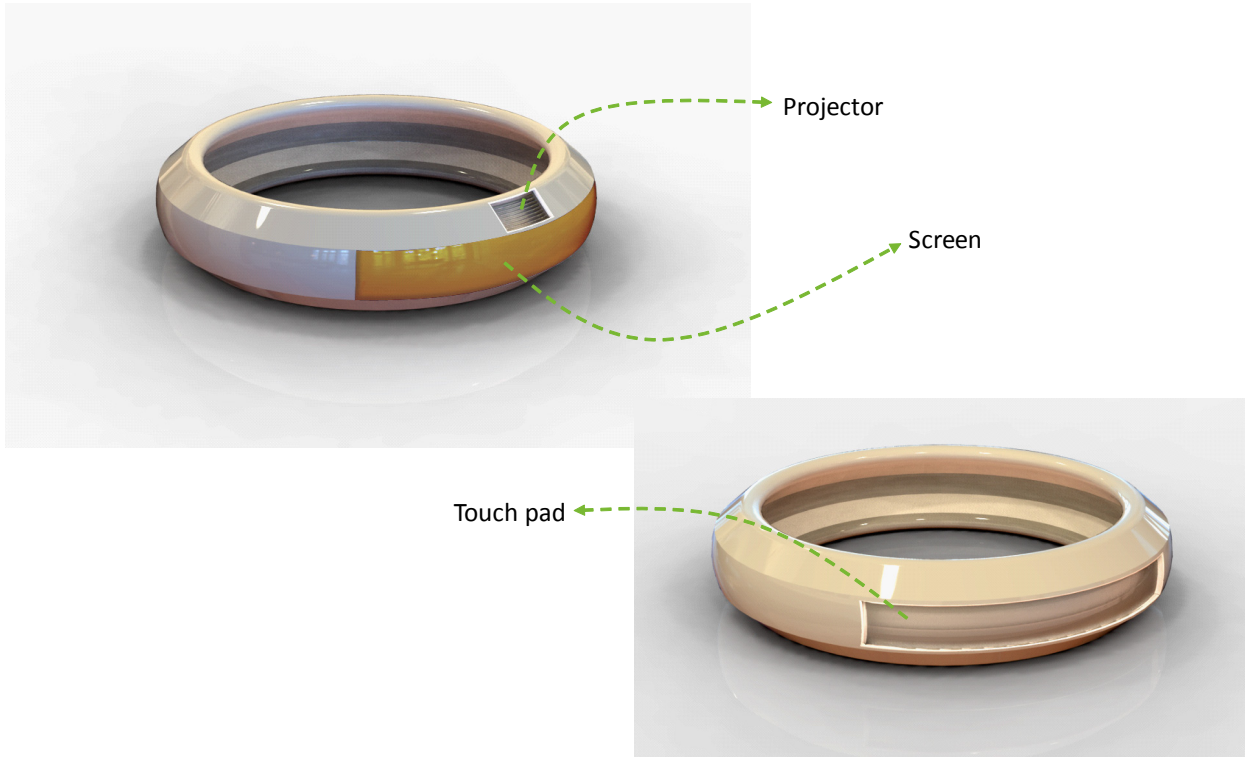


Fig. 1, The general areas we have found to be the most unobtrusive for wearable objects are: (a) collar area, (b) rear of the upper arm, (c) forearm, (d)rear, side, and front ribcage, (e) waist and hips, (f) thigh, (g) shin, and (h) top of the foot.

(Fig.6.2.3b) Design for Wearability, (R6.2.3a)
Institute for Complex Engineered Systems, Carnegie Mellon University



(Fig.6.2.3c) Updating device

Then I also tried to see from Indian perspective, that jewelry has been used from thousands of years. It also shows the status and life style of the person. Also women are emotionally attached to the jewelry as it has cultural and traditional valued to attach to it.
Here in India, women use bangles as a part of tradition as well as a part of fashion statement. Therefore, forearm and portion before the wrist can be used to wear for the device. The bangle can be helpful because it is traditionally accepted by the women and it will be very subtle and user will feel comfortable while using it.
Therefore I had decided to work little more on this idea to use bangle as an updating device (Fig.6.2.3c).

The bangle will be a ubiquitous computing device which will pull the information from

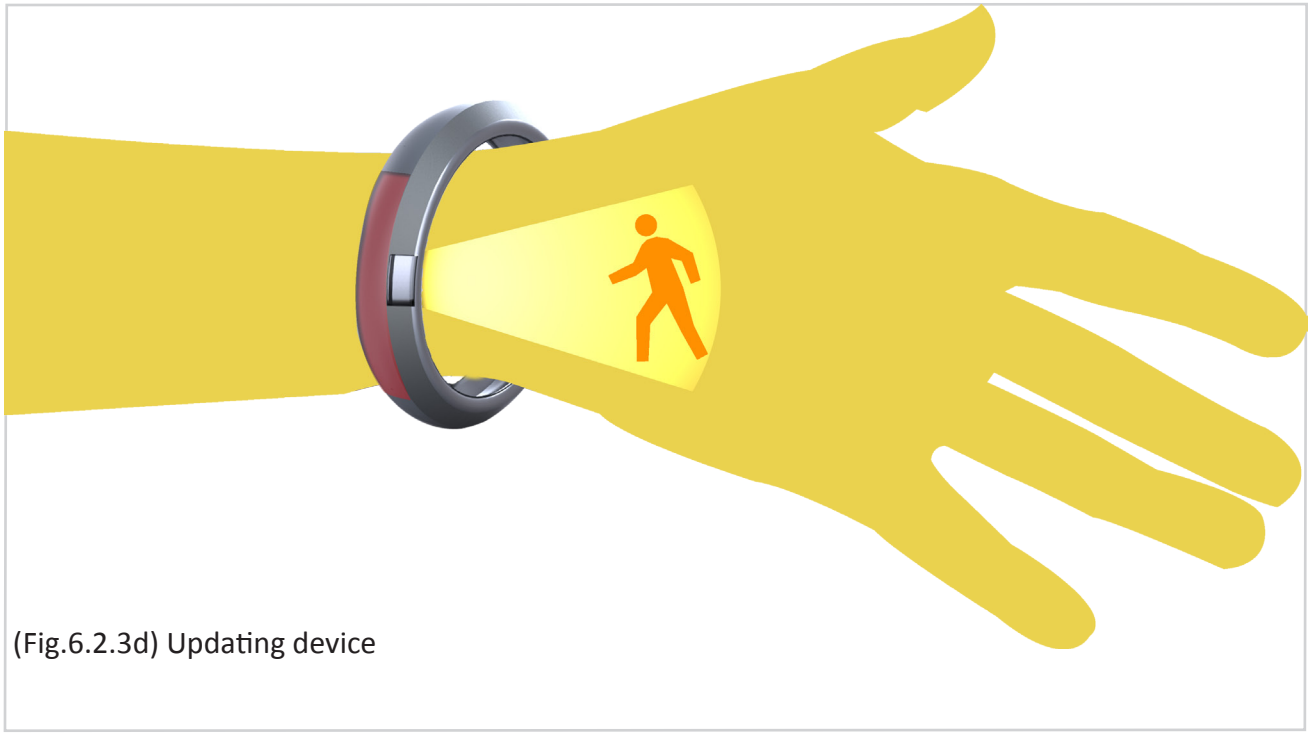
- Family
- Office
- Friends
- Other sources

The device is having,

- Screen
- Touch pad for browsing
- Projector

The screen is for very short messages to read. It will show short notifications.
For ex. Subject line of E-mail, Sender of Email.
So that user can take decision whether to check email or not.
In this way the information can be visible in very subtle way. If there is no notification then screen will be off, which in other way will save battery also device will not look like a digital device.

If user wants to see the particular data in enlarged mode like image then user can use the projector.
User can project that data on the wall or on the back of the bus seat or on the hand bag.
Projecting images or data on the wall is not a good idea because many of the users may not want to do it (Fig.6.2.3d).
If user wants to see the data in enlarged mode then user can also project data on opposite side of palm of hand.
This way user can assess the information in more enlarged as well as subtle way.



(Fig.6.2.3d) Updating device

The touch pad can be use

- For taking user inputs
- Browse the events on the screen

On touch pad user will make gestures, clicks that will be taken as inputs for the opening or zoom and zoom-out the data.
The device will give feedback in various forms, the most general way is to use vibration alert to get incoming message.
But to make information more subtle and totally invisible,

- Rise the temperature of device
- Drop the temperature of device

can be used to give the feedback about the incoming notification.
For ex.
If the temperature of device falls down – update from family member.
If the temperature of device goes up- update from office.
The device will calculate the body temperature and will raise the temperature of device by few degrees up or down, so that it will not harm user anyways.
User can decide in which way she wants to get alert. It will be totally customizable, as the notion of heat and cold is totally depends on the user's perception.
For customizing the device, the device can be synchronized with mobile phone or Personal computer. The things like adding

- new web. accounts,
- new hobby groups,
- office & home timing,
- What info. to show & which to not

Ex. During work time- show only updates related to family & close friends

6.2.3. Concepts

Concept 6:

The next concept was derived from the keyword,

- Helper in busy life
- Searching

The concept was of a device which can help working women in busy and hurry situations to find and locate the object, people & places(Fig.6.2.3e).

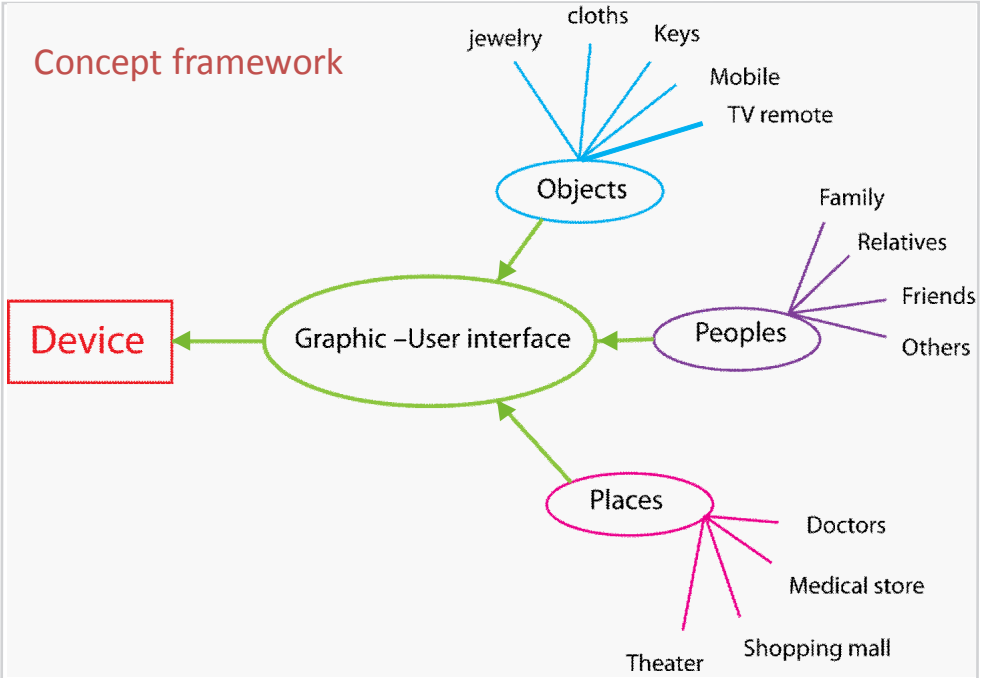
User Group:

Many of the time in busy and hectic schedule and in hurry, sometimes we forget the location of the objects, cloths or jewelry, when we need it the most. The same situation is with the people and the locations like the medical store or doctor.

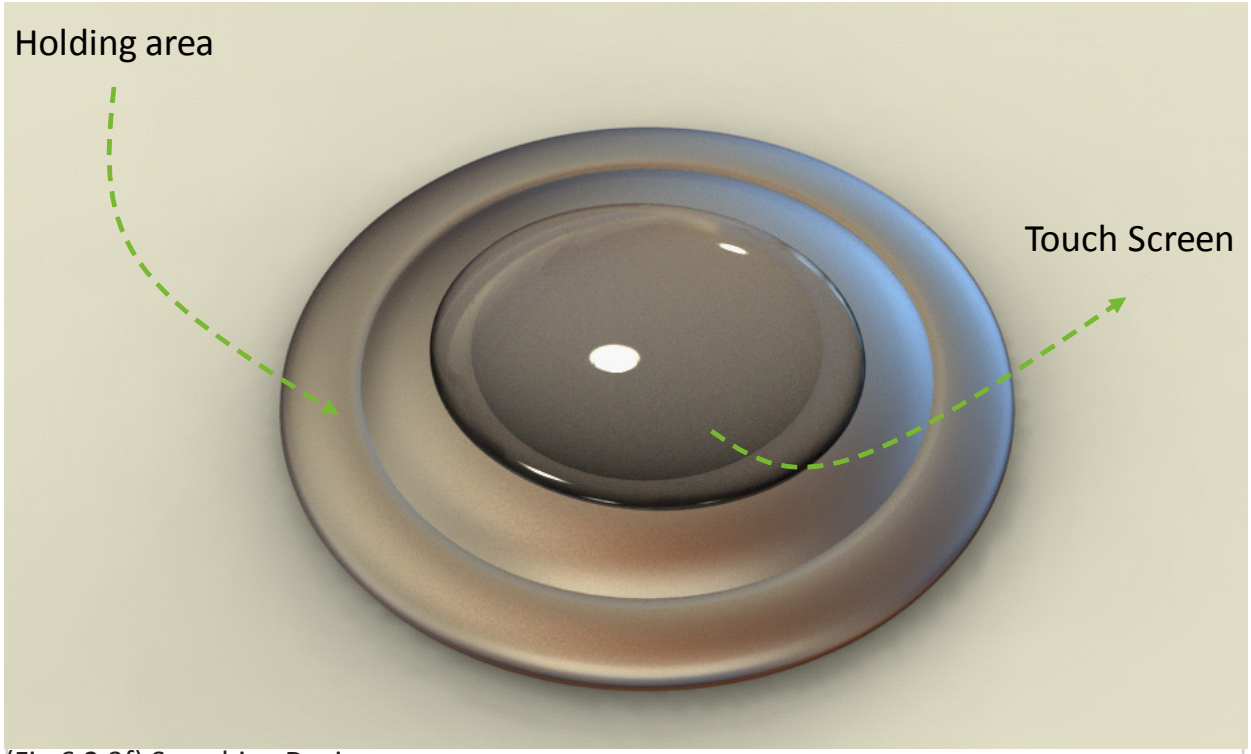
Objective:

The device will help user in searching and locating the objects within the house as well as the physically apart located people & addresses. The searching will happen by touching on the icons or images of the objects and people (Using Graphic-user interface).
The entire interface is based on the image based searching.
All the objects in the house are tagged with the information details.
For Ex.
Suppose a new shirt is brought in the house, the shirt will be already tagged with the image & information details. The new shirt will be detected by the device and only after user's confirmation, the shirt will be added to the device library. The new shirt can be then browsed by image search under the category of clothing.

Concept Framework: See(Fig.6.2.3e)



(Fig.6.2.3e) Concept framework for searching device



(Fig.6.2.3f) Searching Device

Interface Details:

The interface and searching is based on the tagged object information and the objects added in the library.
The most external layer of the device is the holding area. And the next two internal layers are nothing but the touch screen, which will deliver the two levels of information during searching.
The interface is integrated with the hardware, to provide intuitive understanding.

The GPS capable device will understand that where it is located. It can understand the difference between the home and office (Fig.6.2.3f), so that it can be used according to the user's needs and particular tasks to do. Basically customization related to the location sensing capabilities.
Device will have the information about the house architecture and furniture within the house, which can be installed during the setup and installation of device in the new place. Once the information is loaded, then device can locate itself and it can show visually, that where the object is placed right now, Is it stationary or moving?
For Ex.
below the sofa or in the moving car

6.2.3. Concepts

Concept 7:

The concept was that, when a female in a family is pregnant, then the family members who are away from her, can express their feeling of caring, blessing also their excitation, supportiveness for her through the device.

User Group:

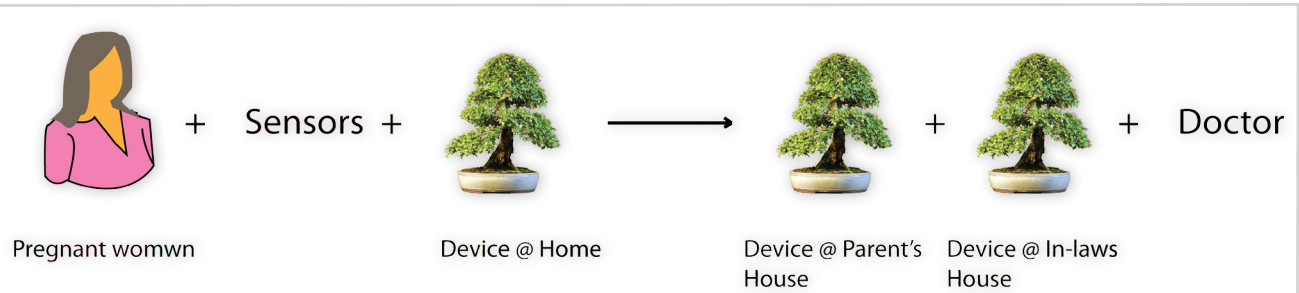
The is applicable to both working as well as housewives.
In many cases, In-laws and parents of the pregnant women live away from her (and in some case, her husband also).

Objective:

The concept is that, There can be sensors on pregnant women's body and which it will take information about unborn baby's health, growth and movement (inside the womb), the heartbeats…
And it will be sent to the people through the device in interesting way; so that, the In-laws or parents or husband, even if they are away, they can see what is happening to baby and mother.

Here, I am using TREE as a metaphor For showing the unborn baby's growth.

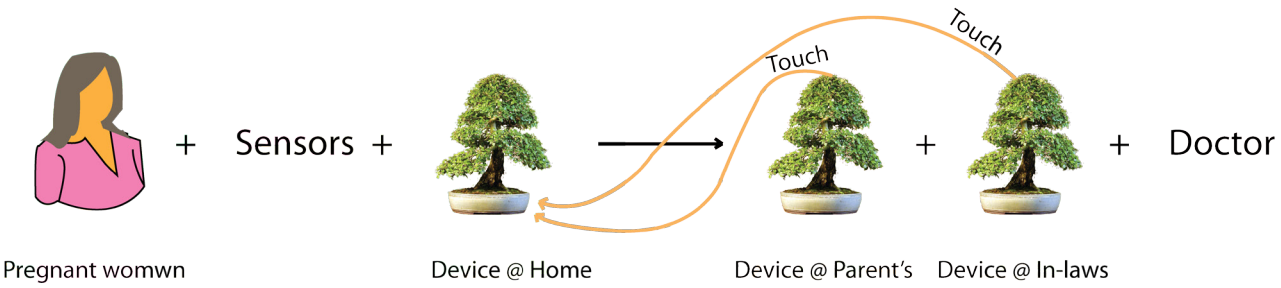
Concept Framework: (Fig.6.2.3g).



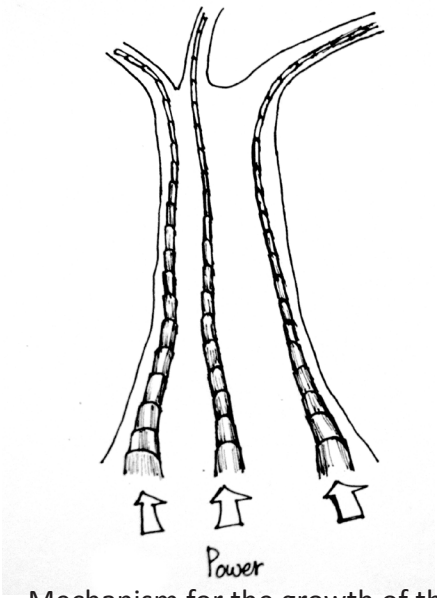
(Fig.6.2.3g) Concept framework

Possible scenarios:

		Away
Parents & In-laws	---	Husband and wife
Husband	---	wife and in-laws
Husband & In-laws	---	wife and parents
Husband	---	wife



(Fig.6.2.3h) Concept framework



Mechanism for the growth of the tree

The tree is a tangible digital tree planted in a small pot.
The tree will actually grow as the baby is growing inside the womb. The growth of tree will be shown by new leaves, new branches, flowers... Etc.
- If we go near to the tree, user can hear the heartbeats of the baby.
- The movements of the baby will be shown by the movement of the branches
- The data related to the health will be send to the Doctor to monitor it.
The similar kind of tree will be with the in-laws, parents or husband, the people who are living away (geographically) can see, touch and interact with the tree. So even if they are away, they can express their feeling of care and support.
The touch to the tree made by the parents or In-laws, can be send back to the tree in the house of pregnant women, where on the tree-pot, the touch will be shown by colors, patterns or may by the glowing light. So that pregnant woman will understand that the people who are away are sending their blessing and support to her and to the baby (Fig.6.2.3h).

6.2.3. Concepts

Concept 8:

The next concept developed using following keywords,

- User act as connecting bond between family members
  - Keep family members updated about each other
  - Stay connected
- Common message storage
- Share multi-media

Need:

The work of co-ordination and updating among the family members is done by the Mother. Incase of working women, the task becomes sometimes difficult due to busy and hectic schedule.

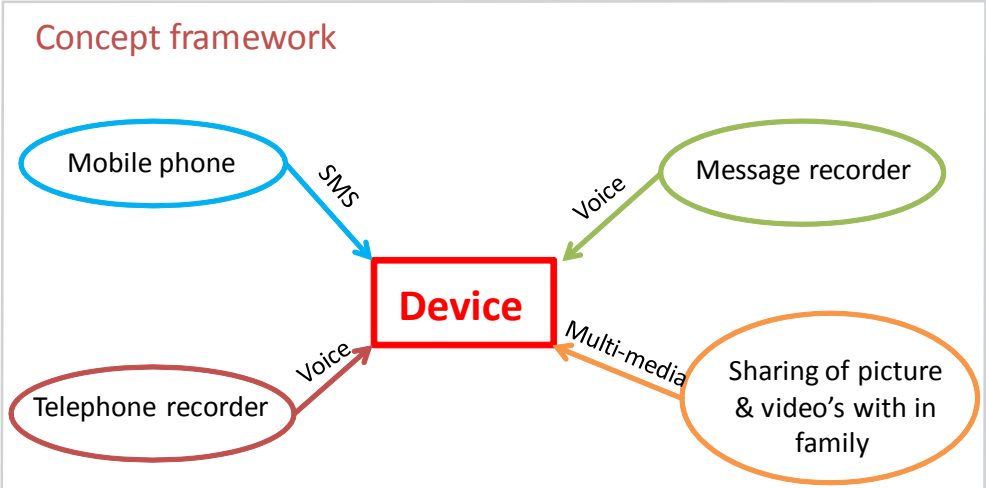
Objective:

The concept was that there can be a **common message storage device** which can receive, store, share and play back the massages from all the family members, which are collected or pulled from the different sources, so that everyone can access the information, see(Fig.6.2.3i). So basically it was a message storing & sharing device **for family members.**

User Group:

The device is really helpful for the families where all the family members have different daily schedule. The coordinating and updating among the family members becomes a difficult task for User, who is busy and works in tight schedule.

