Animation Design, Special Project

Future of Game Design...

A report on video console and their development.

Project Report

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Approval sheet

The special project titled... “Future of Game Design” by Kunal Parida
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VIDEO GAME CONSOLES
AND
FUTURE OF GAME DESIGN

INTRODUCTION

With the evolution of graphic media we have come across yet another important subject which has almost equal influence as well as importance in the vast marketing world of computer visuals and graphics. This medium is nothing new to us. We are very much aware of computer game arcades in present context. There is hardly any person we would have met who never played a video game in his life. The popularity of the medium cannot be ignored regarding old video game arcades to the modern home consoles and portable handheld units.

Along with its popularity also comes the common misconception that these things are for kids and not for the domain of adults. But going by the immense amount of research available on all the above accusations, we will find that video games are more than just a few minute of escapist fun. Video games help in exercising the mind, developing strategies and builds team play in multiplayer games. This is not to say that video games should be played night and day, but to use it moderately like any other thing.

Game Design- An outlook

In India, quantifying gaming faces a peculiar problem due to the grey market here. Gamers predominantly use the PC, mostly because of the high piracy rates on that front. Sony's PlayStation 3 console has not been cracked yet and while Microsoft's Xbox 360 offers that option, the numbers of bugs that can render it obsolete mean that a lot of gamers prefer to keep the warranty intact.

Additionally, the grey markets sell the consoles themselves at a significantly lower price than the retail ones. A large percentage of sales for the Nintendo Wii, which can be easily cracked and used with pirated games, come exclusively from the grey markets. This leads to lot of console sales that don't accounted for either.

However, the console market that these sales figures do account for it quiet large in it and cannot be ignored. Plus with increased rate of adoption and better economic conditions, console gaming is on the rise.

But before going on through the game design aspect of our tomorrow, let's have a brief coverage of the history or evolution of video game consoles as well as the development of computer graphics and memory storage.

History of Video Game Consoles

Magnavox Odyssey, technically the first console, home video games came into the spotlight with Atari's Pong

In this 37 year old industry of game console manufacturers even the recent economic recession was not able to affect the position while other industries were already shuttered down their business. Understanding what makes them ticks requires a fair knowledge of this industry of video game consoles.

The first video game console for home usage was the Magnavox Odyssey, was released on May 24, 1972. However, as far as the public at large is concerned, the first 'true console' was Atari's 'Pong', created by founder Nolan Bushnell, who is known as the father of video games. Pong was released for home use in 1975, although its idea was taken from a similar game in the Odyssey.

The Pong console, at that time, was little more than a motherboard and chip with single Pong game running on it, with two crude controllers attached to the device. However, little did they know that this was to set up the future of a multi-billion-dollar video games industry.

16-bit gaming came with the SegaGenesis

The next significant step forward for video game console came in 1983, with the launch of the Nintendo Entertainment System (NES) in Japan, which was subsequently taken to the US and European markets in 1985 and 1986, respectively.

Video games, which were often seen as something for the kids, received a boost with the vision of legendary game developer Shigeru Miyamoto, who infused life into gaming by blending art and story-telling into the mixture. Names like Super Mario Bros and The Legends of Zelda quickly became known across the world and in every home, even those in India. And true to Miyamoto's vision, the games transcended all ages, sexes and other demographics to truly reach out to the family at large.

During the era of the NES, the power scales of the video game industry shifted. Nintendo now reigned supreme, wit Sega catching up fast. Atari, the market leader for all these years, was however not able to catch up the progress made by the former one.

Gradually PCs became the weapon of choice for most of the gamers, as the graphics on the computer began improving rapidly. The console industry needed to come up quickly, and this was provided by Sega in the form of the first 16-bit console, the Sega Genesis, in 1989.

Nintendo's GameBoy/color ushered in the era of handheld video games

This was soon followed by Nintendo releasing the 16-bit Super NES (SNES) two year later, sparking the first of the video game console wars, complete with pot shots, fake marketing claims and the works! The jump to 16-bit chips, however, still didn't bring high quality 3D graphics to video games. Most of the games for consoles were still 2D, with the occasional title such as Virtual Racing demonstrating the possibilities of upcoming 3D technologies.

At this time, Nintendo also kick-started the handheld gaming console market its Game Boy. The console was virtually unchallenged, although Sega's Game Gear and Atari's Lynx tried to compete for a very very short while.

The shift to high-quality graphics finally happened in 1994-95, when Sony released the Nintendo 64 (N64) sparked a visual war, with 3D graphics finally coming to the forefront of games. This also led to different kind of battle between the PlayStation and N64, with the two consoles' formats of choice leading to Sony getting better end of the deal. The Nintendo 64 used cartridges instead of CDs, thus resisting piracy but at the cost of speed and storage. The PlayStation's developers, such as SquareSoft, the makers of the Final Fantasy series, had to switch to the PlayStation as the console of choice.