Concept Framework: (Fig.6.2.3i)



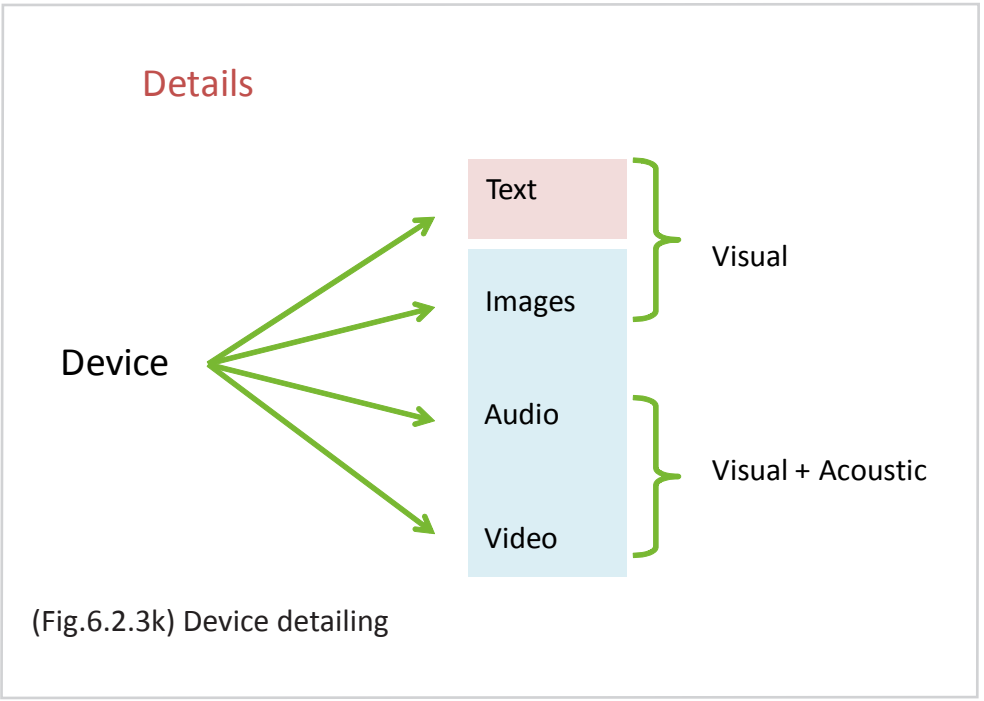
(Fig.6.2.3i) Concept Framework for recording device

(Fig.6.2.3j) Recording device

The concept framework shows that the device is collecting/pulling the information from the various sources like mobile phones, telephone as well as direct speaking messages. It can also help sharing the multi-media file.

The device is a storage device, therefore the form of the device is inspired from the pot.
If user wants to leave the voice message for family member, then he can simply hold device in the hand and speak inside the device and message will get store, Device will detect who is speaking and the message will get stored accordingly (Fig.6.2.3j).
The interface is so intuitive that, it will show the message is going inside it and saves at bottom. So that when the other family member comes, he can see visually that there are messages which are not yet receipted.
User can touch on the message icon to play or read that message.
If the message is directed towards some particular family member then that message will be get delivered to that person only when he or she gets in contact with the device.
Sharing the multi-media file is very easy here. User just has to put his mobile phone or digital camera inside the hole of the pot and then the files will get transferred to the device. Then if user wants to share those multi-media file into the other device or send it some family member, all he/she have to do is to put other personal device into it or send the files through the E-mail or MMS. The file will get transferred directly to the other device (Fig.6.2.3j).

To take this concept up to the next level I decided to detail it out the possibilities for the interaction and the interface.
The primary purpose of the device is to help Working women to co-ordinate and update the family members. The other possible user who are using device are family members like kids, husband, elderly (In-laws and parents).
Therefore I realized that the device should allow the multiple user interaction. And it will be nice if they can possibly interact with the device at the same time. So that, device can become a part of family meetings where family members can sit around it and interact with it simultaneously.
Generally the mother in the family act as a person who reminds family members about the family and social events and happening.
Ex. - Attain Mr. Sharma's daughters marriage on weekend.
- Reminder the Maid or baby sitter for particular task
Therefore, device also should help user to place reminders for other family members or for the maid/baby sitter.
Other possibilities like connectivity and sharing between the device and the other home based devices like PC and TV, will help sharing the schedules (from the google calenders, office appointments and meeting) OR TV serial schedule OR sharing of multi-media files.
So basically device is dealing with visual and acoustic medium i.e. the Text, audio, video and images. (Fig.6.2.3k)



(Fig.6.2.3k) Device detailing

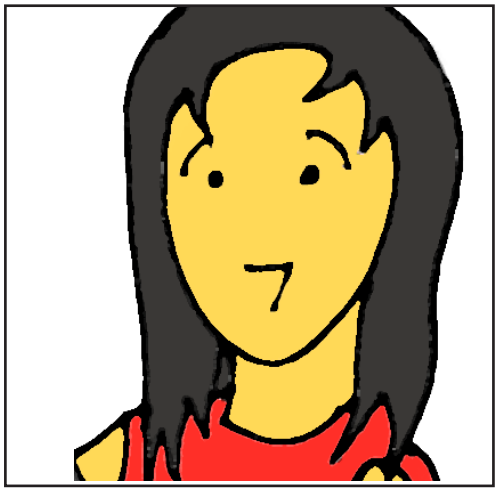
(Fig.6.2.3l) Inspiration

After that, I decided to work on particular theme to design the interface and make it more interesting.
Therefore I had taken inspiration from the aquarium and the fish tank,

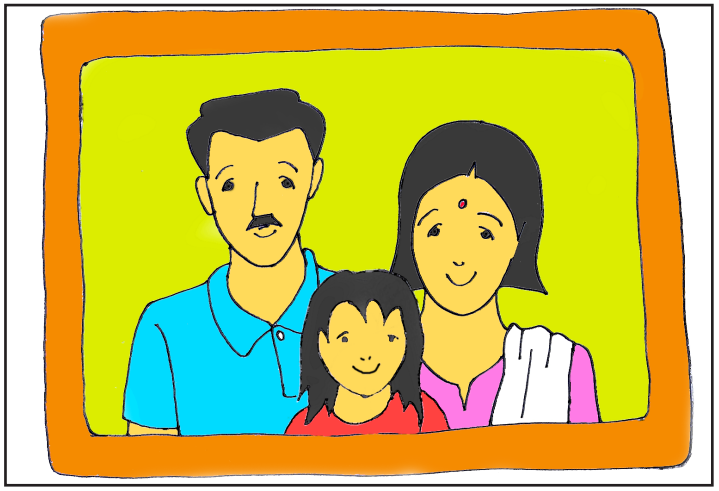
- People loves to interact with the fish tank
- They touch to the glass to attract the fishes

see (Fig.6.2.3l).
On the next page, I will explain the scenario and after that the interface detailing.

Scenario 1:



Hi, my name is Tinu. I am 4 years old.

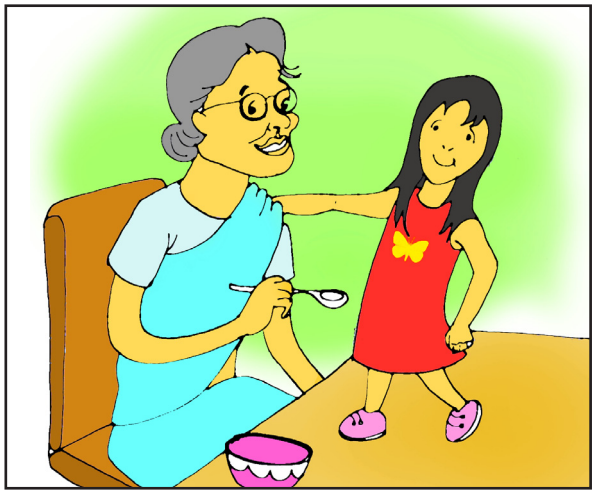


Meet my Mom & Dad.
My Dad is a businessman and my Mom works in the computer firm.

whole day they are very busy with their work.
Both come home very late. When Mom comes back from office its quite late. I generally sleeps at 8 O'clock. So she can not even wake me up. I miss them so much.

but on weekends we spend time together. They take me to park, playground and on beaches.

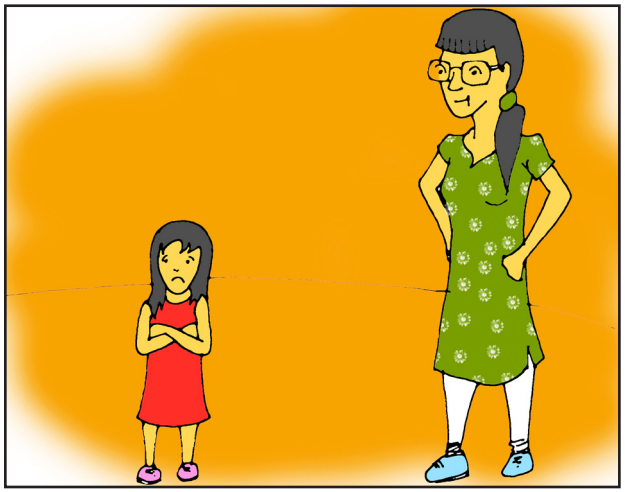
First Grandma used to take care of me when Mom goes for her job.



she used to stay with us since I was little kid but now she has gone to her home.

Therefore Mom has appointed a baby sitter.

Mom is really worried about the new person.



Because there are many issues to handle about me like food timing and medicines.

My baby sitter comes in the morning, just before mom leaves for the office.

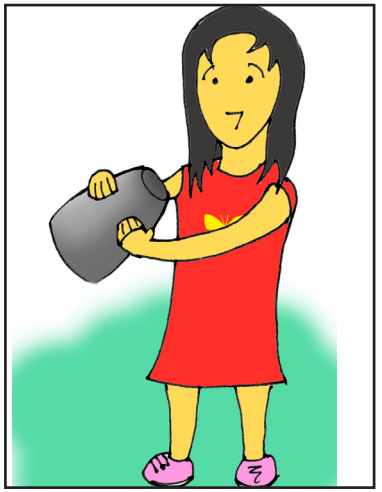
Mom instructs her about the daily schedule but this is not always possible, so Mom calls her on phone, but many times she forgets to call, because she is busy with her busy meetings and appointments.

This week end Mom is really very busy, she is working on a important project. It is very difficult to take out time from work. And her mobile phone is also switched off most of the times because of that I can’t even call her, when I want to talk to her.

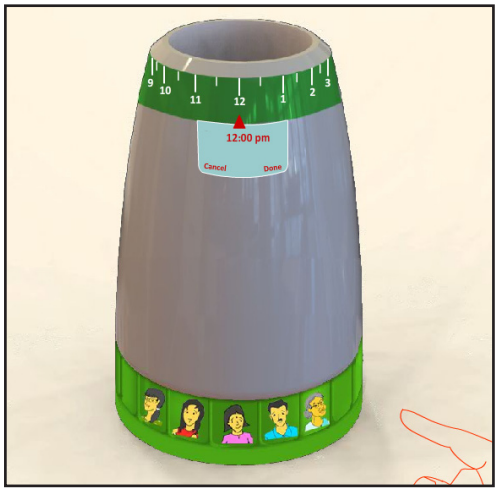
But now we have a device, where we keep our messages recorded, which will remind the baby-sitter about the daily schedule, food and medicine timings.

We just have to browse the menu, which is at bottom, it will open the menu options

Then you can select the record option from menu.

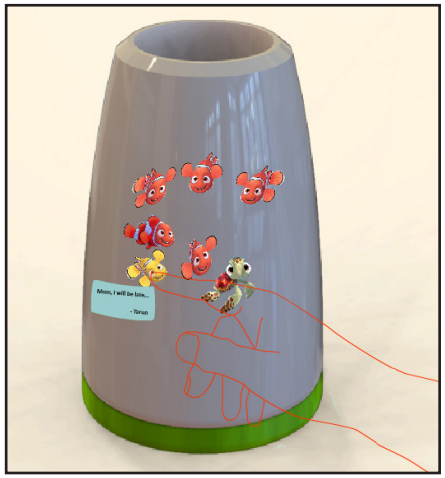


and then just speak into the device.

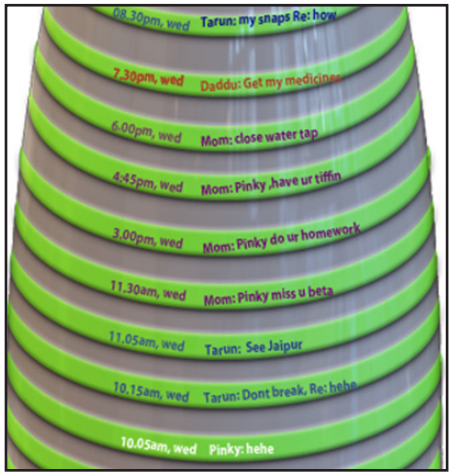


and set the timing and the person to whom you have to leave the message and done. Its very easy. Now mom will tell you in detail how it works.

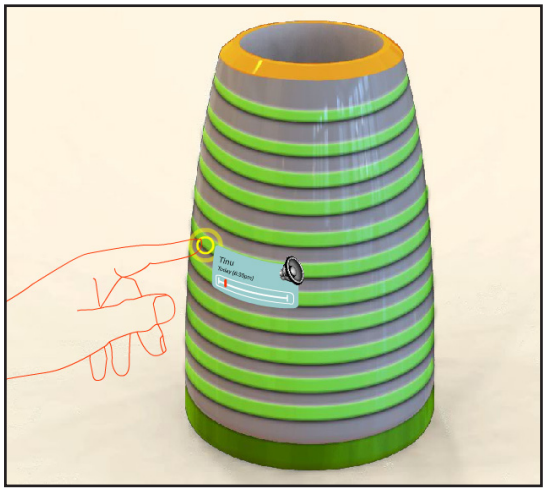
Hi, I will tell How it how it works, now I am checking the device.



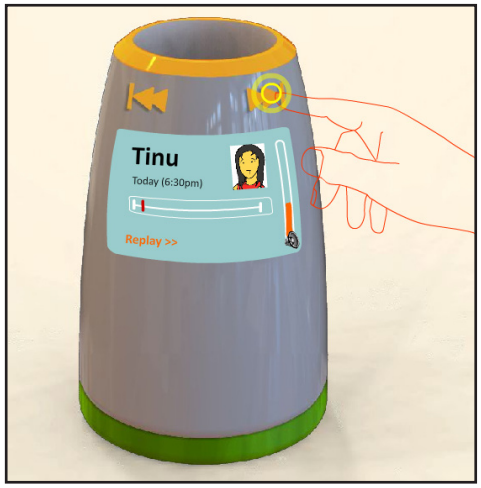
I can see the messages received, I just touch on the device surface. and I found that, their is one personal message (golden fish) for me, I click on the message to read or listen to that!



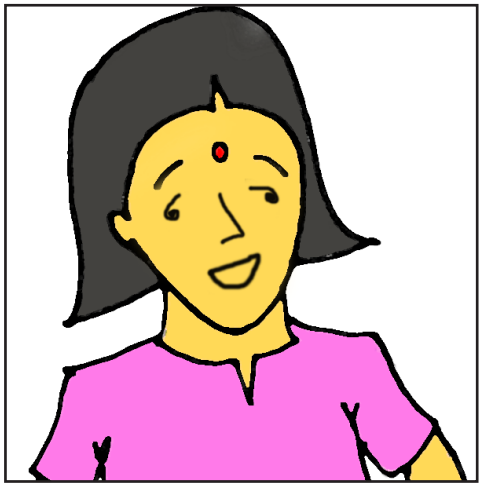
If there are many messages, it will show me in the form of rings.



I can simply browse them by moving the finger over them, the details pop out, so I can see the short description of each message.

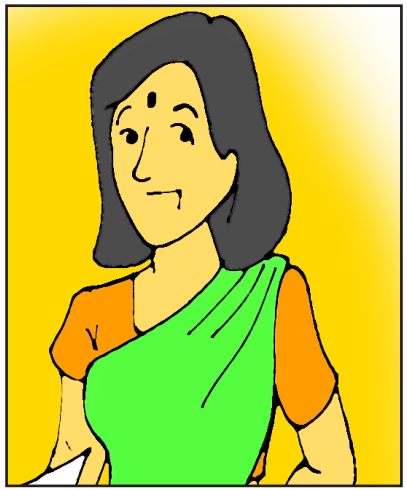


If I want to check the message then i simply click on the message to go into the detail.
Ohhh..I found one message from Tinu. I will play it...
“I miss you sooo much Mamaaaa....”

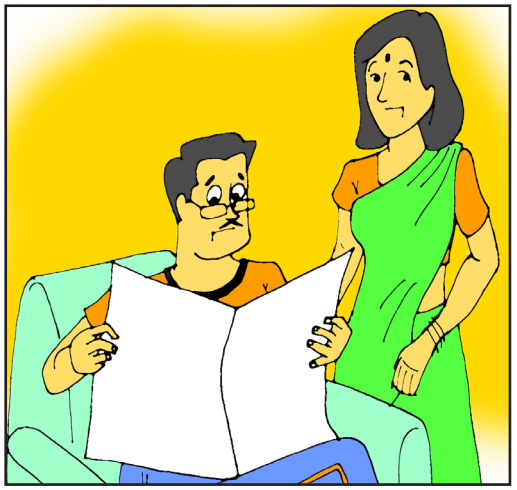


I am happy that, we have device which is helping me to know the unsaid things between me and my daughter. Also it is helping me to guide the baby-sitter by leaving instructions and messages so that she can take care of Tinu even I am busy with my work.

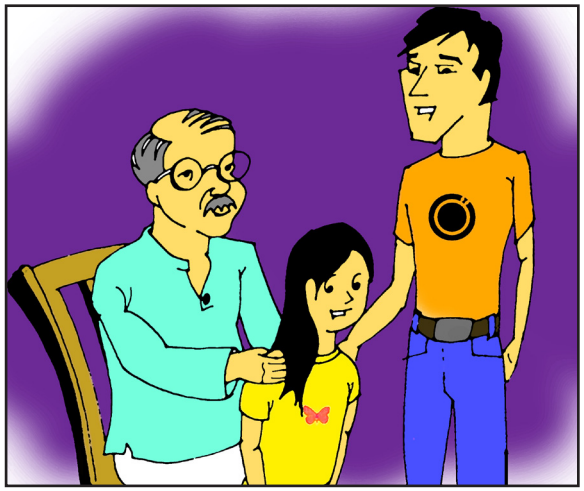
Scenario 2:



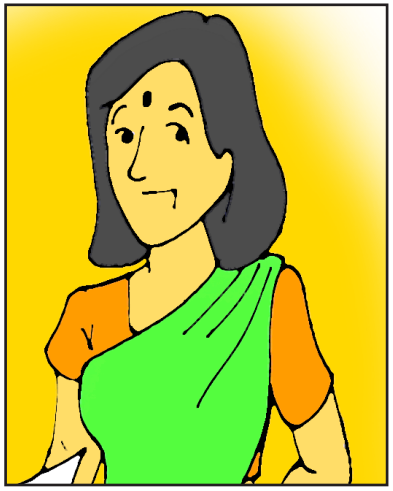
Hi, I am Mrs. Shah. I teach History to high school children. After school I give tuition classes. Whole day I am busy with school and household work. I am using mobile phone for past 5 years. I also use PC but I am not very good at it.



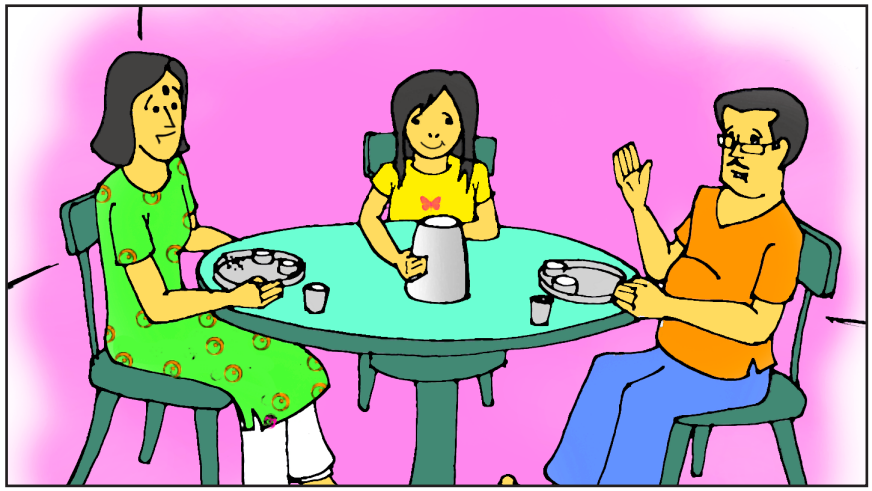
Meet my husband, he is journalist.



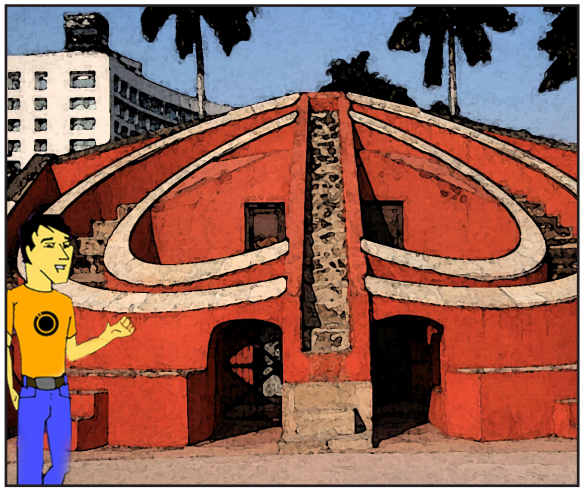
My son Tarun, he is college going student and my daughter Pinky studying in 5th std. My father In-law, to whom we lovingly call Daddu, takes care of grocery shop.



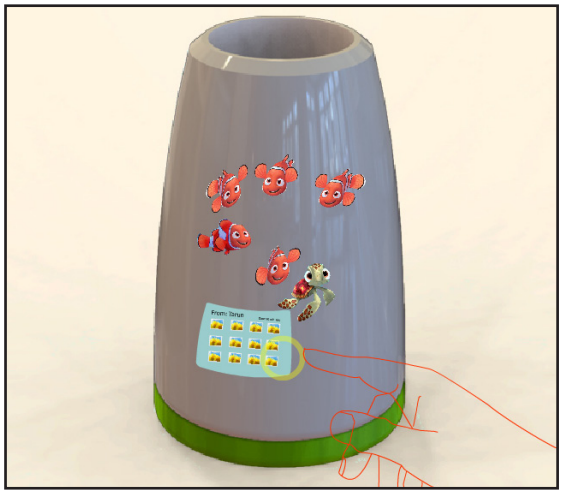
Everybody has different schedule, so everyone comes home at different timings.



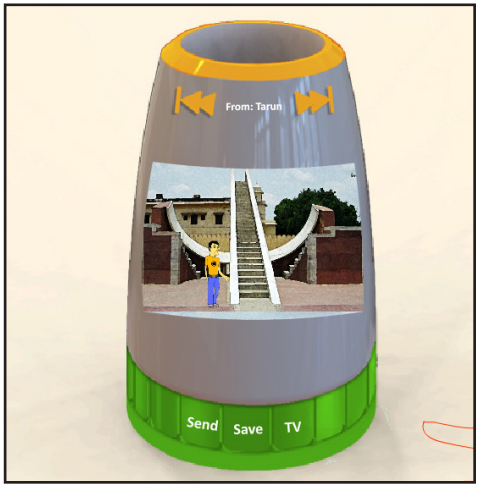
Generally me and my husband, we get late, so we try to have food together, and discuss the how everybody had spend their day, just like now.

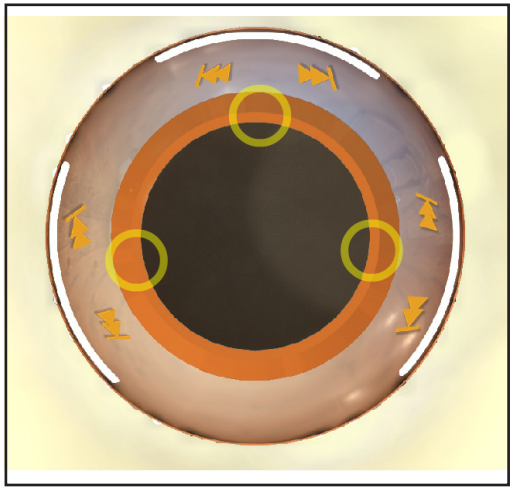


Tarun is not in town, he had gone for his study tour, to Jaipur. Studying the different Architectures like ‘Jantar-Mantar’.



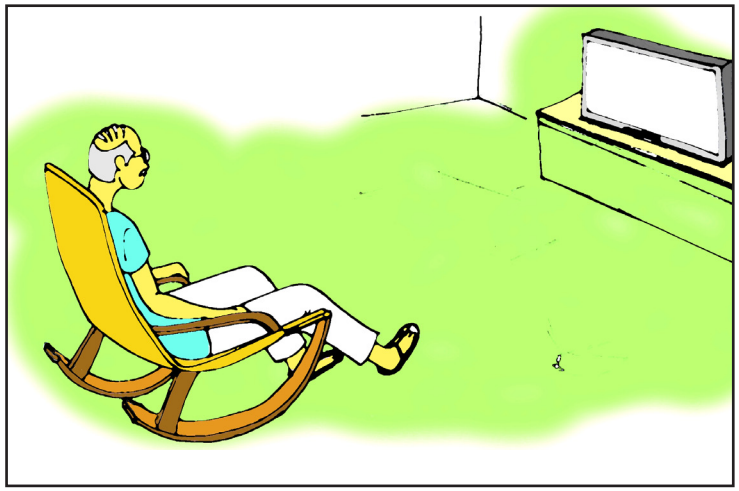
Hey see he has shared his mobile photo’s with us on the device. listen Pinky just check what Bhaiya has shared with us.



Do one thing, convert the photographs into the slide show, so that Dad and me can also see those.
And ya Daddu is sitting in TV room, he will love to see what his dear grand son is doing. why don't you share images and video's on TV, so that he can see it.

(Clicking on the orange ring will multiplies the screen on every sides and everyone gets the individual controls, so that everyone sitting around the table can see and control the content)

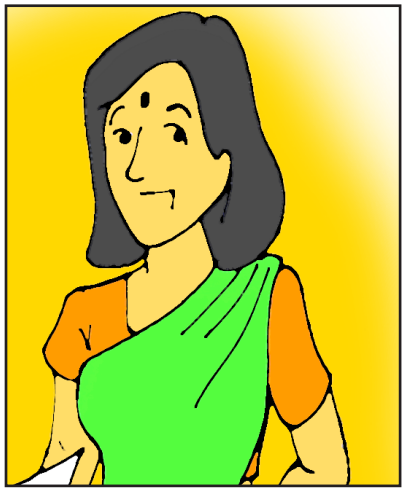


(Pinky has shared the Tarun's album on TV where Daddu can watch them comfortably)

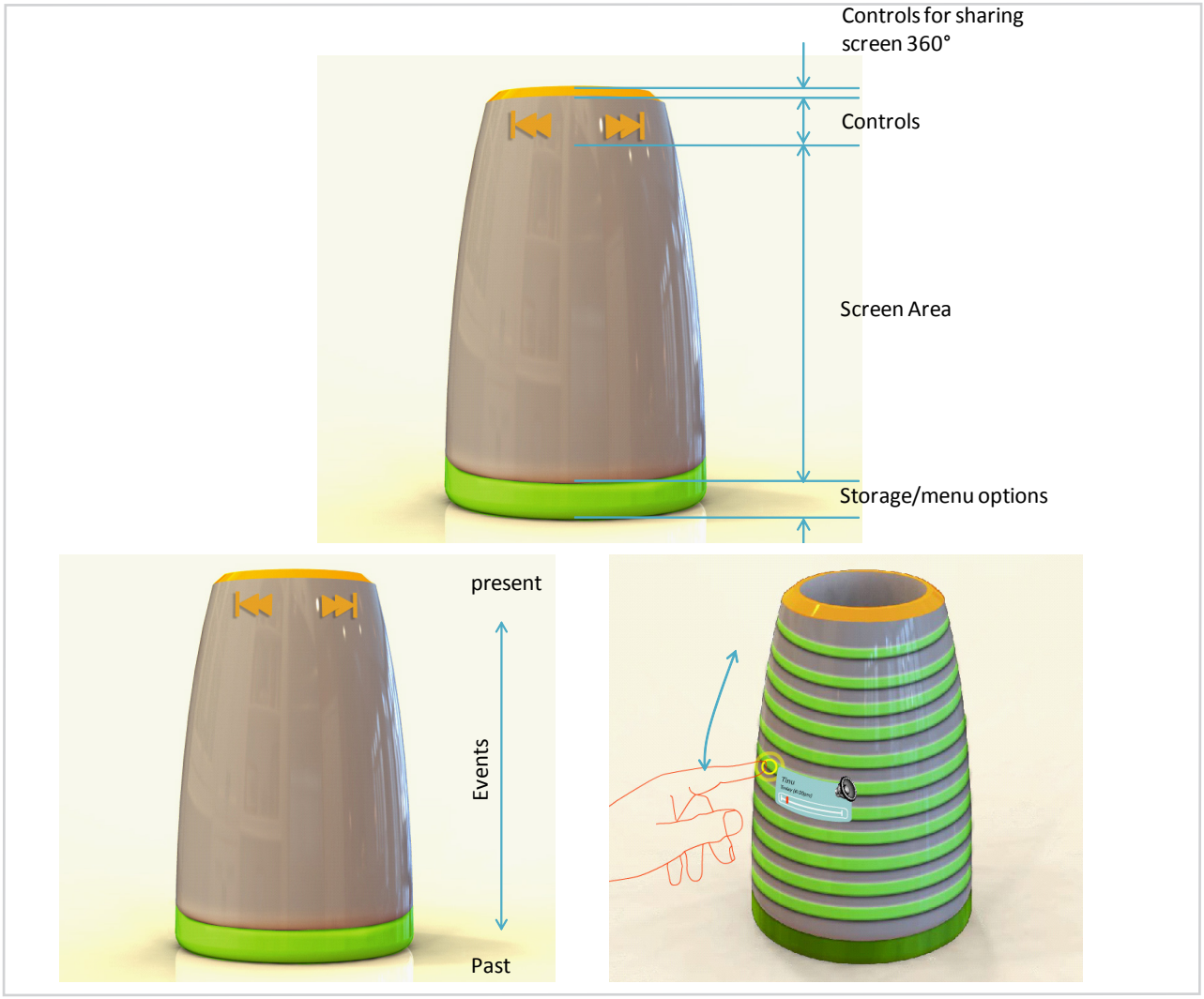
Pinky: Hey lets comment on bhaiya's pic.

"Bhaiya, you are looking handsome !!"

(and voice gets recorded and pinky sends it to Tarun, where is gets stored with the photo on Tarun's mobile phone.)



The device is really helpful for family like us, where everyone has different daily schedule, so we can leave messages for each other and it becomes very easy to stay connected and updated about everyone.

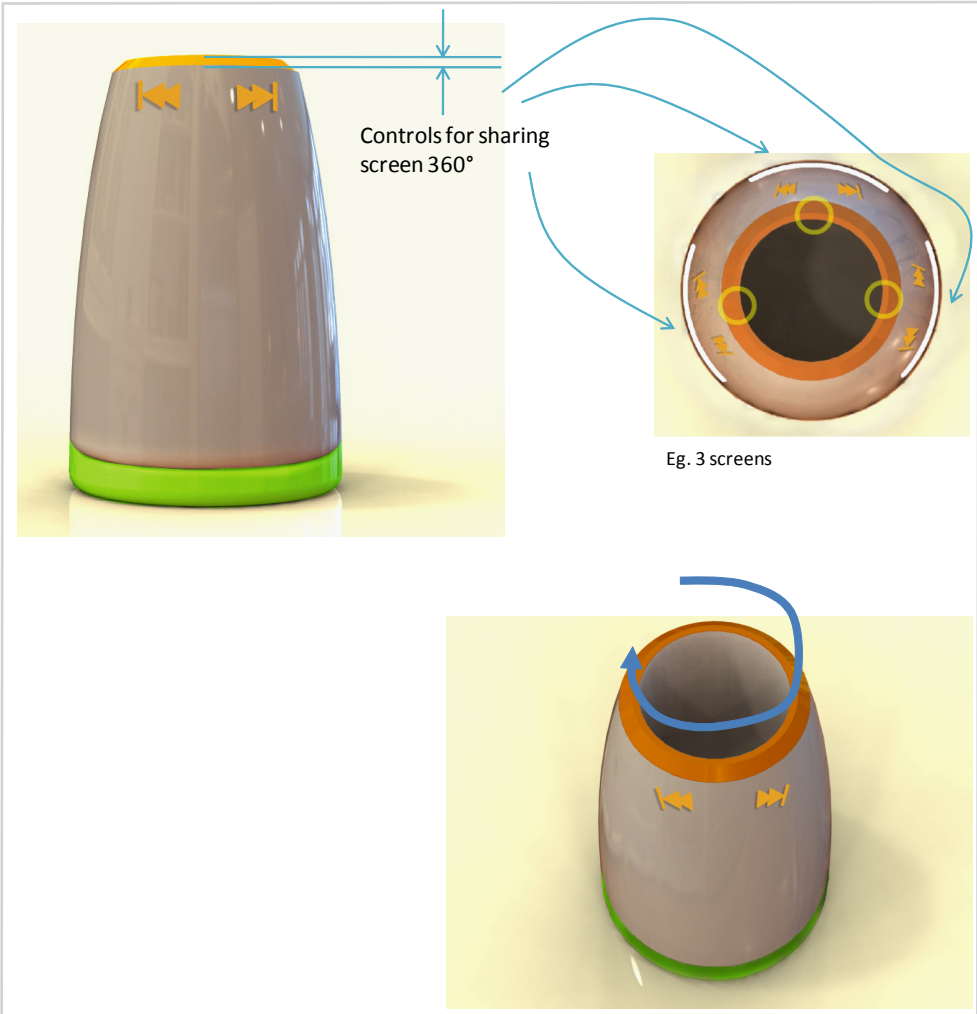


(Fig.6.2.3m) Area division and form factor

If we see, the device is dealing with the input in terms of touch and out in the form of display of content. Therefore there are actions which needs to followed to get the particular output and also I was dealing with the 3 dimensional form, where a lot of possibilities were available.
I decided to follow the form, where the natural movement and user conceptual model will fit to handle the device.
For Ex.
- Speak inside the device, message will get stored.
- The top side of the device is the intake; the bottom side is the storage.
The whole action is so intuitive, that user can see visually the going and storing of message at the bottom. The received message will enter from the top side and as the message gets old it will move towards the bottom, similar to the E-mail inbox. Basically using the directional sense of the device i.e. UP-DOWN. (Fig.6.2.3m)
Then I divided the whole area into the tree parts,

- Controls
- Display area
- Storage and menu options

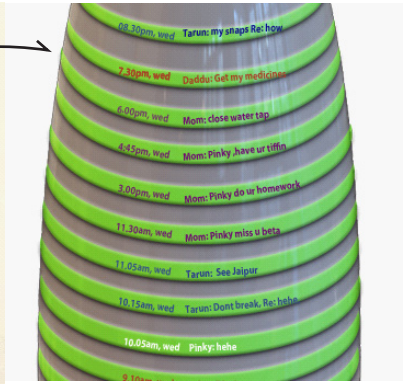
The division of area was basically to maintain the consistency of layout throughout the interface, so that user can form the conceptual model and remember the next move to do.
It's a device which will be placed on the table. Therefore the concept was that to use the cylindrical form of the device and allow it to use by multiple user at the same time.
The circular top touch sensitive ring identifies the touch made by the user and will convert the multiple screen on the device surface. (Fig.6.2.3n)
For Ex. Three touch points on the top ring will identify by the device and it will produce three screens
Each of the touch will produce a screen and individual controls to manipulate the content.
Same for the continuous 360° slide show, user has to give the 360° gesture on the top ring of the device. Then device will starts showing the continuous flowing slide show of the content. The flow speed and content size can be manipulated by the simple hand gestures on the device surface.



(Fig.6.2.3n) Multi user interface

The elements:
Here the content is interface. The icon which are in the form of fishes & turtles moving all over the surface of the device, will also show that who is the sender of the message and file type (text or multimedia) (Fig.6.2.3m).
The icon are color coded as well as they are different in form, so that user can visually differentiate between them.
The turtles are the multimedia messages, on their back it will show the content of the folder, and the fish are audio/video or text messages. The yellow fish is the private message, it come out from the storage only when the particular parson touches the device.

(Fig.6.2.3m) Content is interface



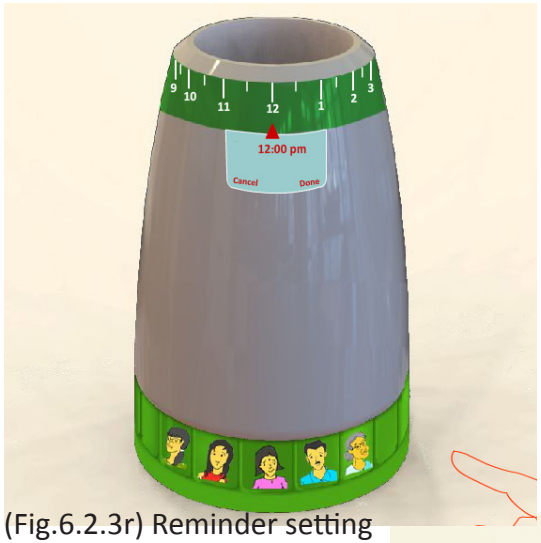
(Fig.6.2.3o) History browsing

(Fig.6.2.3p) Multi-media content browsing

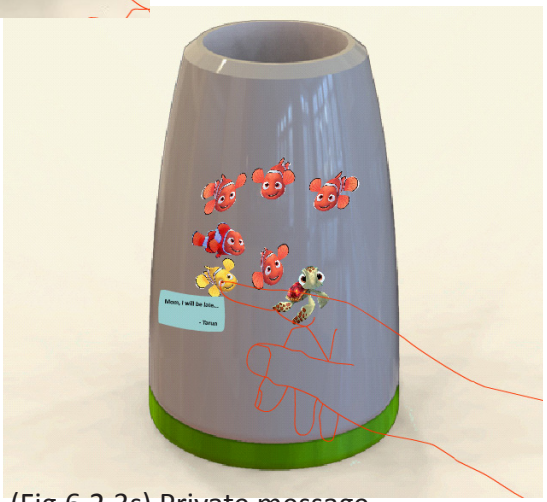
Browsing of content:
All the incoming or received messages will get displayed in the form of fishes (as I discussed earlier), but when one or more user wants to browse the history of events happened in the past (large number of events), then use can select the history option from the menu can switch to The Ring interface.
The Rings are nothing but the events and updates happened in the past, which can be seen in one go, by reading the details over it, and if user wants to go into the details, then he can simply click on the ring. (Fig.6.2.3o)
For browsing the multi media files, the controls will get appear on the device top side edge, which can be used by following the directional sense of right and left by touching on the direction buttons. (Fig.6.2.3p)

For browsing the received messages, user can use the menu bar which is at the bottom of the device (in green), by giving the rotation gesture or following the device surface, that will open the menu options, in the form of bubbles, which will keep coming from the bottom, then user can select the ‘message option’.
then the fishes and turtles will appear on the device which are placed according to the time line (top fish/turtle is recent event and bottom fish/turtle is past event), which are revolving through out the device surface (which will give the feel of fish tank or aquarium) and when user touches on the surface, then the all the fishes will gather near the finger. Just by looking towards them, user will understand the sender and message type (text or muti-media). The single touch over the message will give the little detail about the message and if user wants to go into the detail he can click on the particular event. (Fig.6.2.3q)

(Fig.6.2.3q) Basic interface



(Fig.6.2.3r) Reminder setting



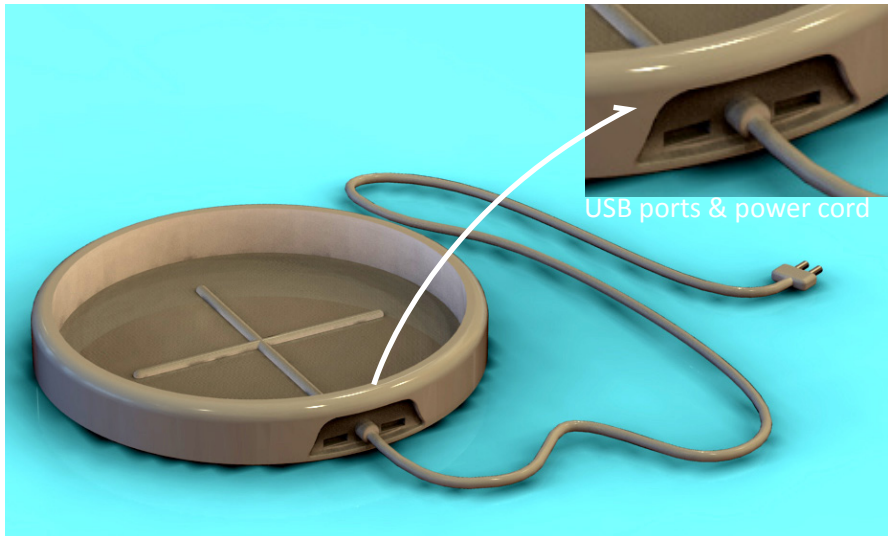
(Fig.6.2.3s) Private message

For setting the reminder,
User can select the reminder option from the menu option, then the device will change into the interface as shown in the (Fig.6.2.3r). where at the bottom menu bar is converted into the family member's images and the control area, will change into the clock for setting the reminder.

User can set the timing, by rotating the clock in any direction following the device circular top green ring surface and after checking the details, in the blue window, user can speak into the device and leave the message for all/ any the particular family members.
If user wants to leave private message for particular family member only, then he can select the image/images of the family member. Then message will get stored for that particular person only.
When that particular person approach the device, then the yellow/golden fish will come out from the bottom storage, so that particular person will understand that he is got a private message. Therefore the privacy of messages can also be maintained. (Fig.6.2.3s)

The device is allows the sharing of content between the various synchronized personal devices and personal web account of family members and relatives.
For Ex. for downloading the images from the mobile phone to the device (Fig.6.2.3t), Simply put the mobile phone into the device and device will download the content.
Which can be further shared to other personal devices, by dragging and dropping. The files can also be shared by E-mail or by MMS, user need to drag files to the send options, then it will give the option of devices and images of the family member (images in place of E-mail Id's) and then device automatically attach the content to the email, also user can add the message to it by speaking into the device (voice mail).

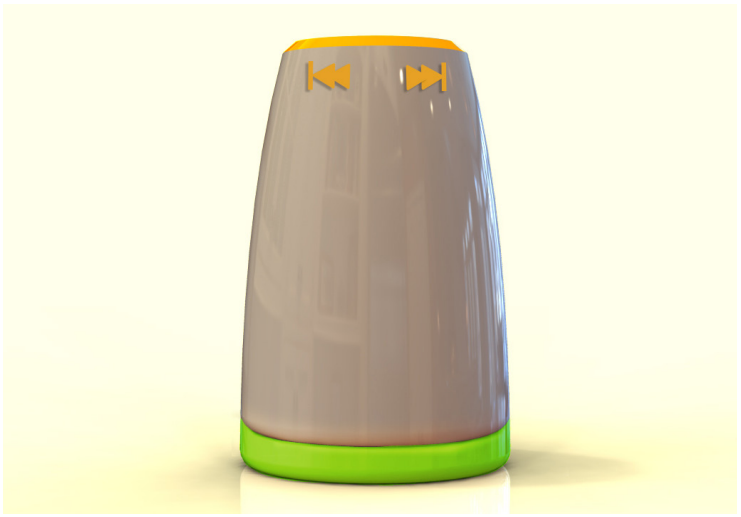
(Fig.6.2.3t) Multi-media content sharing

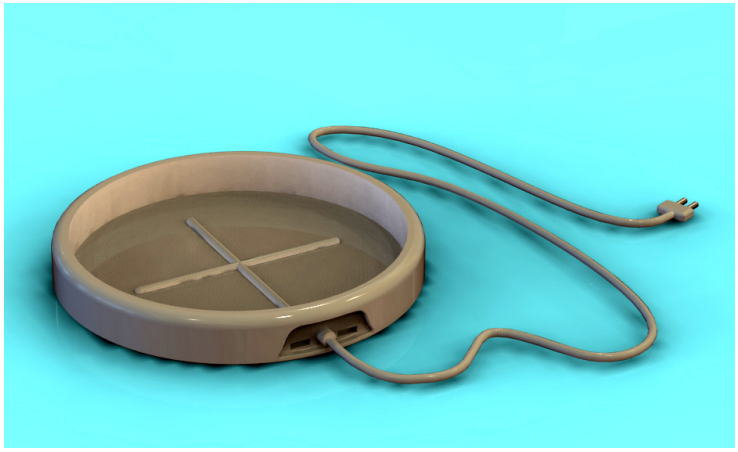


(Fig.6.2.3u) device hardware

The device can be attached to the computer by USB cord through the base, so that user can add, synchronize the account information and details about the family members into the device.
The device and the base are separate, so that the device can be taken to any part of the house.
The device can be charged by placing it over the base which are having the Plus shaped (+) grooves, by putting those over each other, the charging and the data transfer between the device and PC will happen. (Fig.6.2.3u).
The final out put of this concept is shown on the next page.

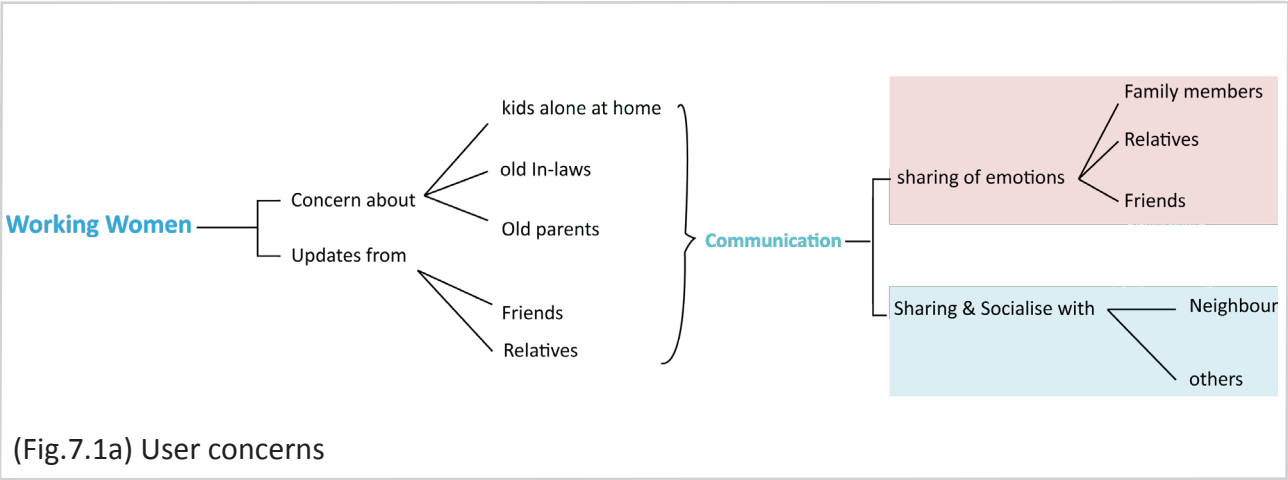
RECO





7. Final Concept

7.1 Objective



(Fig.7.1a) User concerns

After all previously described concepts, I discussed them in detail with professors and tried to evaluate them. The conclusion and feedback was to work more on,

- the basic user understanding
- the emotional & intimate environment
- study the social & technological trends in near 10 years.
- Try to use existing systems with added technology benefits to satisfy the core user needs.

So the final concept is an attempt to incorporate all above factors into the design.

User group: Working women

Need:

The working women are concern about the family members (when they are at work place) especially for the key children, old parents or old In-laws at home.

For Ex.

- Key children: back from school? What are they doing? Food? Crying? Fighting with each other?
- Elderly: medicine timings, health care

The same thing happens with the dispersed families. Here in India, people live and grow in the family environment but now social and economical changes made possible the higher opportunities in education and job anywhere in the world. These are the few reasons among many other, which are responsible for the families to get dispersed.