The next 'generation' of consoles emerged in the period 1998 to 2001, with graphics becoming the point of contention as multimedia playback increasingly gained ground. The struggling Sega gave it one last shot with the DreamCast, and subsequently withdrew from the console market for good.

The DreamCast was Sega's last chance of survival

Metal Gear Solid series was associated with PS2

Nintendo's loss in the last battle due to the cartridge format saw the company release its first disk-based console, the GameCube. The graphics and processing power, however, never competed with Sony's PlayStation 2, and the latter started a period of rule that was to last for many years. The PS2, released in 2000, went on to become the most widely sold video game console of all time. The very next year Microsoft introduced its first hardware venture, the Xbox which was based on Pentium III CPU, the console used much PC technology to enhance its internal development.

The PS2 and Xbox also cemented an emerging trend among developers to sign up for exclusive deals with console manufacturers; The Metal Gear Solid series became a trademark for the PS2 while Xbox relied on the mega-hit Halo as its premier title. Between the times the PS2 and the Xbox were engaged in their epic battle and waiting to come out with the next generation of consoles, Sony was busy preparing to enter the handheld gaming industry.

The PlayStation Portable was finally launched in December 2004; just a month after Nintendo launched its DS. The two consoles had gone in completely different directions, as the PSP banked on better graphics and more horsepower to deliver great visuals, while the DS sought to take a more 'fun' approach to gaming.

The philosophical shift would continue into the next generation of video game consoles that the three giants of the industry came out with the current lot of the Sony PlayStation 3, the Microsoft Xbox 360 and the Nintendo Wii

Video Game Consoles

Sony PlayStation 3

1. Sony PlayStation 3

Without a doubt, the most highly anticipated product in the generation of consoles was Sony's Playstation 3 (PS3). The original Playstation and the Playstation 2 had already been a mega-hits, and with Microsoft upping the ante with the Xbox 360, the world was ready for Sony to take it head-on. Sony came out with what it regularly touted as a mini-supercomputer and its foray into the `convergence box' - a central multimedia and computing device to replace all other in a household. The Playstation 3 first launched in Japan on November 11, 2006, and sold 81, 639 system within 24 hours, according to Media Crate.

A- Hardware

Cell processor

At the core of everything that the ps3 stands for is the awesome processor that was custom built for it, dubbed the 'Cell Processor '.
The story goes that after launching the ps2, Sony executive wanted their console to have the capability of outperforming the ever-increasing hardware of computer around it. The processor, the heart of any computer, was narrowed down as the one aspect to concentrate on and make it unbeatable.

The company then approached IBM, the world's leading makers and innovators of chip, to build a processor that would be two generations ahead of the pc processors prevalent at that time. IBM was glad to obliged, but asked for a little help. In 2000, an alliance called STI was formed between IBM, Sony computer entertainment and Toshiba, who together worked on the design of the cell broadband engine architecture (CBEA), commonly know as cell microprocessor.
The first chip was tested in the STI design center at Austin, Texas. And the first real application, of course, was in the PlayStation 3.
Getting into the technical aspect of the cell processor would entail a lesson in the microprocessor technology, with phrase like 'power processor element' and 'synergistic processing elements, being thrown about every couple of sentence.
In layman's terms, the cell processor is an eight-core processor, which means that it can compute eight different processes at the same time – a fantastic achievement to improve the speed of computing. Each of these eight cores is also fitted with 256 kb of memory for local storage when processing an instruction.

The biggest problem for IBM with building such a chip was to figure out how to use each cores to the fullest. The introduction of a resource allocation algorithm solved this problem by ensuring that the PS3 is smart enough to determine which cores are being used at a time and allot new operations accordingly.
In the end, the 64- bit architecture, coupled with the 3.2 GHz core clock speed and the 256x8 kb of storage; translate to some awe-inspiring computational speeds.
A worrying factor for such a high speed processor is overheating. In the PS3, Sony managed to make room for the high quality heat sink that enable the cell processor to run smoothly at temperature as high as 85 degree Celsius.

More powerful than two GeForce 6800 Ultra cards put together

RSX Reality Synthesizer

Just as Sony went to the leader of the chip making world for its cell microprocessor, it went to the leader of the graphic processing unit (GPU) manufacturers for the PS3 graphic card. Nvidia was glad to help out in building what Sony eventually called the reality synthesizer RSX graphic unit.