If we try to understand the overall situation then it's clearly specify the need of a system which will satisfy emotional needs like,

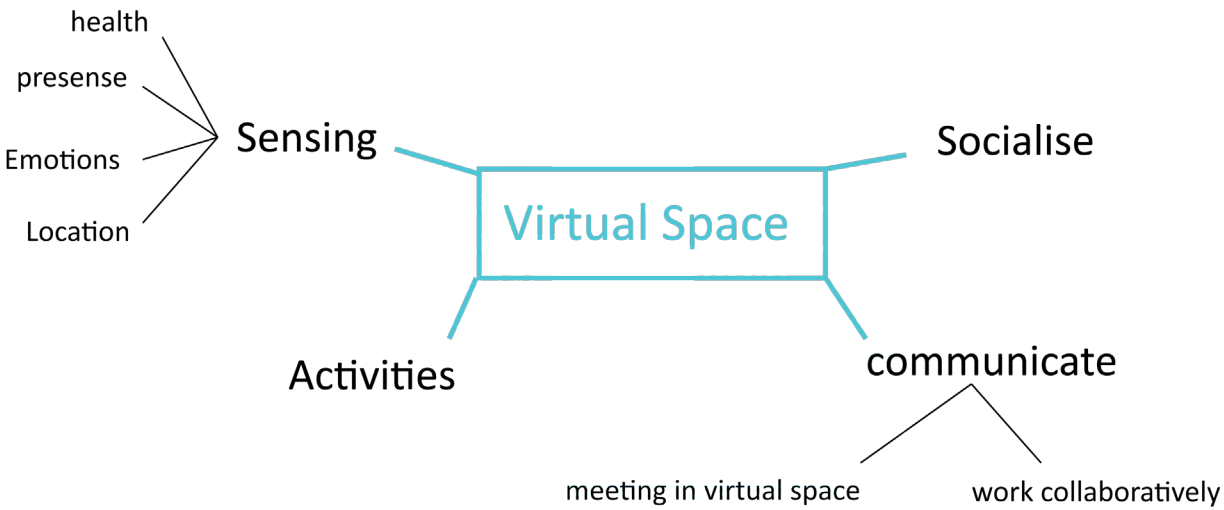
- being in touch, stay connected
- feel the presence of family members
- Sense of togetherness.

The existing ways of communication are

- Telephone & Mobile phones (Phone to phone)
- Email, Chatting & Video conferencing like Skype (Internet to Internet)
- VOIP services mobile phone (Internet to phone & vice-versa)

which allows user to communicate with other directly through visual and/Or acoustic mediums.
But still there is the need of a **subtle virtual space** which will give **the feel of being in touch** without actually entering into one's **personal space**.

The other need which I had already discussed in the few other concepts also is the need of **getting updates (gossips)** from neighbor, friends, relatives and etc. Also, allowing them to communicate with **new or existing devices,** with the high level of **personalization and customization**. This will make system more intimate and motivating to use.



(Fig.7.1b) Concept

Objective:

The concept is of a virtual system which allows user

- To stay connected with the love ones without actually invading the personal space.
- To share & communicate messages and experiences in more personal and intimate ways using the new or existing technology.

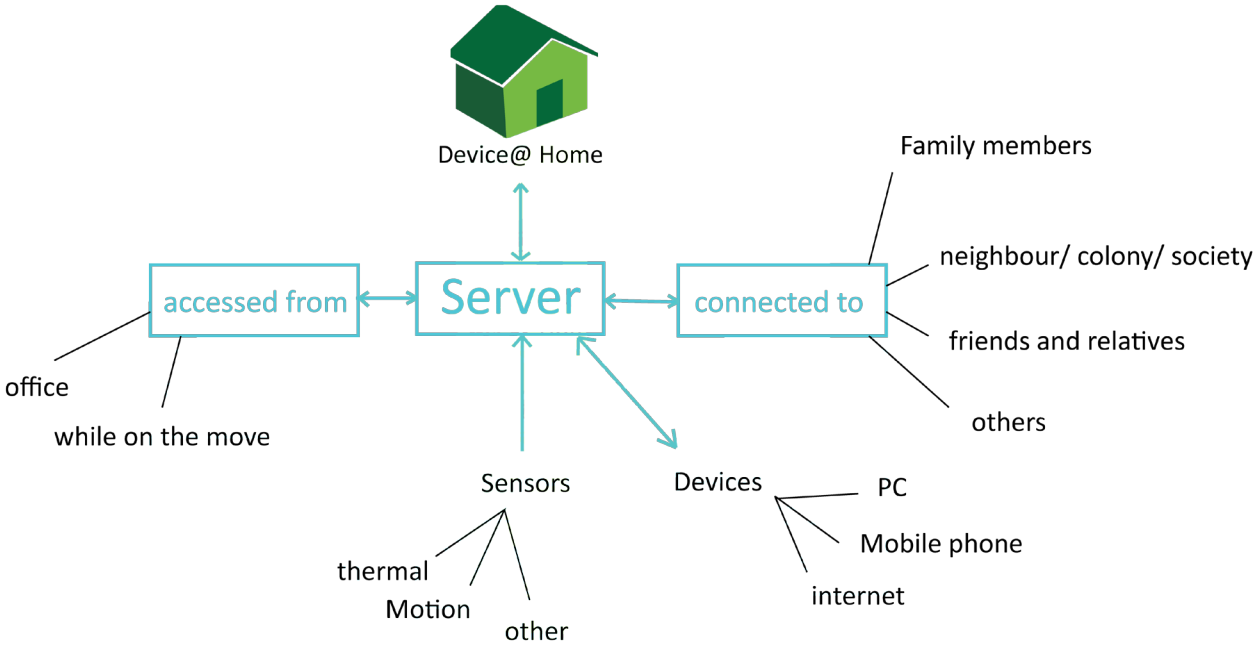
(Fig.7.1b)

7.2 Concept Framework

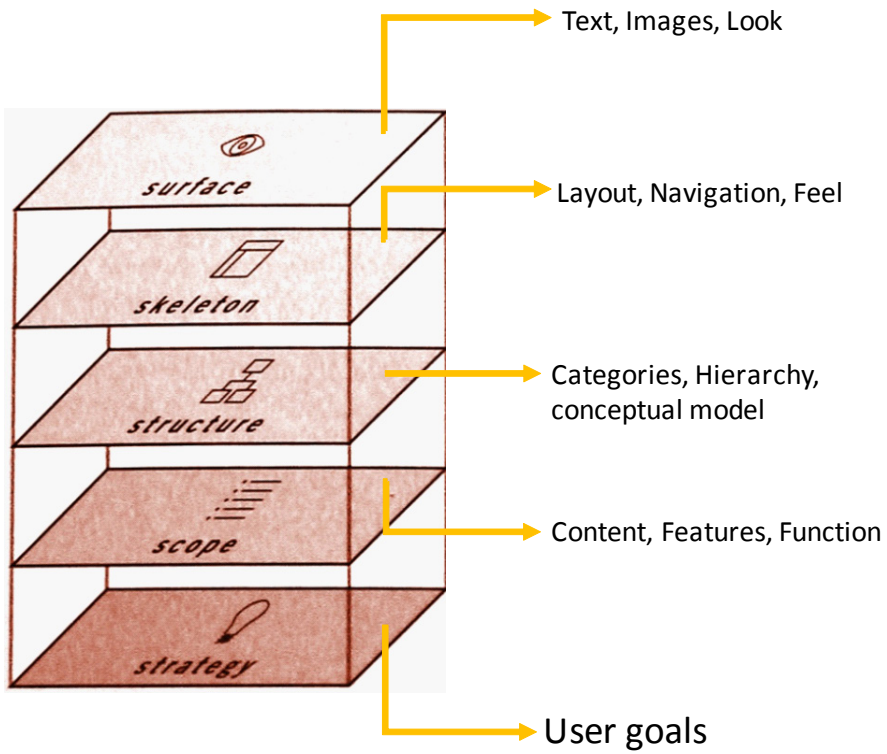
Aim:

To design the system which will help user to stay connected to the dear ones and also to enhance the intimacy between the family members who wish to be in contact through feeling the presence of each other.

The concept framework is shown in the (Fig.7.2a).



(Fig.7.2a) Concept framework



(Fig.7.2b) Layers of user experience (R7.2a)

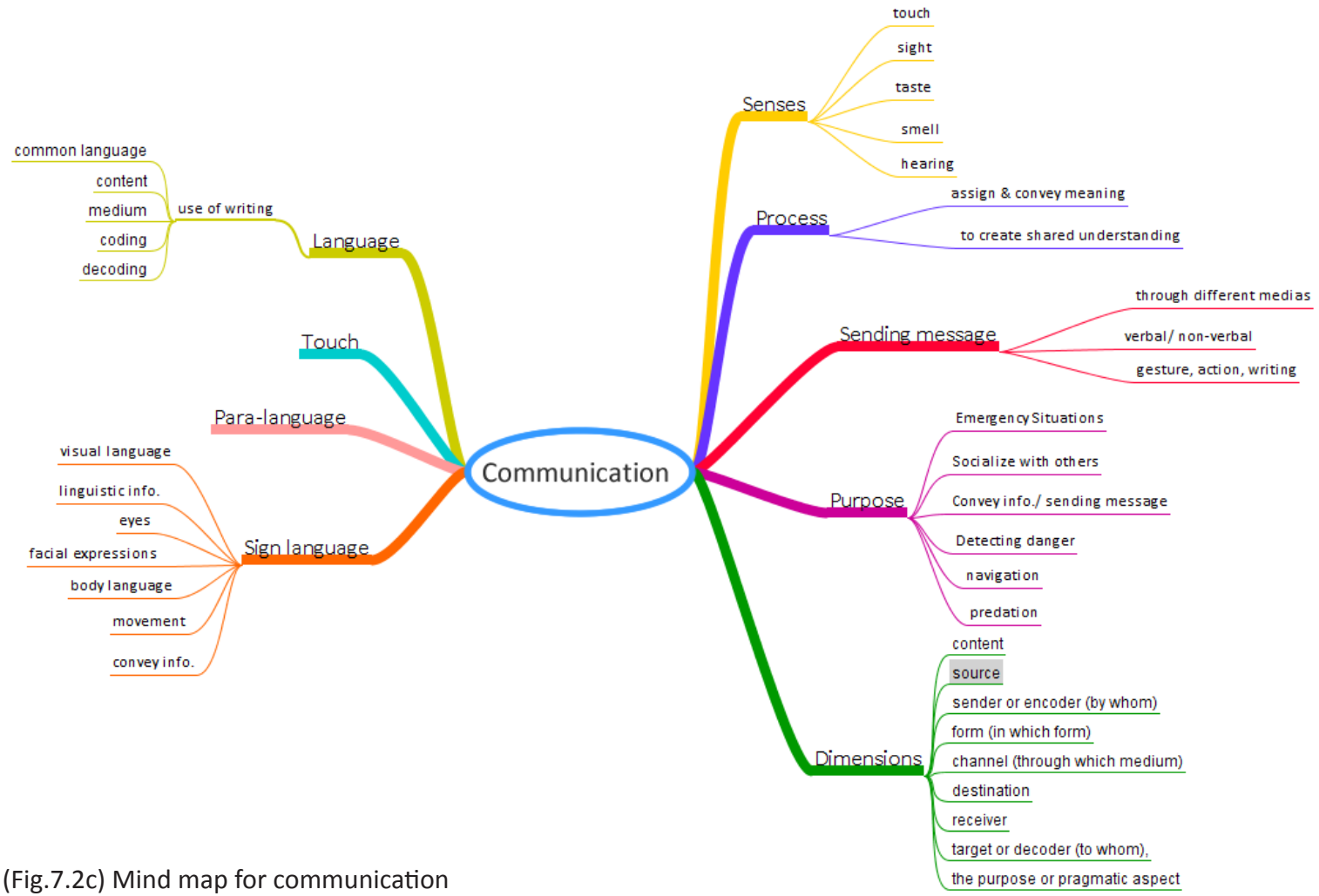
Brainstorm:

After plotting the initial concept framework and understanding the user goals in the virtual communication space, which is the strategy plane according to the Jesse James Garrett's layer of user experience, (Fig.7.2b) (R7.2a), I started with the brainstorming for the next layer of user experience i.e. scope plane.

The scope plane defines the content, functions and feature of the system or device.

So I decided to brainstorm over basic goal i.e. communication and ways & mediums of communication. The brainstorm had given me good number of keywords to work upon and see the wide possibilities in design (Next page, Fig. 7.2c).

The insights from the mind map had helped me to start the work upon content and features of the system & device.



(Fig.7.2c) Mind map for communication

7.3 Interface Overview

The concept frameworks shows that(Page no. 54 Fig 7.2a), System is acquiring information from the home based device & sensors and then that can be access by any of the synchronized personal devices carried by the family members.
So there are two sides to this system,

- Design of home based device
- Interface of the personal device like mobile phone which user can carry with her

(Here, I am assuming that user is having the 3G mobile phone, which is with web connectivity, GPS and multi-media capabilities)

So I decided to start with the scope plane for home based device.
For identifying the feature and functions, it was important to identify the possible user and user tasks, **all related to communication.**

Home based device:
The possible users who are going to use this device will be **the family members.** It means that, the device will be used by the limited number of people.
In family, plenty of the things are common for Ex. the contacts, birthday reminders of relatives, family friends...Etc.
And there are plenty of things which are uncommon like for Ex. Father's official contacts, meeting schedules and reminders...Etc.
Basically I tried to identify the common and uncommon tasks which might vary according to each user preferences.
Each user's way of organization and ways of interpreting the same information is different. It is totally depends on the user's conditioning and past experience.

So there are two ways to do the things, the device which will do

1. everything for each user (within the family)
2. specific task (for the family members)

Therefore, I decided to follow the middle path and that is

- **let user choose themselves what task they wants to prioritise**

The tasks prioritise by each user will get stored for him only.
To accomplish user prioritisation, system should identify or detect the user, who is using it and accordingly the interface will change to suit the user tasks, which results in, the frequent user can use device proficiently with minimum steps to reach up to the required information.

For Ex. The frequent user can also have customized speed dial contact list, which may be user made or generated by the intelligent system (system will generate the list by identifying the frequently communicated people)
Also this will help in,

- personalization of the device
- motivating user to use the device
- efficient use

The next thing was to decide that, how user is going to communicate? What are the new ways of communication possible?
The existing ways of communication are through

- text messages
- audio messages
- audio + video messages

For identifying the new ways of communication, which will give similar and more intimate experience, I used insights from the Mind map (Page 56 Fig. 7.2c).
I tried to identify keywords which might lead to some interesting feature. The keywords identified are,

- use of touch (Direct presence)
- sign language (Visual presence)
    - body language
    - movement
    - visual language
- use of writing (written presence)

Each of above mentioned keyword gives personal and intimate touch to the communication, so that the user can feel the presence of other.
But the important issue here is of privacy. The system must not invade one's privacy.
The inspiration can be taken from the internet based social community websites, where people share personal information like photo's, documents, calendar...Etc. with the networked people. User has full control over the whole activity of sharing. It's totally user's choice whether he/she wants to share the information with anyone.

Similarly here also, user on the both ends must have the full control over the sharing of presence
OR
the another thing possible is to make presence very abstract, so which will give feel of being together but will not give the feel of being monitored or watched.
Therefore, I decided to choose the second way, because the **main purpose** of the device is to be in touch and feel the presence of the dear people which is out of the feeling of care in case of working women and staying connected, in case of dispersed families.

Also another thing which I wanted to bring in design is the use the existing technologies like telephone and mobile phone communication. Therefore, the thought was that, the device can have an inbuilt telephony system. The concept is that, the user can make or answer the calls, while using device or might convert the same calls into more possible ways.
For Ex. Possible scenarios are,

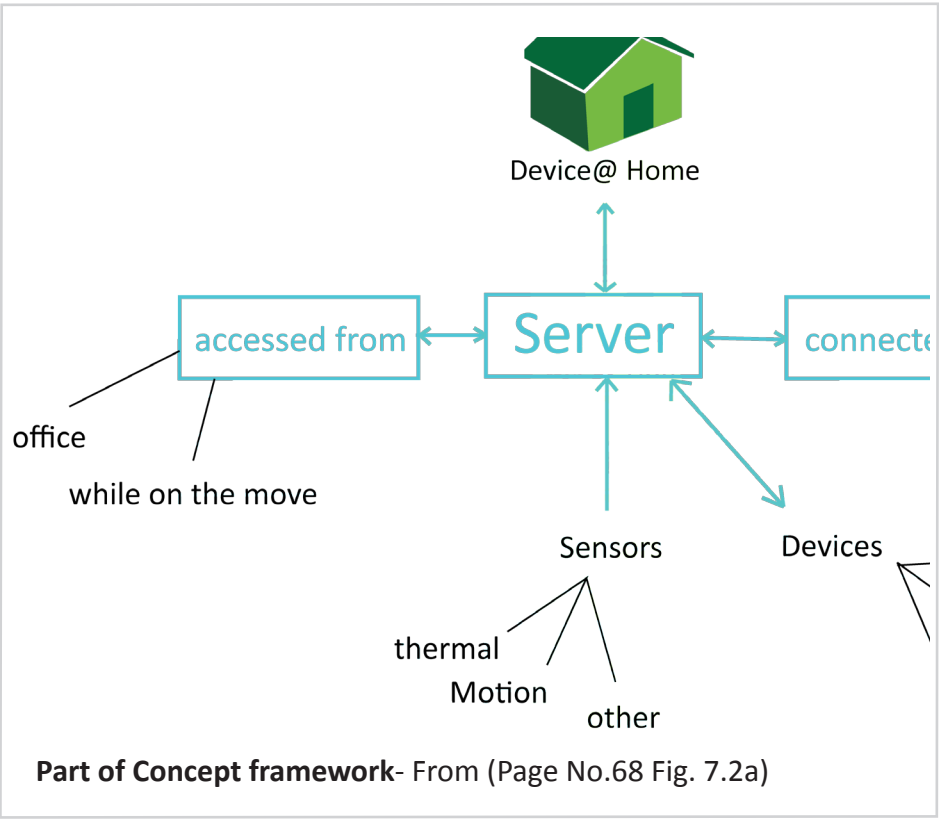
1 Mobile to Device	Device to Mobile
2 Telephone to Device	Device to Telephone
3 Internet (VOIP) to Device	Device to Internet (VOIP)
4 Device to Device	

In 1st case, the call can be converted or changed from audio to video (existing tech. - 3G tech video call).

Therefore the concept is that, it is also possible to extend this limit by sharing or converting the same mobile phone call into more useful and interesting ways.
Therefore, the same call can be converted or changed into the sharing of the information (which user concern about) or data from the device to the mobile phone, which means that call will carry more channels of information to give the desirable output at receiving end.
In other cases also, more or less the new possibilities are there.

Now, it was possible for me to see the possibilities of conveying the information from home based device to the other communication devices.
The information about the family member's presence at home will be collected by the sensors. The information is then sent to the server where it coded into the abstract form. This abstract information is then can be accessed by the other synchronized communication devices as shown in the concept framework (Page No.68 Fig. 7.2a). This way the privacy of the family members can be taken care.

In case of In-direct communication: In this case working women can access the information about the kids at home on her mobile phone i.e. Physical presence:
Kid's presence in home can be detected/ sensed by the sensors. The information will be sent to the home based server where it will get coded in the abstract from. Then mom (in the office) can see the kid's presence on her mobile phone in very subtle form.



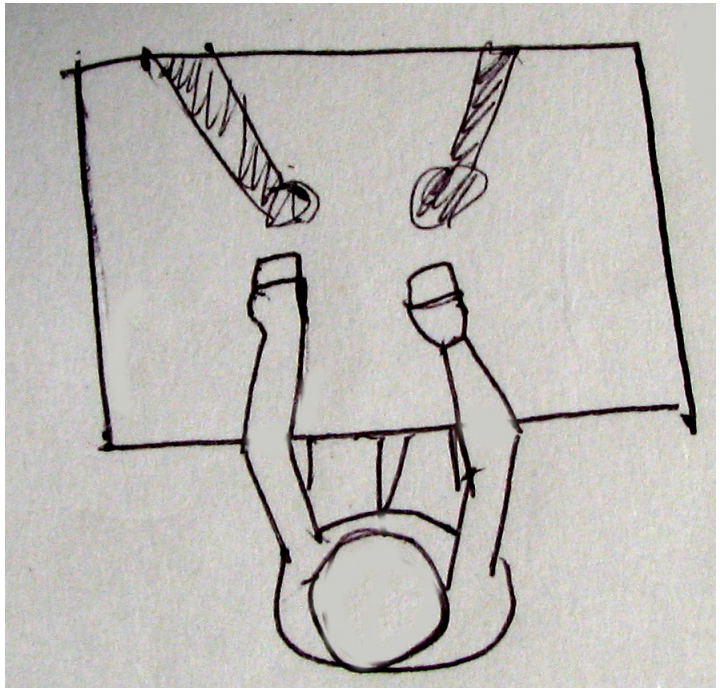
Part of Concept framework- From (Page No.68 Fig. 7.2a)

Emotional level:
Also the sensor will detect the emotional level of the kid like he is happy or sad or scared. Then it will get displayed on mom's mobile phone.
The emotion sensing is bit more complex, because people may not want to or like to show the exact emotional representation.
For Ex.
Mr. A is so angry with Mr. B, he is not interested to speak with him. But still he is speaking to Mr. B because Mr. B is his Boss. And of course Mr. A will not like to his show emotional status to Mr. B.
And this is true in many other cases also. Therefore, in case of family members also, the representation has to be very subtle and abstract.
The other way is that, to show the extremes of the emotions like 'happy and sad' or 'positive and negative'... Etc.
In case of working women, it is not very important for her to know the exact emotional level of the kids at home but it's enough to know that kid is happy or sad or crying without actually making a phone call.

In case of direct communication:
The other feature is that, the when call is being made between the 'device to device' and where it is possible to share the presence, device should allow it to happen in more richer way. It is possible by the messaging with personalized way.
So I am using the insights from the mind map which I had mentioned on the [Page no.70, Fig(7.2c)].

In case of the webcam which is used for video conferencing, where the input is taken from the camera and displayed on the output display. Here one can feel the presence of other visually. The input and output are two the different mediums. Therefore one cannot see himself and the other at the same time in the **same virtual space**. The Presence of the users can be seen on the same screen but it's in different space. It's all because, the input and output medium both are different.

Therefore the concept is that, there can be a touch screen and sensors which will take input and will show the output on the same screen. By this way people can see and touch each other (on screen) and experience will be different feel than the conventional video conferencing. It will add value to the video conferencing with one's physical presence in virtual space. (Fig.7.3a)
For Ex.
Two users are using similar kind of setup and located at different locations and they are drawing Rangoli on the device. With existing technology, using only touch screen, they can draw the Rangoli collaboratively on the screen but for a user the rangoli points and lines starts appearing magically. It is not a good user experience. It does not give the feel of the other user.
Therefore the concept is that, the touch screen and the sensors will coordinately work together to show the hand position as well as the scribbling on the screen. It's like they are working together looking at each other's hand movement, which is a good user experience. It is adding value by physical presence in virtual space.
This feature is like a mirror, reflecting things exactly onto the other side. Therefore, this feature I am calling it as Mirror.

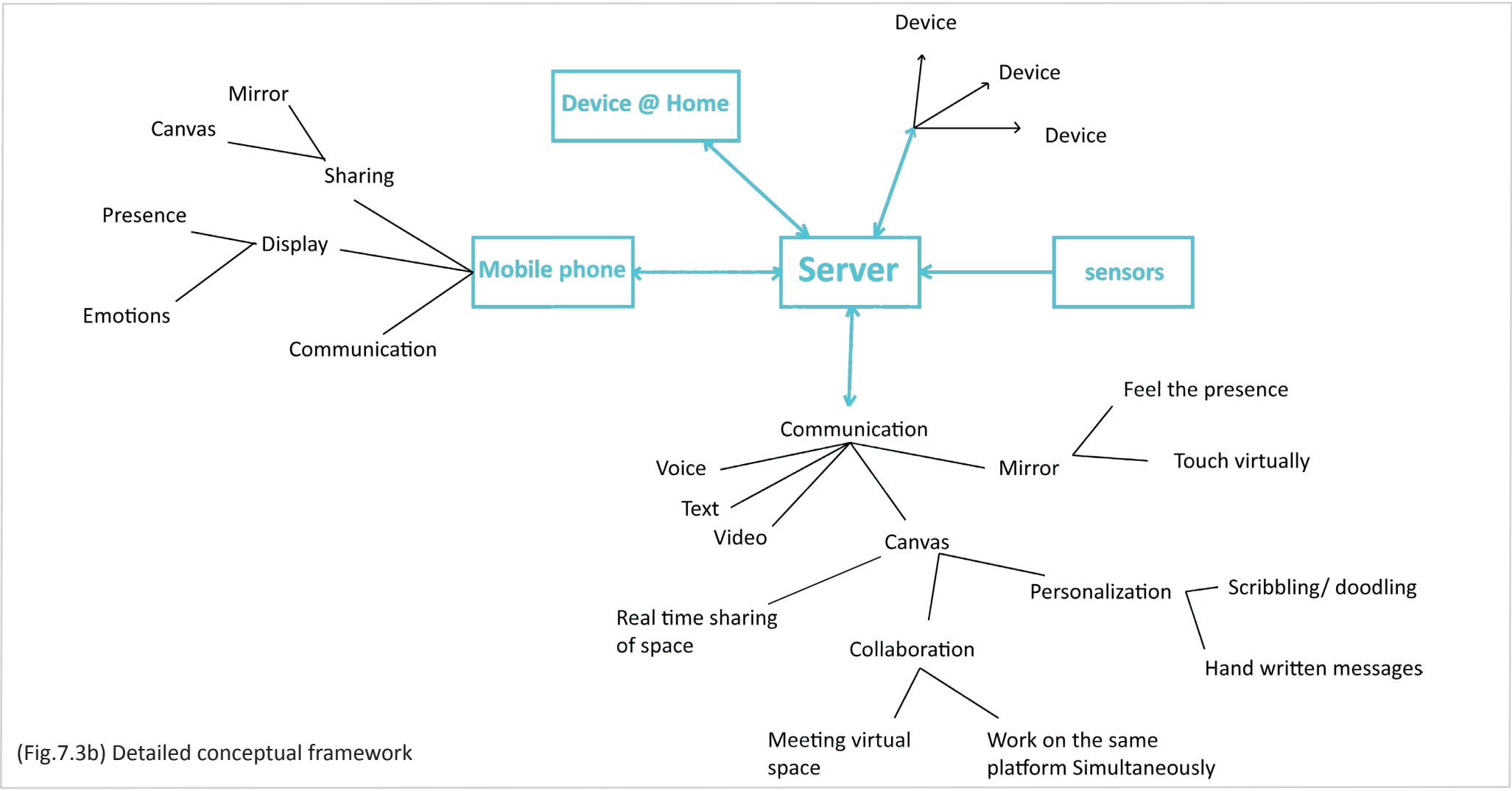


(Fig.7.3a) User experience

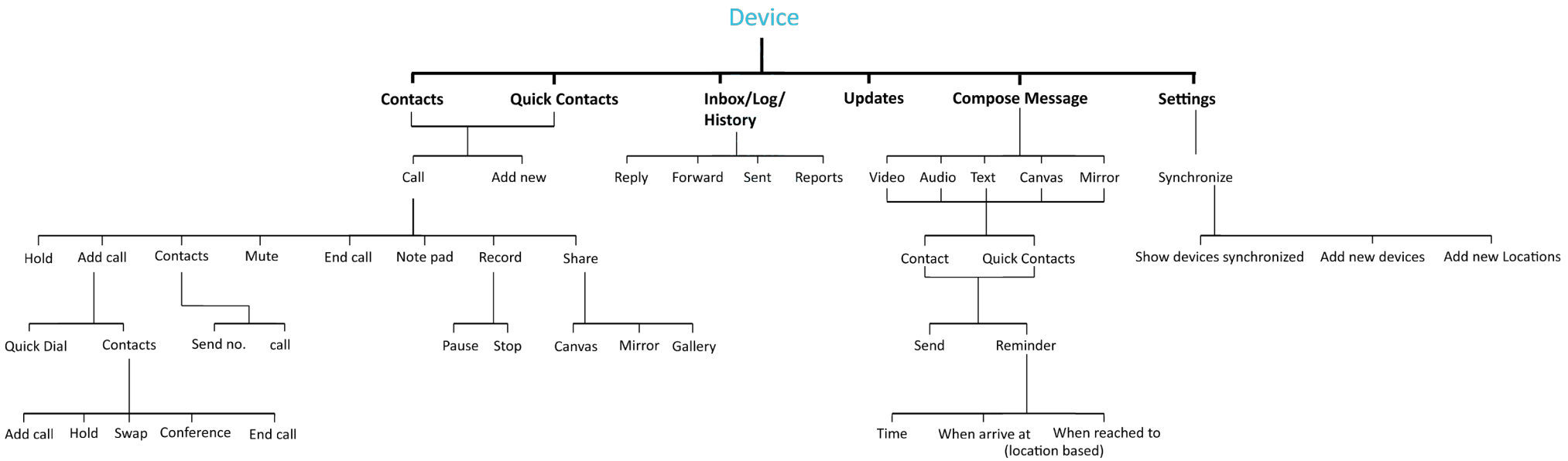
Now I can conclude the that the device should have the following features, the need of each I had already discussed in earlier pages,

- User identification
  - For customization of data according to particular user needs and tasks
- User location identification
- User emotion identification
- Communication
  - In-built telephone or mobile phone technology
  - Mirror option
- Networking
  - Connectivity with internet
  - Connectivity with the neighbours or society members or colony people
- Common Message storage and reminder
  - So that everyone in the family member will be connected and updated
- Updates from the different sources according to the user preferences
  - Like updates from relatives and family friends
  - Updates from the hobby groups

After deciding the core feature, the next step was to make a detailed Conceptual framework and information architecture (Fig. 7.3b and Fig. 7.3c), which is the structure layer of ‘element of user experience’.

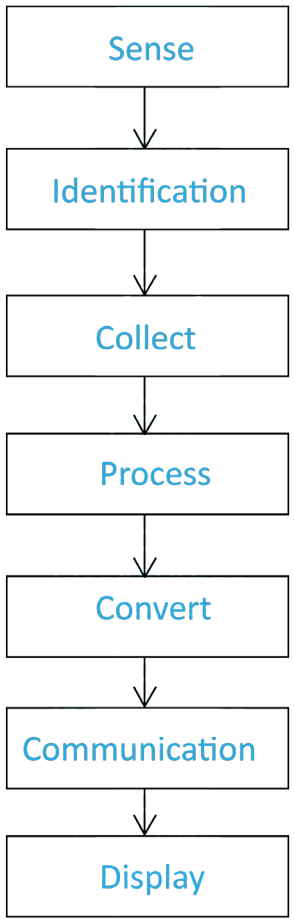


(Fig.7.3b) Detailed conceptual framework

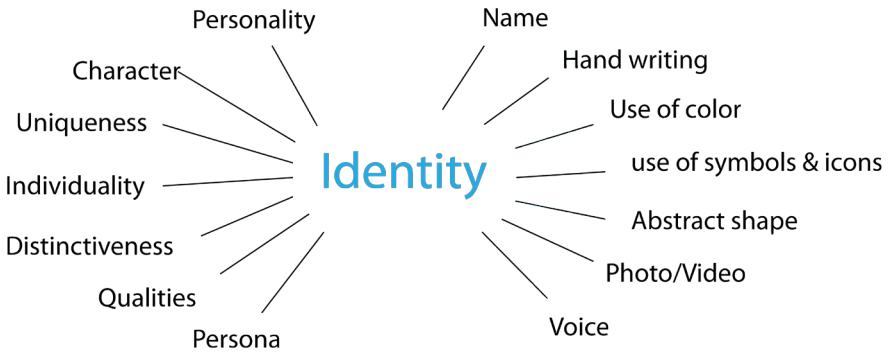


(Fig.7.3c) Information Architecture

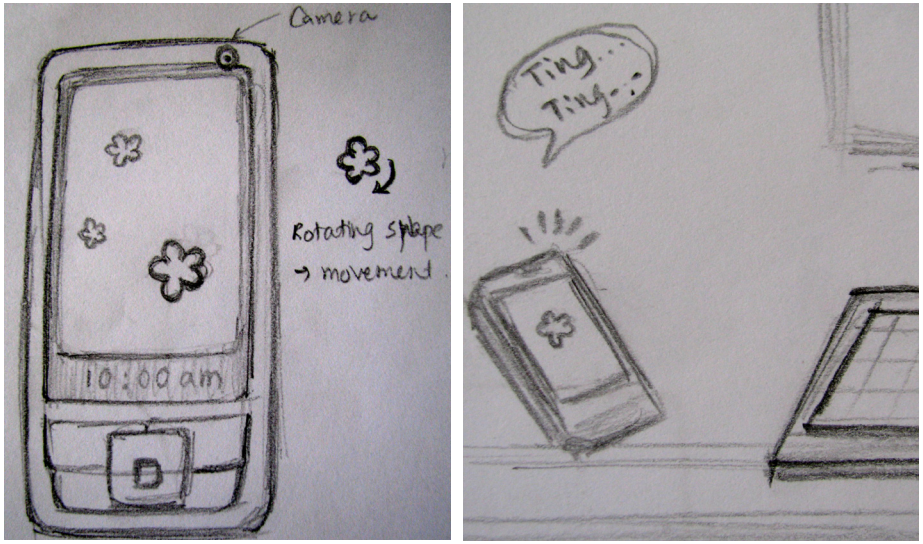
Mobile phone interface:
As mobile phone is always with the user, it can be used for accessing the information from the device from anywhere, any time, also user need not to carry separate device, all the time.
Technical reason is that, it is possible to acquire the required information with the **same mobile and network.**
Therefore, it needs a software application or interface, to deliver the information in desirable form, which will allow user to connect to the virtual space.
The next step is to find the content and features (Scope plane) require to access the information in desired form which will make sense to user.
So, aim is not to design **a spy device** which will monitor on each and every move of the family members but to design an interface which will help satisfy 'the worry and care' of User for their dear ones.
The concept framework for the mobile interface is shown in (Fig.7.3d), the information sensed, collected and processed it to convert to the abstract form at the server level and then can be communicated with the synchronized devices where it will get displayed.



(Fig.7.3d) Conceptual framework for mobile phone



(Fig.7.3e) Brainstorm for identity



(Fig.7.3f) display of family members on mobile screen

The working women are concern about the family members especially about, the key children and the elderly (Old parents and/or In-laws). And their concern is about, are the kids fine, what they are doing? They are studying or not? Had taken lunch or not? Scared? Sad? Crying? Fighting with each other?
In case of elderly, are they fine? Medicine reminders? Health issues... Etc.
Therefore, the presence of the family members at home, can be shown in abstract way (as I had already discussed in earlier pages).
The presence or identity of a particular person can be shown by (Fig.7.3e)

- Name of the person
- Voice
- Image/ Video
- Hand writing
- Abstract shape
- Use of Colour
- Symbols & icons

Or maybe the various combinations of above mentioned identification marks.
The next thing is the movement or location of a family member within the house can be shown by the movement of the abstract shape, which may be shown with respect to the house map (i.e. exact location) or simply showing by rotation or liner movement (Fig.7.3f).

The location and movement must not be captured exactly, it must not invade one's privacy. But at least it should tell user that kid is fine and active in some way.
For Ex.
Sensors will detect that Kid is sitting in front of TV. And the TV is ON. Kid is not moving and his emotional status is normal. Therefore the conclusion drawn may be that, the kid is watching TV or he is sleeping. This simple example shows that, it is sufficient to know for a mother that Kid is fine. This information can be displayed on the mobile phone in interesting and easy to understand way.

This location sensing can also be helpful to set the particular reminders related to the physical space for particular person.
When a particular user will reach at particular place, then the message will get deliver. In this case, the reminder is not time based; it is based on the particular user and place, which will results in efficient and sensible system, which will help user to perform the task in better way without missing any task to do.
Mom in the office can send the message or set the reminder on the home based device,
For Ex.
- deliver the message, when kid enters into the kitchen room
- deliver the message, when grandpa wake up

The same thing can also possible from home device. Kids can set reminder on mom's or dad's mobile phone, like
For Ex.
- When mom leaves office, deliver the message.

Future devices have to be intelligent to understand the user location and their preferences. In few cases, we do not want to miss particular calls even if we are too busy with any situations and at the same time we do not want to have the unwanted calls. In such situations, the system should understand the user priorities.
For Ex.
- If user is busy in meeting, then deliver calls from home (silent) only and reject all other calls

After conceptualisation, I was able to decide the feature and functions for the mobile phone application interface and they are,
- Accessing and sharing of home device information on mobile phone
    - Communication
    - The location of family members on the screen
    - The emotional status of the family members
- Setting the reminder based on
    - time
    - location
    - Person
    - User priorities

After specifying the features, content and hierarchy for the device and the mobile phone interface, the next things was to design the layout, navigation and over all feel of the interface (skeleton plane).
Basically working on how the interaction will happen and how things will fit into the layout to suit the device handling while using it.

7.4 Interface Detailing

For designing the software interface for both the device and mobile interface, I tried to follow few guidelines from the Shneiderman's eight interface design guidelines. (R 7.4a)

Shneiderman's "Eight Golden Rules of Interface Design"

1 Strive for consistency.
Consistent sequences of actions should be required in similar situations; identical terminology should be used in prompts, menus, and help screens; and consistent commands should be employed throughout.

2 Enable frequent users to use shortcuts.
As the frequency of use increases, so do the user's desires to reduce the number of interactions and to increase the pace of interaction. Abbreviations, function keys, hidden commands, and macro facilities are very helpful to an expert user.

3 Offer informative feedback.
For every operator action, there should be some system feedback. For frequent and minor actions, the response can be modest, while for infrequent and major actions, the response should be more substantial.

4 Design dialog to yield closure.
Sequences of actions should be organized into groups with a beginning, middle, and end. The informative feedback at the completion of a group of actions gives the operators the satisfaction of accomplishment, a sense of relief, the signal to drop contingency plans and options from their minds, and an indication that the way is clear to prepare for the next group of actions.

(R 7.4a) Shneiderman's "Eight Golden Rules of Interface Design"

Contiue on the next page...

5 Offer simple error handling.
As much as possible, design the system so the user cannot make a serious error. If an error is made, the system should be able to detect the error and offer simple, comprehensible mechanisms for handling the error.

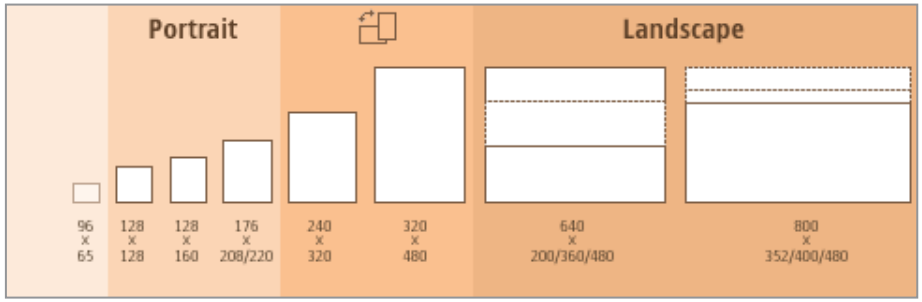
6 Permit easy reversal of actions.
This feature relieves anxiety, since the user knows that errors can be undone; it thus encourages exploration of unfamiliar options. The units of reversibility may be a single action, a data entry, or a complete group of actions.

7 Support internal locus of control.
Experienced operators strongly desire the sense that they are in charge of the system and that the system responds to their actions. Design the system to make users the initiators of actions rather than the responders.

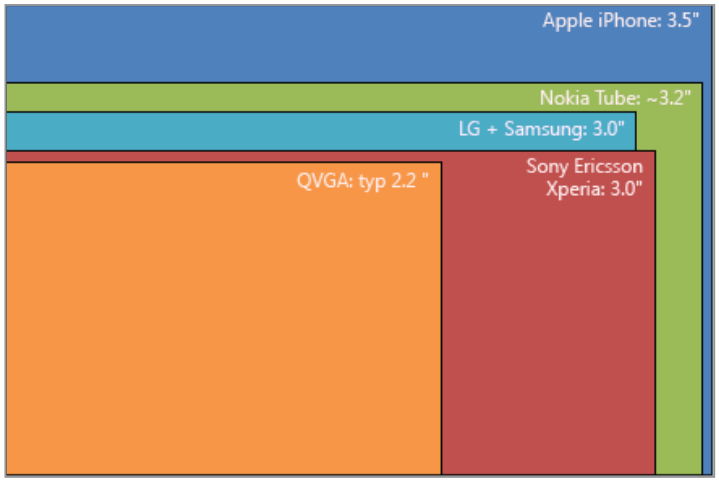
8 Reduce short-term memory load.
The limitation of human information processing in short-term memory requires that displays be kept simple, multiple page displays be consolidated, window-motion frequency be reduced, and sufficient training time be allotted for codes, mnemonics, and sequences of actions.

(R 7.4a) Shneiderman's "Eight Golden Rules of Interface Design"

The interface has to be consistence in layout, navigation and appearance on device as well as on the mobile phone. This will be helpful for a user to form the conceptual model while accessing the data from the device onto the mobile phone and vice-versa.
The consistency is totally dependent on the device's capability of input and out (data input and display of data). If we try to see, there are major data input problems exists in case of mobile phone. Therefore, the task which will be getting performed on the home device has to be consistent with mobile phone but has to be minimised in terms of data input and has to be maximised in terms of output.
The current trend in mobile phone is the use of touch screens, where it allows direct manipulation of the content, which results in faster input of actions but still it has limitations of its own like size of the screen. The current trend in the mobile phone screen sizes shows that the screen sizes are increasing day by day (Fig. 7.4a &b) (R7.4 b&c). Now Philips's has come with the new folding-screen e-book reader 'READiUS' (developed in part by Polymer Vision). The screen is 5 inches big, which is bigger than device itself (Fig. 7.4c).



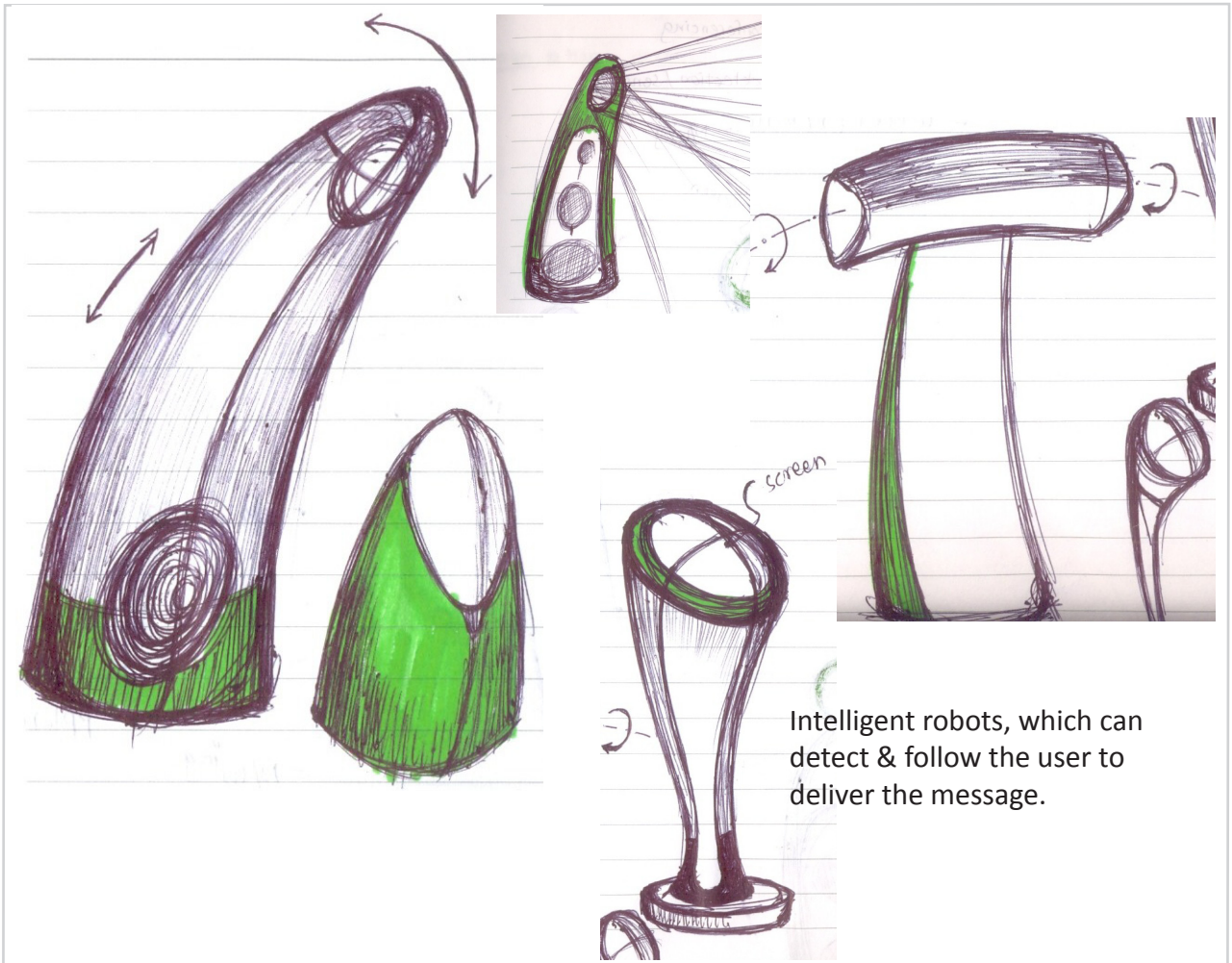
(Fig.7.4a) Trend in mobile phone screen size (resolution wise) (R7.4b)



(Fig.7.4b) Trend in mobile Phone screen size (Physical size) (R7.4c)