The chip was ready quickly, running at a core clock of 550 MHz and utilising 256 MB of video memory. Nvidia and Sony often touted the power of the RSX by saying it was more powerful than two GeForce 6800 ultra graphic cards combined.

The RSX can easily output resolution of up to 1080p; but an important feature is its up scaling ability. When you put in a regular DVD or VCD, the ps3 uses the incoming video data to send the information to the RSX, which refines the image quality when playing it back. For multimedia lovers and especially fans of old Hindi movies, this is a Godsend.

Blu-ray ROM

The PlayStation 3 was also to introduce Sony's new format for optical disks, dubbed Blu-ray. Sony was touting these disk as the future of multimedia and gaming in particular, with a single Blu-ray disk being able to store over 30 GB data. The next generation optical disk promised games at a more rapid pace and with loads of extra content.

PS3 Hardrive

Hard Disk

The PS3 comes with different sized hard disk, ranging from 20 GB right up to 80 GB. The coolest part about the ps3 is that it uses a standard 2.5 inch SATA hard disk. This means that as long as you find a model that is compatible with the PS3, you could easily replace the current hard disk with a larger capacity offering.

Connectivity

Since the PlayStation 3 was always targeted at being a convergence box, Sony had thrown in a lot of connectivity options into the system. For connecting to television, a monitor or a projector the user can use either HDMI or component cable.
For a internet, a ps3 can be connected to a standard Ethernet cable via a port at its back or use the built in Wi-Fi chip to latch on to a signal.

The PS3 also has Bluetooth V2.0 with A2DP built into the system, which is used to connect the controller or any other accessories wirelessly. At any one time, the ps3 can support up to seven controllers. Some version of PS3 also built in 5 in 1 card reader. This supports most of Sony's propriety formats and SD card, but you will need an adapter to connect a MicroSD card.

B- Accessories

Six Axis and DualShock 3 controllers

First of all, the SixAxis came with built in motion sensing technology. This feature was often criticised as a last minute add on by Sony to compete with Nintendo's Wii , and it could be clearly seen by how little the games that out for the ps3 used the motion sensors. The name of the controller is derived from the fact that it can sense both rotational orientation and translational acceleration along all three dimensional axis, providing six degree of freedom.

Another noticeable feature of the SixAxis was that the weight of the controller had gone substantially. This could be chalked up to the fact that vibration feedback was completely missing in the SixAxis. Sony claimed that the vibration messed with the motion sensor. Thus it was a conscious decision to discontinue that aspect.

In terms of design, very little changed in the transition from DualShock 3 to SixAxis , with Sony retaining the same eight button layout (cross, square, triangle, circle , R1, R2, L1, L2), four way navigational pad and dual analogue sticks. The one change, though were the R2 and L2 buttons, which now bore a trigger like mechanism instead of the former rounded edges.

PS3 Eye Webcam

PlayStation Eye

Trumpeting the bigger and better horn, the PlayStation eye claims to record 640x480 pixels VGA video at frame rate 60 Hz and 320x240 pixels video at 120 Hz twice that of the EyeToy.
The camera features a two setting adjustable fixed focus zoom lens. Selected manually by rotating the lens barrel, the PlayStation Eye can be set to a 56degree field of view similar to that of the EyeToy, for close–up framing in chat application, or a 75 degree field of view for long shot framing in interactive physical gaming application.

Wireless Keypad

Wireless Keypad

Since the PS3 was always meant to take over the computer, the introduction of a wireless keyboard was only a matter of time, as without it, browsing the internet is nearly impossible. And of course, with the introduction of PSN home and other clients, gamers needed a way to be able to chat with each other.
The peripheral is quite ugly and tips the weight of the controller forward by an unhealthy amount. Plus, since it comes right above the L1 and R1 buttons, switching between the four forward facing buttons invariably ends up with your fingers scrapping the bottom of the keypad.

C- INTERFACE

Xross Media Bar

The main graphical interface of the PlayStation 3 is known as the Xross Media Bar (XMB) , pronounced as ‘Cross Media Bar ‘. The interface is based on the XMB that was developed for the PlayStation Portable.

Sony also hit upon an innovative way to make the XMB wallpaper vibrant: the background of the XMB changes its colour on the 16th and 24th of each month, while the brightness of the colour changes its shade throughout the day. Of course, users can always select a background colour and shade and make it permanent, or use an image stored on their hard disk as the permanent wallpaper.

The XMB is fully controlled by the SixAxis or the DualShock 3, and uses ten main categories to start off with: users, settings, photo, music, video, game, network, PlayStation network, PlayStation home and friends.