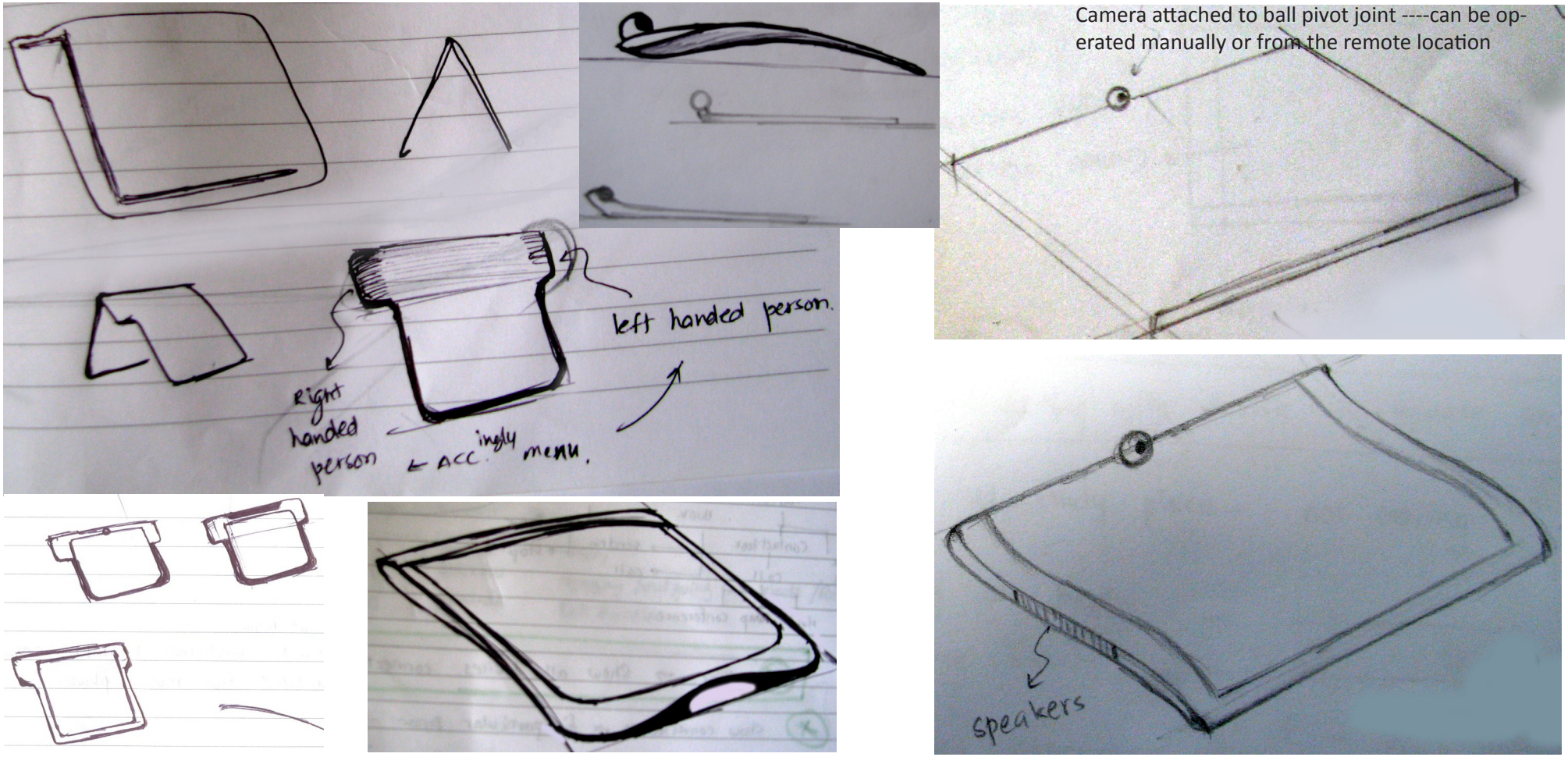



(Fig.7.4c) READiUS

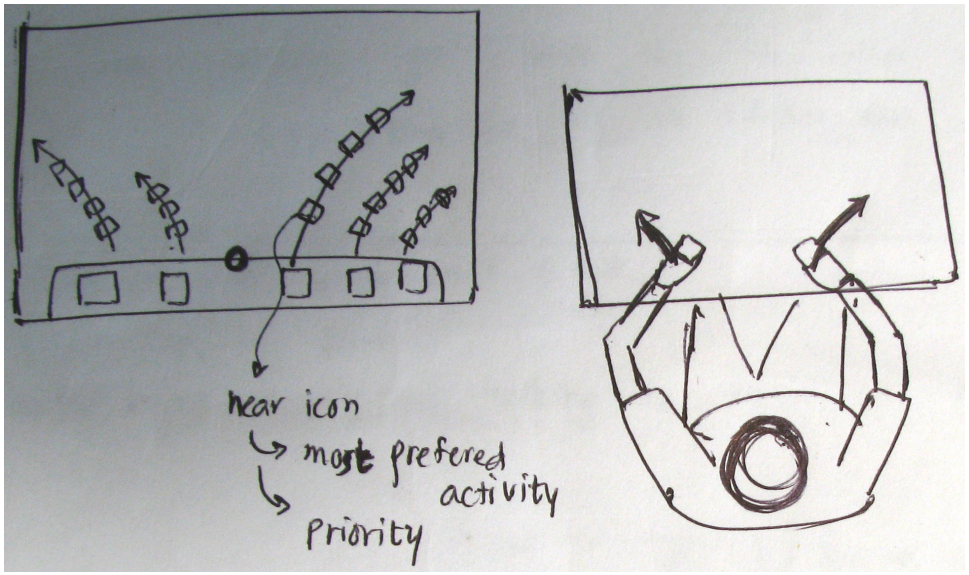


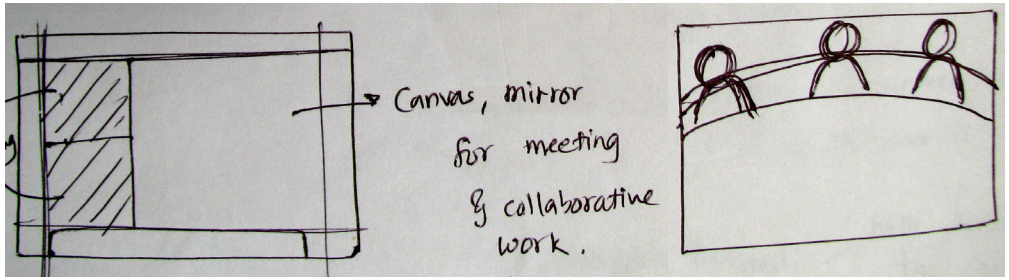
(Fig. 7.4d) Brainstorm for the devices - form and technology integration

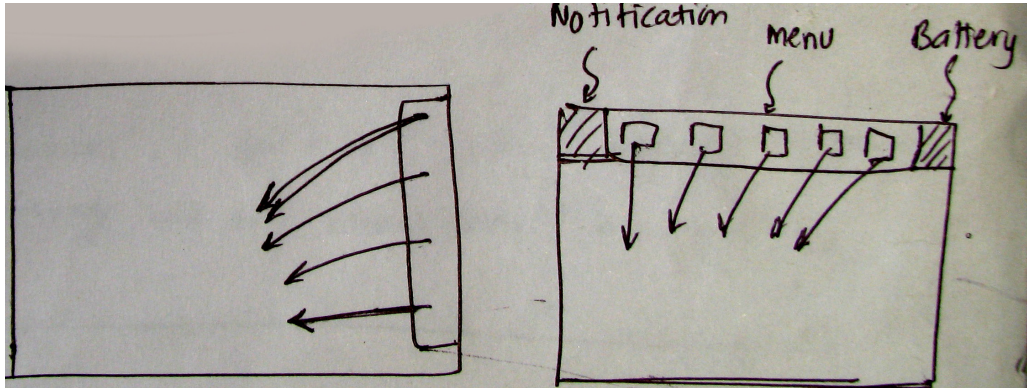
Therefore, I assuming that user will be equipped big touch screen mobile phone, which will be multi-media capable and high rate data transfer wireless networked.
In case of device, it will be used within the house by the kids or the elderly. It has to be mobile, so that user can use the device at any part of house, OR any surface OR simply holding in the hand.
At the same time device has to be big enough to give the experience of the other person whom with the communication is happening.
To allow more flexible use of the device, which is possible in case of touch screen where direct manipulation of content is possible and user do not need key board and mouse like input devices, therefore touch screen will be more useful in this case.
Before actually starting the interface detailing, It was important to decide the form of the device, so that the software interface like layout, navigation and feel can be designed accordingly.
To have a integrated device, the hardware and software has to go hand in hand.
Therefore, I started the brainstorm for the shape and the technologies needed for input and out put of data (Fig. 7.4d). I tried to use the home environment element like table, ceiling or curtains for the out put of content using projector system to project the content.



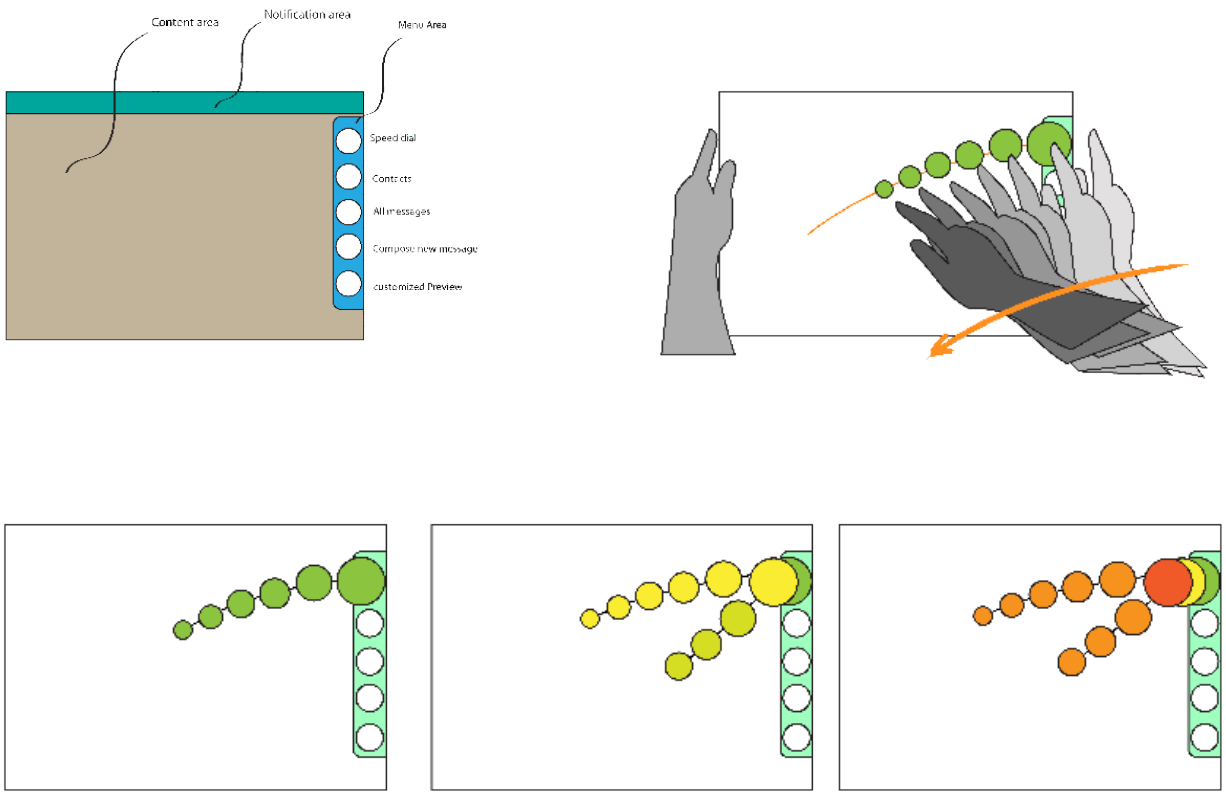
(Fig. 7.4e) Brainstorm for the devices - form and technology integration







(Fig. 7.4f) Brainstorm for the space operation with respect to the device use



(Fig. 7.4g) Layout for the device

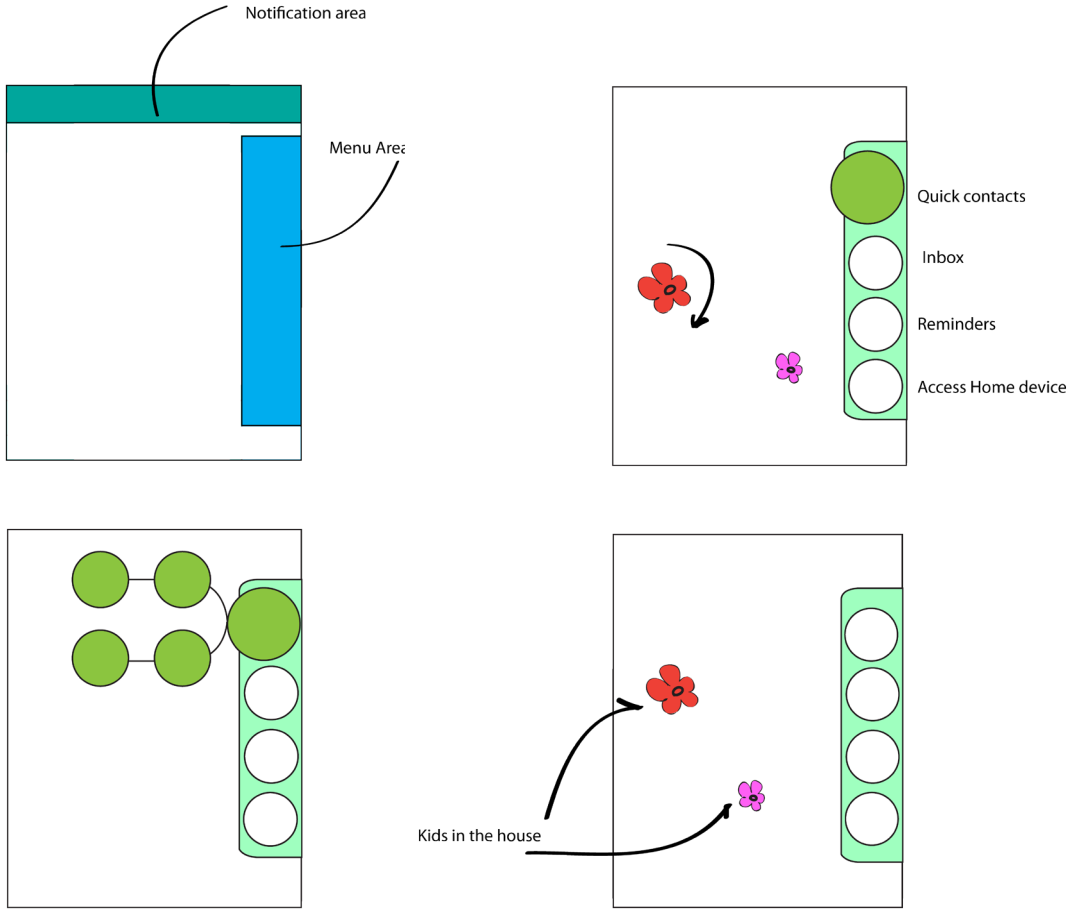
After detailed information architecture (Page No.80 Fig.7.3c) and the brainstorm, I was able to plot the layout for the device. In which device screen is divided into the 3 parts
- Notification area
- Content area
- Menu area

Notification area is placed as a header, to make it **consistent** with the mobile phone layout. The majority of the mobile phone has the notification area as a header, in the layout. Therefore it will also follow the existing conceptual model of user.

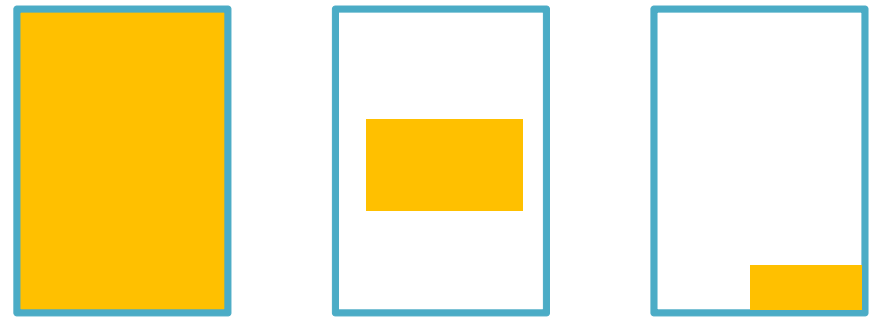
The menu bar is placed to the right hand side, to suit the right handed user, also it can be shifted to left hand side to suit the left handed user. Another reason was, to follow the natural movement of arm. The menu options will open, to follow the natural movement of hand.
As the (Fig. 7.4g) shows that the multi-level of interface can be built

The next step was to make detailed navigation for the device and mobile interface which both will be consistent with each other.

My aim was to make mobile application as simple as possible by providing more information in the form of display of the content and minimizing the input actions i.e. inputs to reach up to the information.
Also to make the application consistent with the device interface as well as to the mobile phone itself, so that it will follow the user's conceptual model, which will help in making less errors and fast use of the application.
The notification of the family members can be shown on the mobile phone application screen symbolically
For Ex.
by flowers, with different colors.
The rotation of the shape or the movement of the shape will show, that the user is active in some way.
User can see the information by choosing the 'Home' option from the menu which will connect to the home device and will access the information in real time.
User can also set this display (i.e. abstract shape, flowers) , as a screen saver or animated mobile phone background, so that user can see the information and update just by having a glance towards the device without actually clicking and selecting through the menu options.



(Fig. 7.4h) Layout for the Mobile phone application



(Fig. 7.4i) Layout for the device (R7.4d)

The other major updates will be given by the beep sound or the flashing of screen but user can always customize it to suit his/her requirement.

After finishing the layouts for the device and the mobile phone, the next step is to detailed navigation and the design of the surface level element like the icons and color for the screen layout.

For designing the detailed navigation for mobile phone, I Placed all the options into hierarchy according to the user need and frequency of use. Then I divided them into the different application posture and they are (Fig.7.4i) (R7.4d),

- Sovereign: programs takes over the entire screen
- Transient: programs come and go
- Daemonic: mostly invisible
  doing its thing in the background

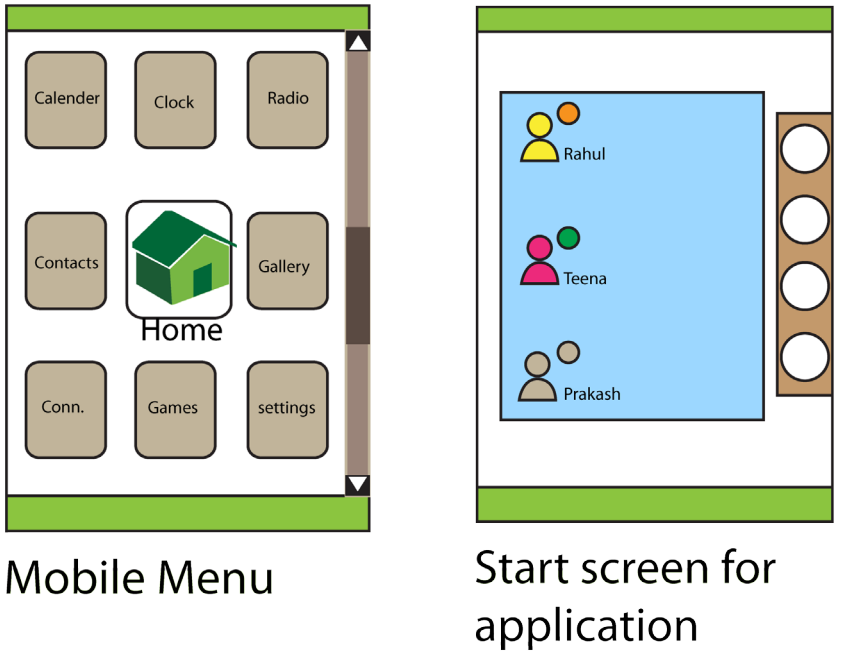
In case of mobile phone application the division of spaces and use of posture is very important as

- screen size is very small
- Information overload can be minimized

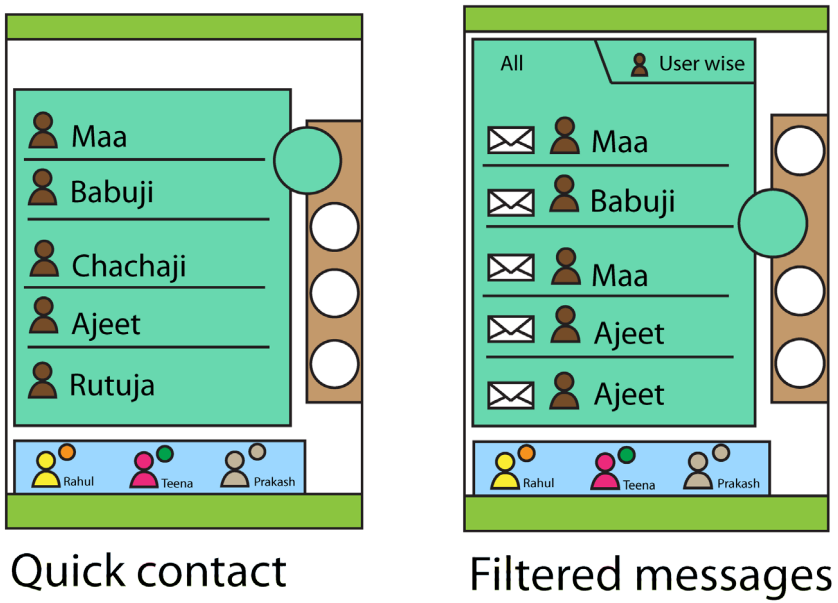
Detailed navigation:
The mobile application will be placed in the menu options (Fig.7.4j). If user wants to access the information from the home based device, she can select the HOME icon from the menu bar.
After clicking the Home icon, the application will open, which is accessing the information about the family members at home. The content space (shown in blue color in fig.7.4j) is totally acquired by the updates because the main purpose of the application is to give updates about the people at home. Therefore this information will be always be there on the screen.
It will show the presence, activeness/ idleness and emotional status of family members using icons, text and color code as shown in (Fig. 7.4j).

Also if user wants to communicate to them, then user can simply click on icon, that will make a call to home based device, which is then can be changed into,
- voice call or
- video call or
- sharing canvas or mirror option.

as these icons will be there always on the screen, it will be easy for user to quick dial them.



(Fig. 7.4j) Layout for the device



(Fig.7.3k) Conceptual framework for mobile phone

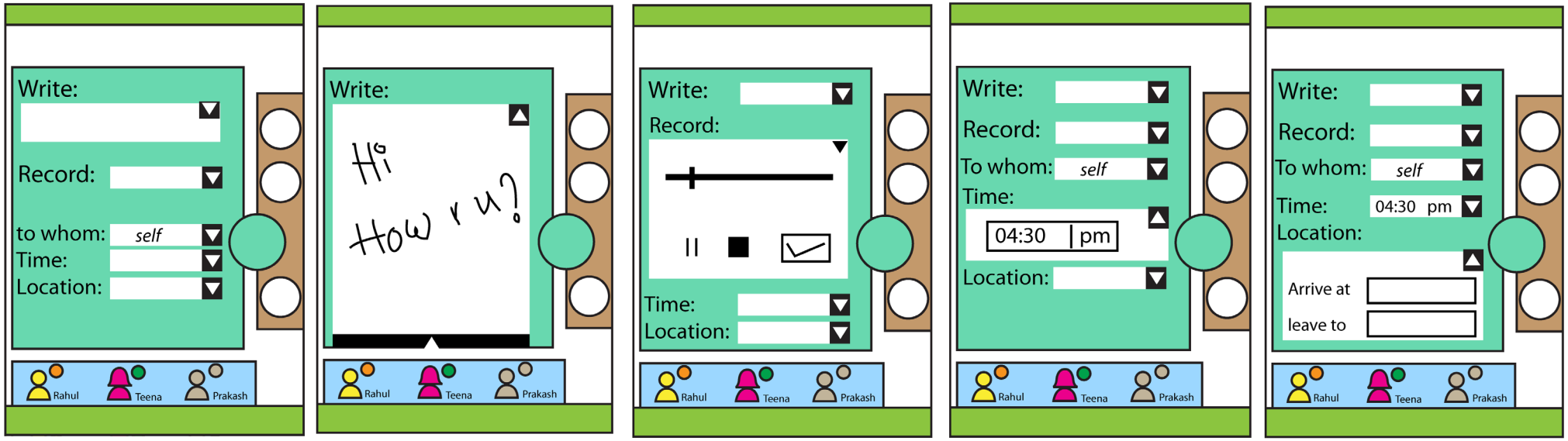
When user will click any of the menu option, then details about the family members(blue space) will get minimized at the bottom just above the footer bar (Fig 7.3k).
The first icon in the menu bar is 'quick contact'.
These are the contact details of people **other than the family members** (relatives or family friends) which user frequently wants to communicate. These contacts are filtered from the contact book. This is user generated contact list like group option in contact book.

The next icon is the messages received. These messages are part of mobile message storage i.e. inbox, filtered for viewing the messages **only from the family members and the quick contact group people** at one place. User can also sort these messages by particular sender wise.

The aim was to bring all the messages from family and friends at one place i.e. filtering or sorting them so that the browsing the old event (History) will be easy.

The next option in the menu bar is the Reminder.
The existing reminder system is based on the two basic things i.e. time and subject or event.
Here this option has flexibility of setting the reminder for the home device by
- person wise
- the location
- time based
- the medium i.e. audio or video or written or typed
User can use any one or combination of those to set the reminder.

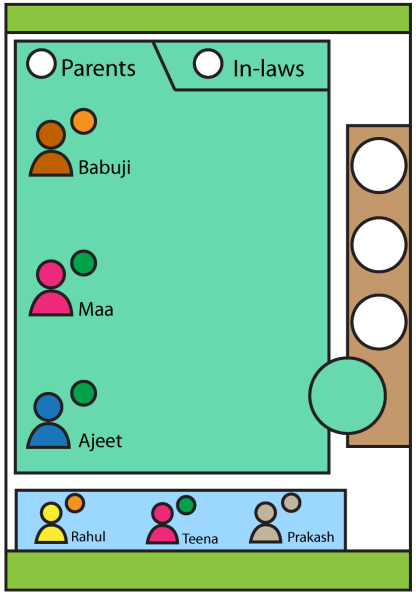
User can choose by which way he/she wants to get or set the reminder for herself or for other family members. This is possible by the 'write option' where user can scribble or type the subject and event. User can set the reminder on the home based device and she can leave the message for the particular person, also at particular location.
For Ex.
User wants to set the reminder for the kids, when they will be back from school. So what user can do is that, she can write or record her voice from the mobile phone and then select the kids from menu and then specify the location like when kids arrive at home and enter into the kitchen, deliver the message.



Reminders

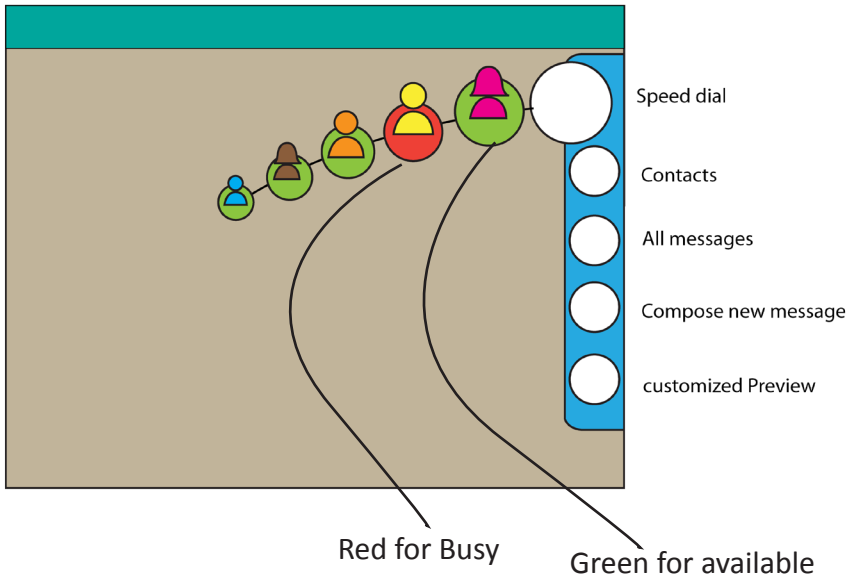
(Fig. 7.4l) Reminder option in menu bar

The last option in the menu bar is access the other devices, which are already synchronized with the mobile phone.
Using this option user can see the similar information like she can see about her own home, like status of the people at home. The similar kind of information she can access for other devices also.
For Ex.
User can get information about the parents home or In-laws home, who all are there in the house, what they are doing, how are they, either to call them or not if they are not sleeping.
By using this user will know about the dear ones, without actually calling them or invading their privacy. Even if User is busy, in her routine schedule, she can get the information by logging into the mobile application.



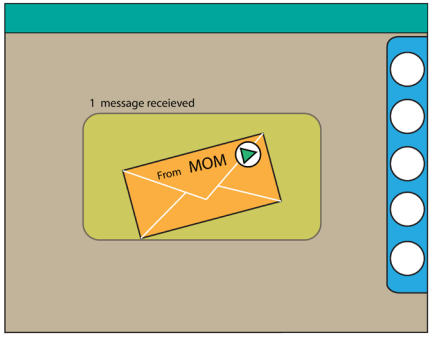
Access other devices

(Fig.7.3m) Access other devices

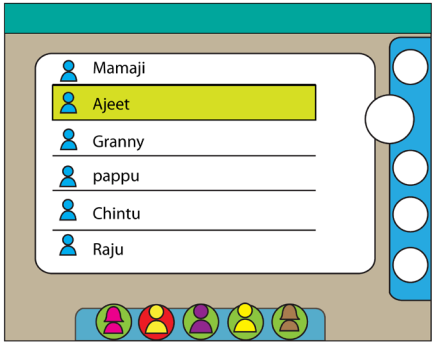


(Fig.7.3n) Starting screen for the device

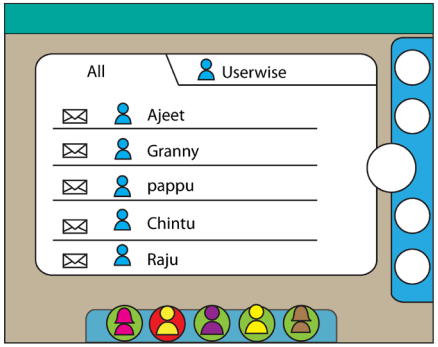
The almost similar kind of interface will be on the device. The only difference here is the family members at home, they will not to able to see the presence, location and emotional status.
The only thing they can see is, the mobile status i.e. is it in busy mode, meeting mode or general mode so that, kids at home can decide to call mom-dad or not. That can be shown by the color code i.e. green for available and red for the busy mode. (Fig. 7.3n)
all the other options and interface details are similar to the mobile phone interface. (Images on the next page Fig. 7.4o)



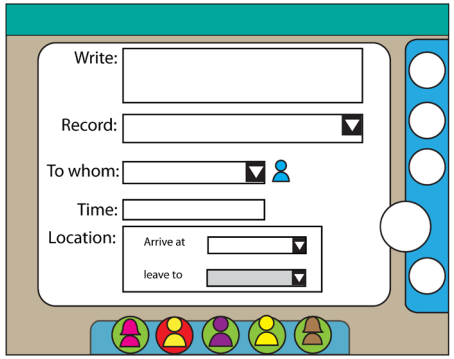
The receieved message



All Contacts



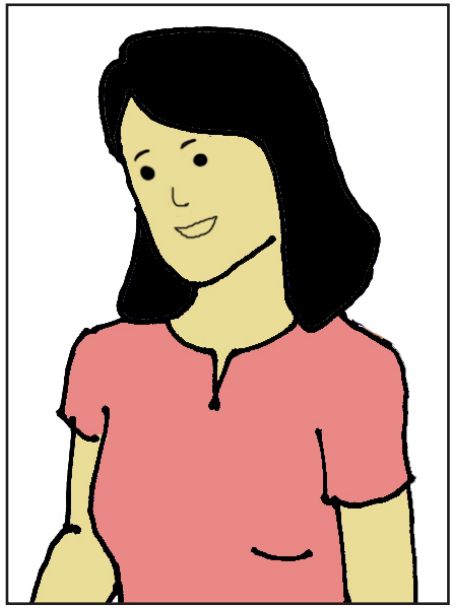
All messgae storage



Reminder or composing the message

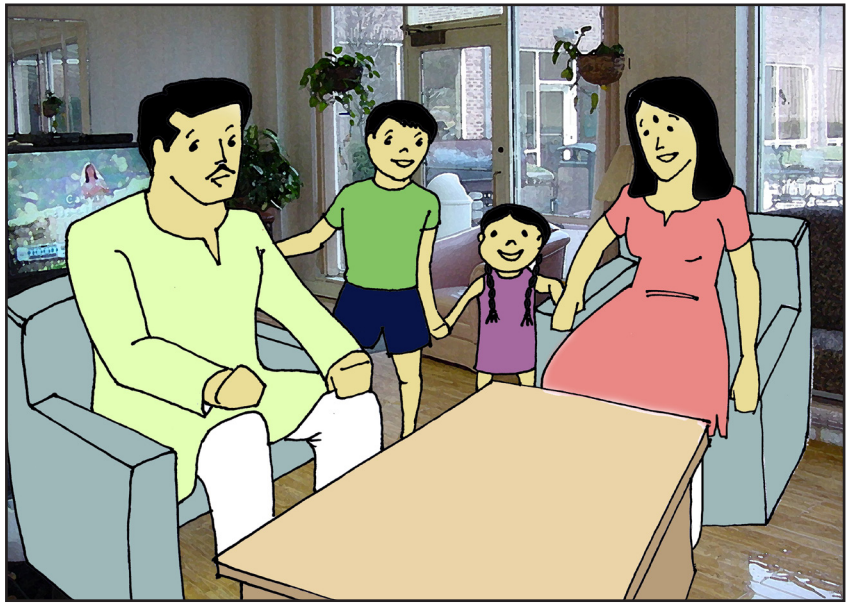
(Fig. 7.4o) Screens for the device

Scenario:



Hi, My name is Radha.
I am 35 years old and i work with ABC Inc. as senior software engg.

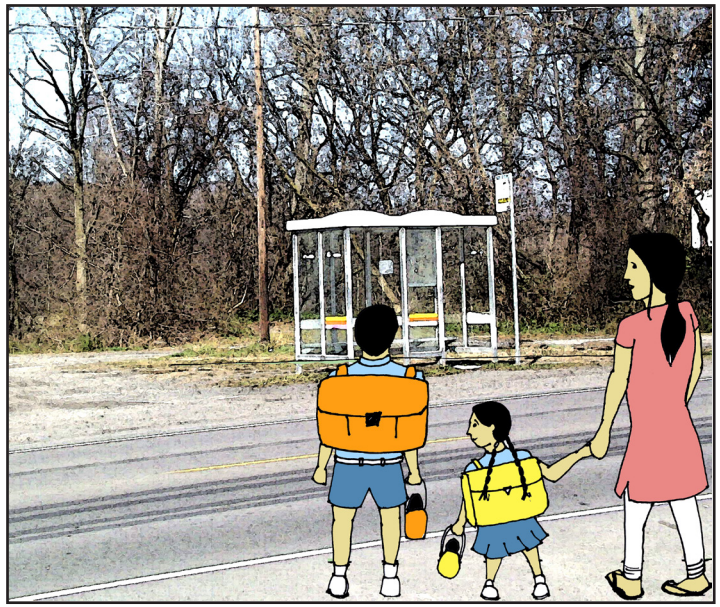
We live in a small society at Hadapsar, Pune. It is a group of apartments.



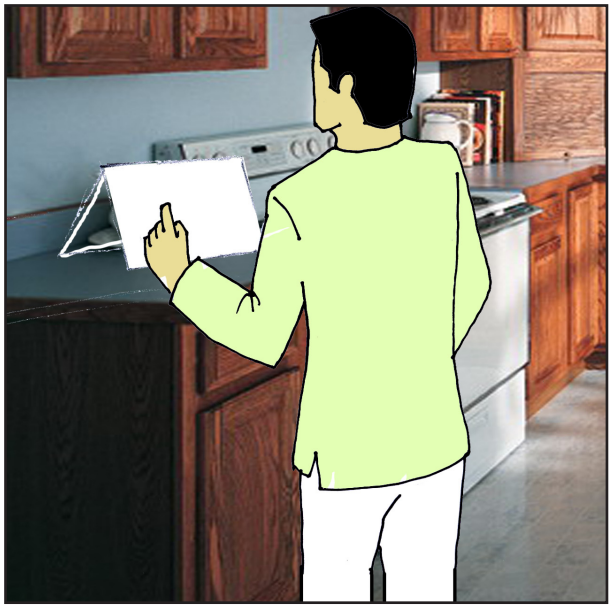
Meet my family, my husband Prakash, he is a H.R manager at XYZ motors. My son Rahul, he study in 7th standard and my lovely daughter Teena, she is in 2nd standard.
Its my small and happy family. Prakash and me both goes to job and when kids return from school, they stay alone at home and study & in afternoon they go to the small colony garden to play.

I manage to come home by 7.30 p.m. Even if I get late,Rahul takes care of Teena. but still used to feel so worried about them.
But now we have a device which has made my life so easy.
Lets see how it helps me throughout the day...

My routine day starts early in the morning, about 6:30 a.m.
I prepare the breakfast and tiffin for the kids.



and then helped them to get to the bus stop, where school bus picks them up.
During that, Prakash checks his calenders and To Do lists from mobile, PC & office all at one glance on the device.



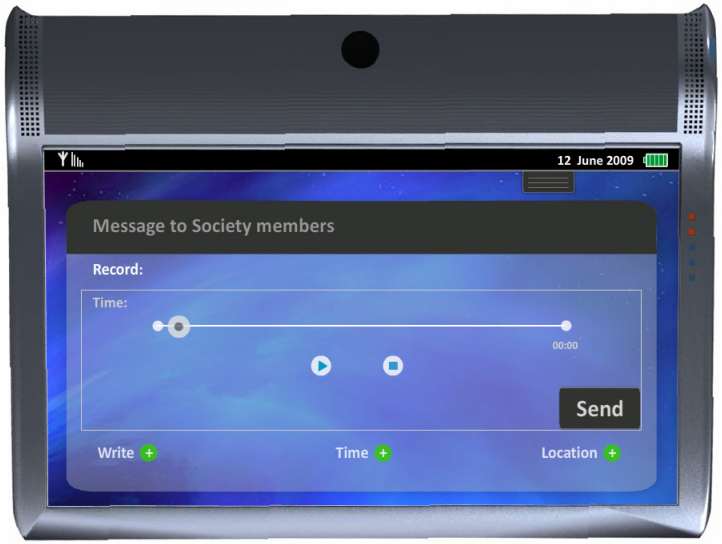
As Prakash approaches to the device, it shows, all the relevant information for him. It is so helpful for him to manage stuff.
Look what he has got, he found reminder. It is about ‘to announce the society meeting’.
Prakash is a society secretary.
He uses device to call for a urgent meeting to-night for apartment members. It is about the repair work of building terrace as Monsoon is approaching.

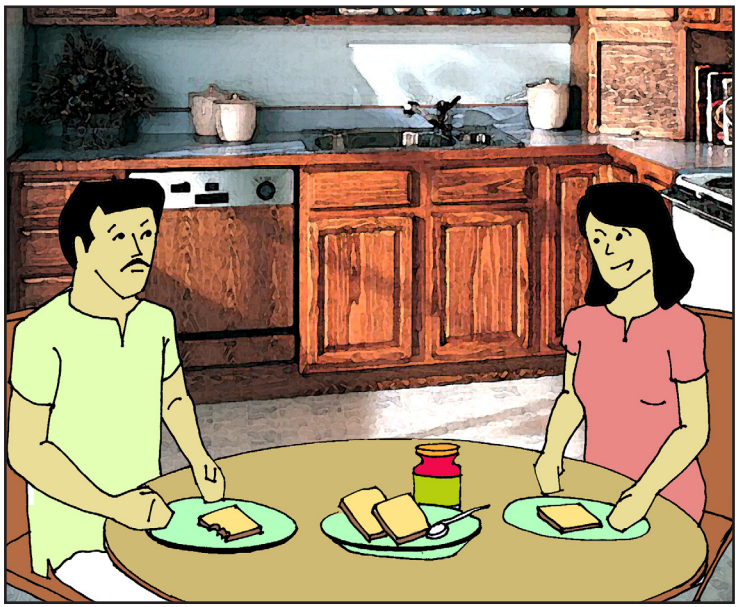

12 June 2009
Reminders
+ Add New
- Announce the society meeting 07:45 am
- Meeting with Mr. Thakkar 02:30 pm
- Appointment with Dr. Za 07:45 pm
Updates
Mr. Thakkar Documents to be... 07:55 pm Reply >>
Ajeet G. RE: I will call you 08:35 pm Reply >>
Ujjwal L. How'z DDS going? 11:03 pm Reply >>
Mohan H. FW: Files are attached... 07:45 am Reply >>
More >>


12 June 2009


12 June 2009
R
Relatives
O
Office
S
Society

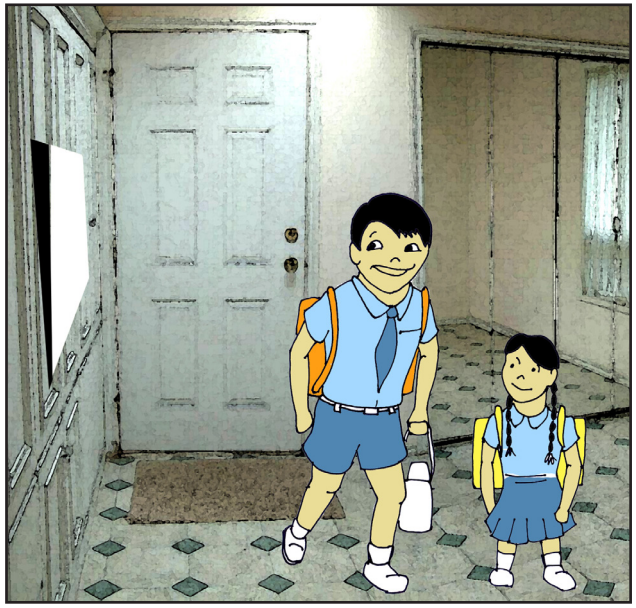

12 June 2009
Call
Message
Reminder


12 June 2009
Message to Society members
Record:
Time:
00:00
Send
Write
Time
Location



We took breakfast together and discuss the daily matters and schedules.

Around 12.30 p.m. I got a call from my old family friend, she has invited us for the marriage anniversary party at 8:30 p.m.
I have to leave the message for kids, so that they can finish their studies and will be ready as soon as I reach at home. But I have a meeting with the client to attain and god knows how long it will take and also Kids are in school so I can not even call them.
Let me leave message from my mobile phone on to the device, so that they can receive it when they get back home.

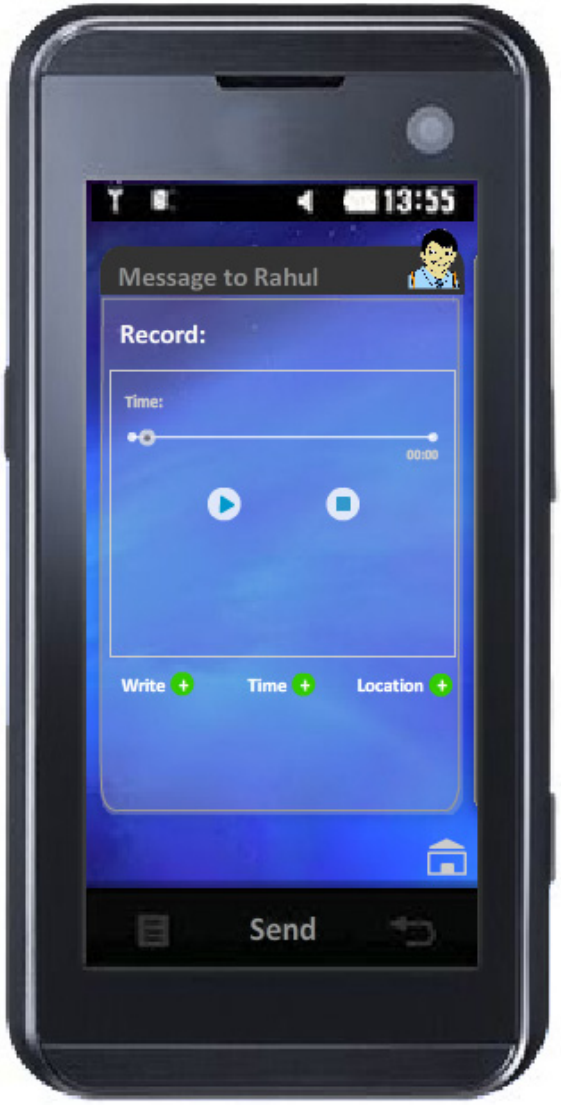


Device will sense that, kids are back home and it also notifies me on my mobile phone that 'kids are back from school'.

And when kids receive the message to kids it gives me the delivery report on my mobile phone, so I feel relief they will finish their study till I reach home.
I can see on my mobile phone, what kids are doing at home. I feel so connected to them.


13:55
Send


13:55
Call
Message
Reminder


13:55
Message to Rahul
Record:
Time:
00:00
Write
Time
Location
Send


13:55
Sending Message...
Send

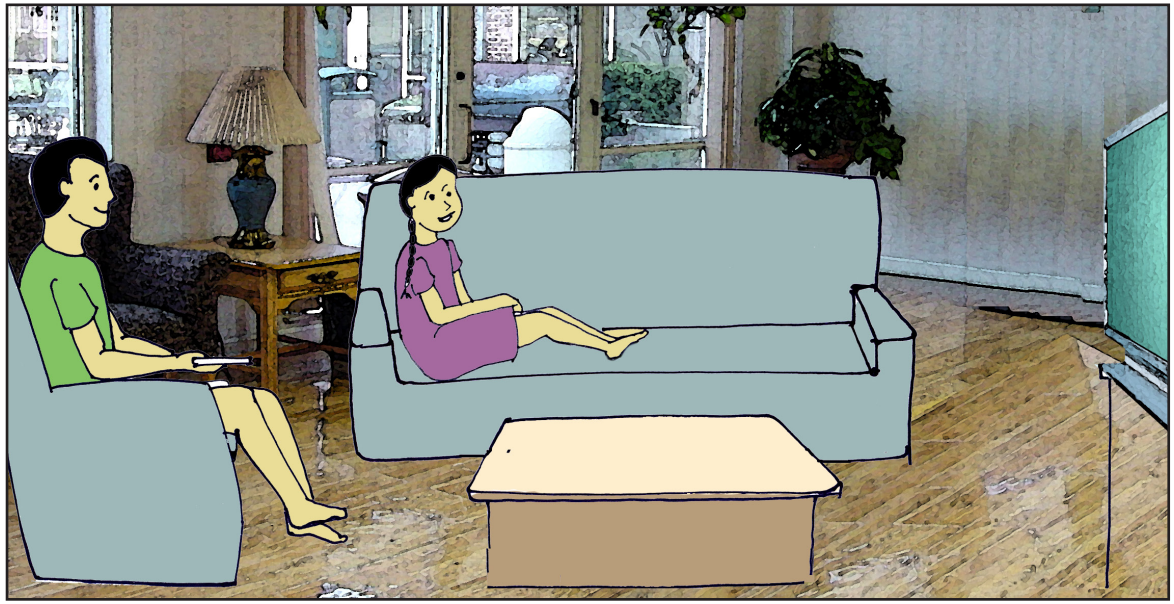

13:55
Show on Desktop
Show as screensaver
Settings


13:55
Home

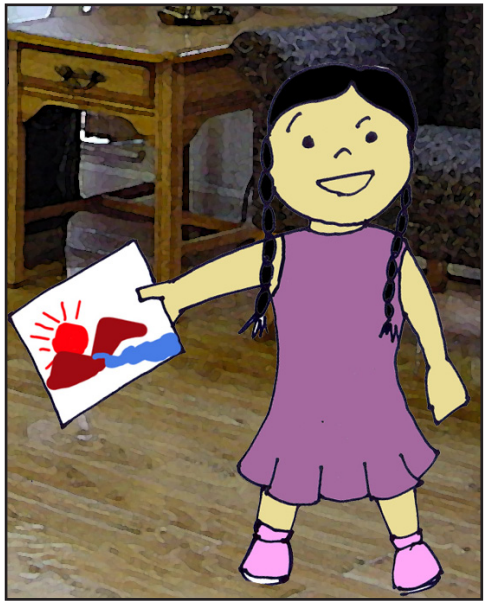

13:55
Home
Rahul & Teena at home
View


12 June 2009
Hi, Rahul & Teena
Message
From Mom
12:30 pm
Reply >>
Forward >>


13:55
Home
Message Delivered ...
View



Kids had finished their lunch and now they are taking rest.
I can see on the mobile screen in the form of symbols that, they both are watching TV.

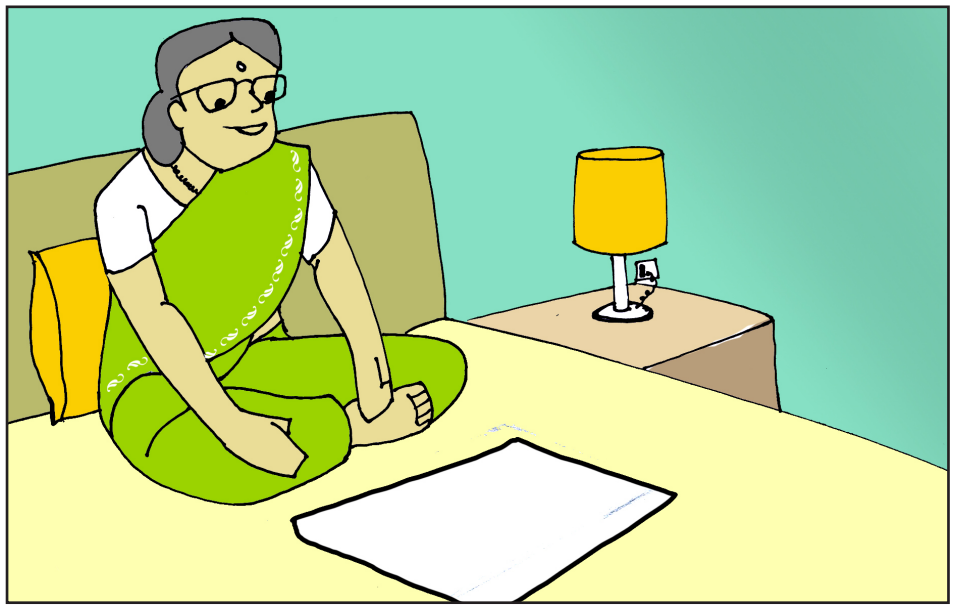


Device starts ringing, Teena knows that , its a call from Granny.
Everyday Granny calls her, same time.
Teena loves painting and sketching.
She is learning it from the Granny.

Granny lives in Nagpur. She is a retired art school teacher.


12 June 2009
Granny calling...
Answer
Reject


12 June 2009
Granny ...
Add Call
Canvas
Mirror
+ Share



Granny and Teena love spend time together, sharing stories with each other. Granny likes that her grand daughter is also interested in art. She teaches her with interest. Granny uses her device to teach sketching and drawing to Teena.

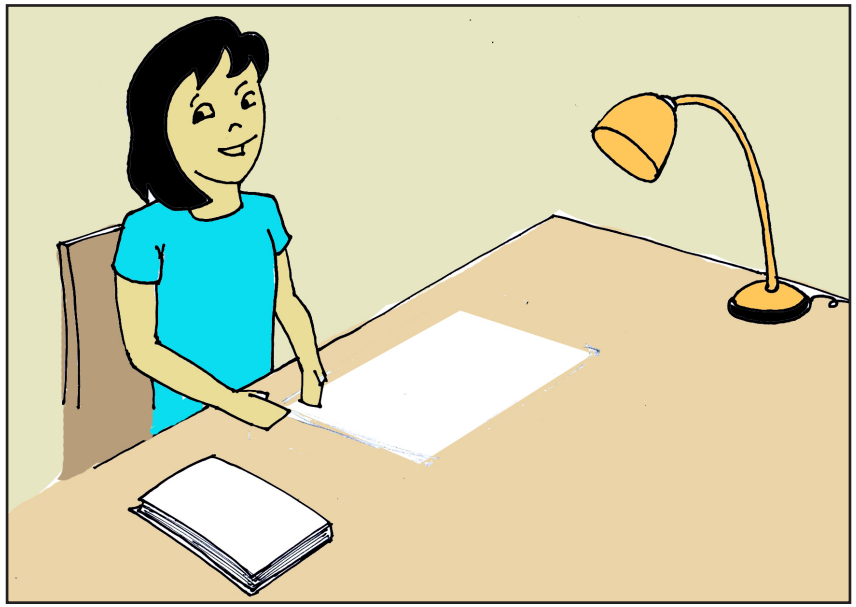
She shares her device (canvas option) with Teena, where both of them can sketch & paint in real time & collaboratively.
Today granny is teaching how to draw the 'Rangoli'. she started narrating and drawing dots and lines on the canvas but Teena gets confused as the lines & dots are appearing on every part of the screen, she can not see and predicts that where granny is going to put the next line and dot. She tell Granny about that, Granny smiles and converts the canvas into the mirror option.

Now Teena can see the Granny's hand outline. The hand and lines coordination helped her to understand the drawing Rangoli.
Granny feels so good that even if they are living away from each other, still they are so connected with each other through their common interest.


12 June 2009
Granny...
Add Call
Canvas
Mirror
Share


12 June 2009
Granny...
Add Call
Canvas
Mirror
Share

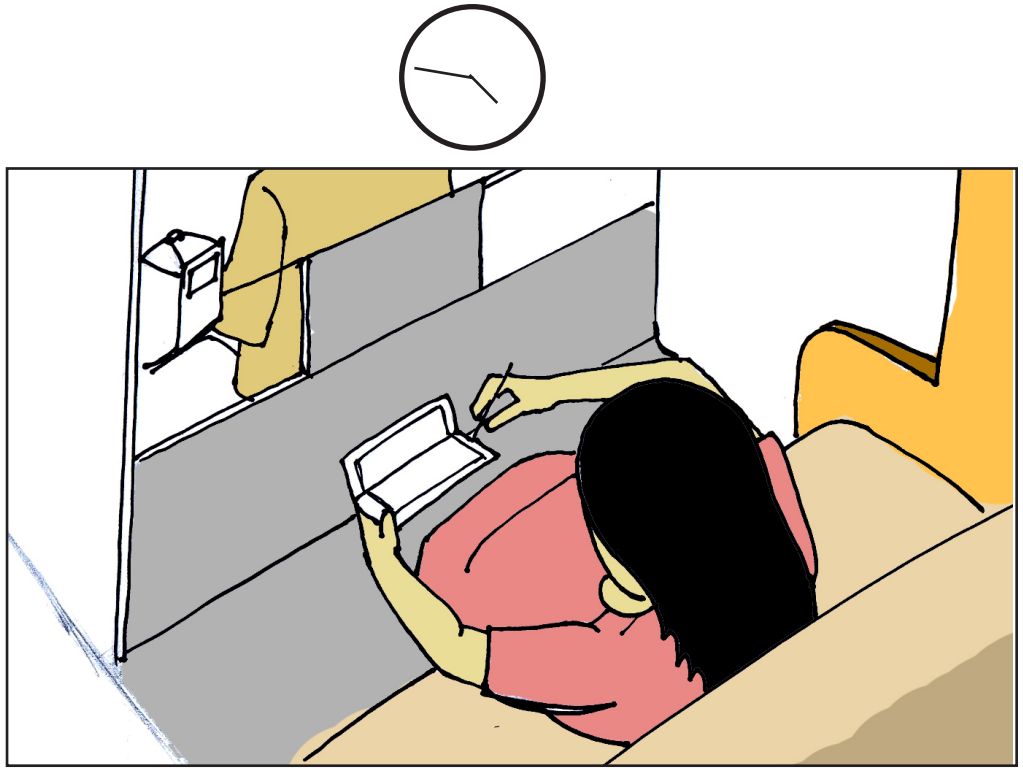
After finish watching TV and Rangoli learning both of them sat for study.
Rahul finishes all this home work except science.
He is unable to understand the Fleming's right hand rule. So he calls her classmate who lives in the same society. Generally both of them uses the device to study together and discuss the homework.



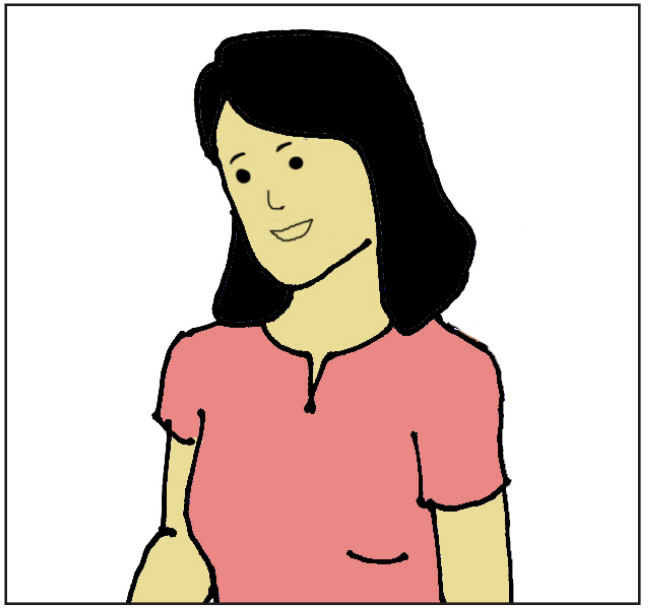
Angali and Rahul uses the mirror and canvas option together, and they starts studying and trying to understand the Fleming's right hand rule.
But Both of them unable to understand the concept.
(Then Rahul gets an alert on the screen, Mom is calling on the phone. Rahul receives phone on the device and automatically the on going conversation gets onto the hold.)


12 June 2009
Call
Reminder


12 June 2009
Anjali...
Add Call
Canvas
Mirror
Share



I called Rahul from auto rickshaw. I told him, that it will take one and half hour for me to reach home, I have to go to the market to buy vegetables and gift for the tonight's party. I also inquired about their homework. Teena was done with her homework. but rahul told me that, he is struggling with science homework. I asked him to share the device screen with me, I remember the simple concept taught by my teacher to understand the Fleming's right hand rule. I explained them the concept by scribbling with stylus on the mobile screen.
Kids were happy to know that it was such a simple concept. It makes me feel good too, as I was able to help my kids in their study.
Then I reached the market, it took more than a hour for shopping. I checked the mobile phone, I found that, Teena is very sad, so I decided to get few sweets, that will surely make her feel good.



After that, we went to the party. Prakash was not able to join us, he was busy with society meeting. And ya...It's the end of a my routine day.

See, this is how device had helped me to keep my family connected by knowing about each other even if we are busy with routine.
The device helped me to know about the kids without actually monitoring or watching them.
It also helps us to share experiences and stories in real time, it's like sitting together with each other.


Rahul...
00:35 Sec.
Add Call
View


12 June 2009
Anjali... & Mom...
Add Call
Canvas
Mirror
Share


13:55
View

The next thing is to design the surface level elements like icons, decide the fonts, color scheme for the device and the mobile interface.
and the form of the product.
As I have already worked on the form (Page no. 88-90), then I decided to give it a look and feel also considering the ergonomic and usability factors.
The device should be such that, which can be hold into hand, can be place over the flat surface or simply hang on the wall. Considering all the other factors I had designed the form for the product (Fig. 7.4p).

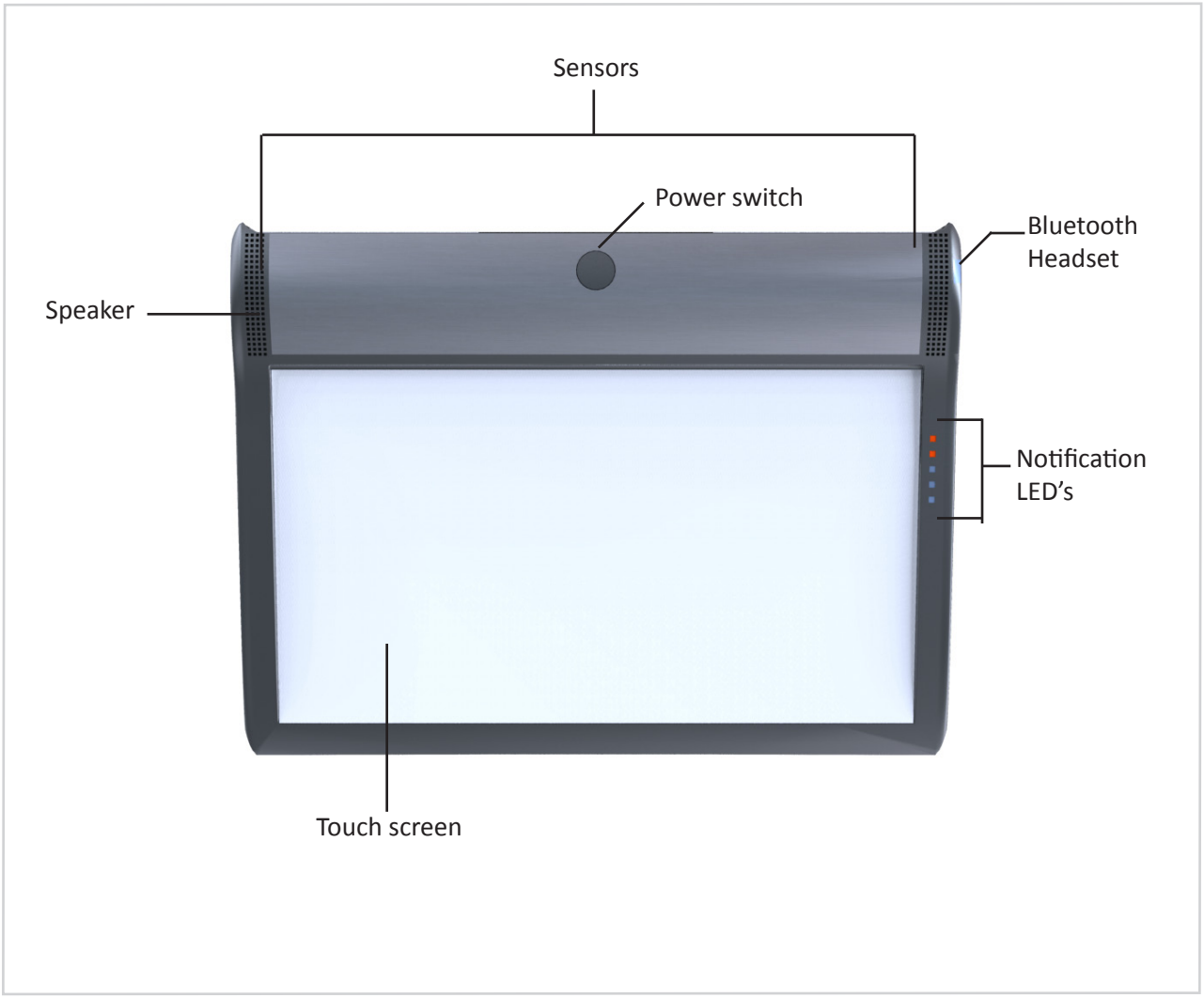
- The attempt was to make it feel little techy, futuristic at the same time very simplistic in form.
- Also tried that there should not be any elevated or protruding element might disturb the user.

- This form is designed in such a way that, when it will be placed on the flat surface, it will be self inclined to get the better visibility.

- The device bottom surface is designed in such a way that, user can take the device in her hand and still get the very good grip, evenif the user is left handed or right handed.

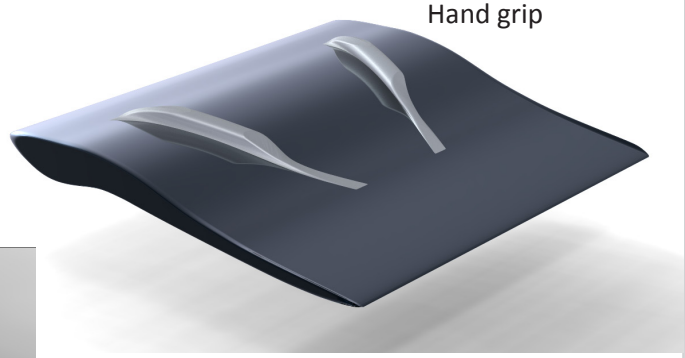
Inspiration sketch from the brainstorm

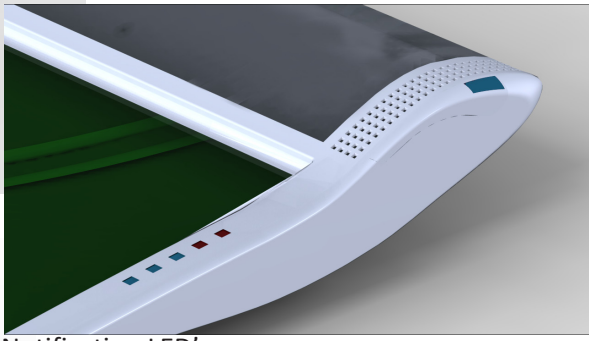
(Fig. 7.4o) Screens for the device



- The part above the touch screen is of the sensors, which will be used during the mirror and user identification.
- The speaker are there to listen the voice messages, notification and to receive the phone.
- There is also in-built bluetooth headset jack, which can be used while speaking on the phone (for privacy) and while recording the voice message from the device.
- The notification LED's will show the connectivity of network and connectivity with the other synchronized devices or the incoming alerts.

Hand grip



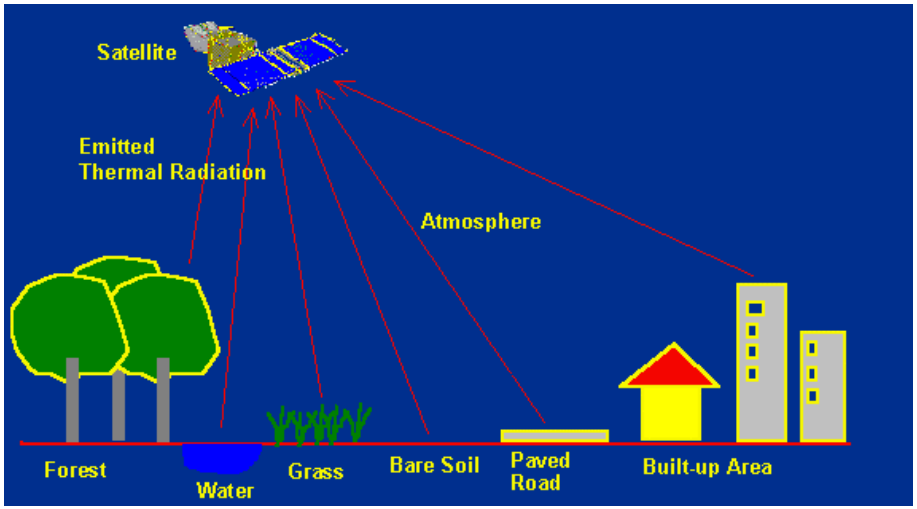


Notification LED's

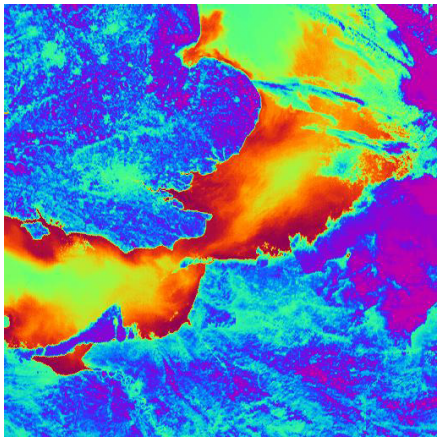
Bluetooth headset

Bluetooth headset

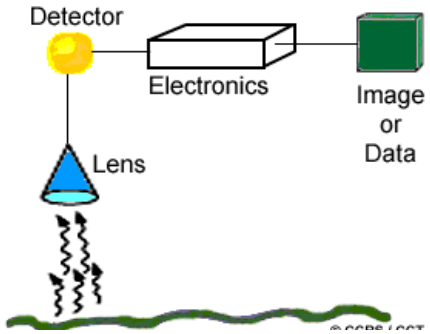
8. Technology



(Fig.8a) Remote Temperature Sensing by satellite for weather forecast



English Channel by Satellite remote sensing



Thermal Imaging

(Fig.8b) Remote Temperature Sensing

The need of sensors is to identify the user's presence, movement and emotions, so that the data received can be processed at the server level and can be accessed from the mobile phone.
For identifying the presence of kids at home, there are many technologies which can be helpful like
- Tagging with RFID
  - in cloths
  - in/on body [in the form of jewelry (Ring, bracelet, toy)]
- Recognition cameras
The technology which I am using here is a mix of many existing technologies.

The concept was that, to use the temperature of human body to identify the presence, emotions and movement made by them. This can be done by the collaborating various technologies into the system.
The Infrared sensor technology can be helpful which is majorly used by military applications include target acquisition, surveillance, night vision, homing and tracking.
Non-military uses include remote temperature sensing, short-ranged wireless communication and weather forecasting..(Fig. 8a &b) Infrared astronomy uses sensor-equipped telescopes to penetrate dusty regions of space, such as molecular clouds; detect objects such as planets and stars. (R8a)

The similar kind of technologies are used in few examples like,

- Tracking the Target:
Stinger missiles use passive IR/UV sensors. The missiles look for the infrared light (heat) produced by the target airplane's engines and track the airplane by following that light. The missiles also identify the UV "shadow" of the target and use that identification **to distinguish the target from other heat-producing objects**. A Stinger missile needs a whole array of sensors, because its job is to track the target while it is flying. The Stinger missile can hit targets flying as high as 11,500 feet (3,500 m), and has a range of about 5 miles (8 km). This means, that if an airplane is less than 2 miles high and it is visible as a shape (rather than a dot), then it is likely that the Stinger can hit it. Stinger missiles are extremely accurate. (R8b)

(Fig.8c) Stinger Missiles (R8b)

For detecting the emotions of the user, It is also can be done by the IR sensors, by measuring the body temperature. Human body temperature fluctuates with the emotion changes. The very good example is of the mood rings.

The Mood rings:
The mood ring was developed by the jeweller Marvin Wernick during 1960's. The mood rings were the extremely popular during 1970's.
It is based on the very simple concept, just wear it on your finger and it will show the emotions of the wearer by changing colour (R8c).
Human body heat fluctuates with the change in the emotions. The human body temperature change is sensed by the ring. The ring stone is nothing but a hallow glass shell which is filled with the Themothropic liquid crystals. These liquid crystals are temperature sensitive; they react to even very small change in temperature. They change their position or twist with respect to the temperature change. This change in molecular structure affects the wavelengths of light that are absorbed or reflected by the liquid crystals, resulting in the change of the colour of the stone.

As body temperature increases, in response to passion and happiness, the crystals twist to reflect blue. When user is excited or stressed, blood flow is directed away from the skin and more toward the internal organs, cooling the fingers, causing the crystals to twist the other direction, to reflect more yellow. (R8d)

(Fig.8d) Mood rings and color chart

The colours are listed according to the change in temperature they represent, with dark blue being the warmest and black the coolest(Fig.7d).

- Dark blue: Happy, romantic or passionate
- Blue: Calm or relaxed
- Blue-green: Somewhat relaxed
- Green: Normal or average
- Amber: A little nervous or anxious
- Gray: Very nervous or anxious
- Black: Stressed, tense or feeling harried

This example shows that, we can use the temperature of human body to predict the emotion of the user, which in our case will be showing only the extremes of emotions.

Therefore, The IR remote temperature sensors will be placed with the IR motion detector sensors so that they will work coordinately to sense the presence of particular user at particular place and also measure the minute temperature difference of human body to predict the emotions and activities made by them in terms of the activeness or idleness.
In order to make a sensor that can detect a human being, it needs to make the sensor sensitive to the temperature of a human body.
Humans, having a skin temperature of about 93 degrees F. It radiates infrared energy with a wavelength between 9 and 10 micrometers.
Therefore, the sensors will be typically sensitive in the range of 8 to 12 micrometers.(R8e)
This information will be collected by the home server which will get processed by the programme and will be converted into symbolic form and only that information can be accesses by the synchronized devices, so that it will not invade the privacy of anyone.

9. Prototype

Home based device and interface

Mobile application Interface

Acknowledgement

Users:
My Mom, Mrs. Raut, Mrs. Jadhav, Mrs. Ghodke, Mrs. Khushbu, Mrs. Shah, Mrs. Shubhangi, Mrs. Rashmi.

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(R8b)
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