The PS3 include the ability to store various master and secondary user profiles, manage and explore photos with photo gallery or an ordinary musical/ non-musical slideshow, rip audio CDs, rip iTunes AAC protected files, play music and copy tracks to an attached storage device, play movies and video files from the hard disk drive, an optional USB mass storage or flash card, or an optical disk. The friends menu allows email with emotions and attached picture feature and video chat which require an optional webcam. The PlayStation network menu allow online shopping through the PlayStation store.

The PlatStation Network

Online multiplayer game play is a huge part of modern video gaming. Sony had realeased this trend and sought to create an interface that acts as a platform that acts as a platform for gamers to be able to meet other gamers, keep in touch with each other, browse the internet and spend points and money in an online store. Thus, the PlayStation Network (PSN) was born.
The best part about PSN is that it is completely free, while Microsoft went for a paid revenue model with the Xbox live service, Sony realised that getting users online was paramount and all revenue would be made from sales in the PlayStation Store and through advertisements.

2. Microsoft Xbox 360

Microsoft's foray into the video game industry with the original Xbox wasn't as big a hit as the company would have wanted. Still, the potential was clearly seen, and as is the competitive way of ms, the second generation of its console was intended to beat the heavyweight PlayStation 3 and reign supreme in the console industry. This wasn't going to be easy: Microsoft's core business has always been software while this was an out and out hardware venture. What's more Sony enjoyed a special spot in the hearts of all game developer, given that the PlayStation 2 had quickly become the most popular console of all time.

Bill gates and his merry men decided to place their trust in two visionaries for this next-gen device: Microsoft's Vice President *J Allerd* and the newly hired Peter Moore, former President of Sega America. This partnership has been widely credited as the reason the Xbox 360 has emerged as the superior console among the two.

A- HARDWARE

Xenon Processor

Just because Sony went to IBM to develop a next generation processor did not mean that Microsoft was going to run in the opposite direction. IBM was the premier processor maker on the planet and MS was looking for something state-of-the-art for the Xbox 360.

Allerd and Moore were not looking to build a device that would take over the lives of the household- at least not just yet. The focus was on delivering good performance at the affordable price with a processor that could last a long time, but didn't necessary have to be a mini-supercomputer like that of the PS3.

Using the PowerPC architecture, IBM developed the Xenon processor for the Xbox 360, which boasted of three cores with 32 KB of cache memory on each. Similarly to the cell processor, the Xenon's clock speed was 3.2 GHz.

Microsoft was in hurry to launch the device, though and so ended up coming out with 90nm chips that took up more physical space, more power and emitted more heat.

Since its launch, the Xenon processor has undergone a change and is now called 'Falcon'. In the falcon , MS managed to bring the chips down to 65 nm fabrication process, thus saving precious manufacturing costs and being able to scale down the size of the Xbox 360 if need be.

Xenos GPU

While Sony decided that Nvidia was the way to go for all things graphical, Microsoft was of the opinion that ATI would give more bang-for-buck.
The graphic processing unit (GPU) that ATI came out with was quickly dubbed the Xenos and promised a revolution for Xbox 360. It was based on ATI's upcoming R600 architecture, which was to be used for the company's premium graphics card line-up.

To make the GPU less power hungry, the company decided to merge the two major aspects of shaded hardware; vertex and pixel. In a normal GPU, the shaded are on two physically different segments of the circuit; but in the xenon. ATI put them in the same place.

As nanotech puts it:" the unified shaded architecture that ATI chose to use in their Xbox 360 GPU allows them to pack more functionality onto fewer transistors as less hardware needs to be duplicated for use in different parts of the chip and will run both vertex and shaded programs on the same hardware."

Still, this change in approach ended up taking a lot of ATI's time and the resultant GPU was based on an 80nm fabrication process, thus throwing out more heat. The two 60mm fans that accompanied the heat sink were never going to be enough- a fatal error that later led to the infamous 'Red Ring of Death'.

However, this aspect has since been corrected and the new version of the Xbox 360 based on the Falcon chipsets use 65nm fabrication process for the same. The Xenos GPU has a core clock speed of 500MHz and 10 MB of embedded RAM (eRAM).

DVD Drive

The Xbox 360 uses a standard DVD-ROM for all its operations and all the games used on the device come on standard DVDs. In the initial war of the next-gen disk formats, Microsoft had sided with the Toshiba led HD-DVD add-on for the Xbox 360. However, the company later retraced this device and there have been rumours of Microsoft favouring Blu-ray for the next big console pack, sometime in 2010.

Microsoft Xbox 360 Hard disk

The back of Xbox 360 is filled with several ports for different connectivity options

Hard Disk

The ‘core’ version of Xbox 360, now called the ‘Arcade’, comes without a hard disk at all! This iteration is largely aimed at those who just want to play games and not use the 360as a multimedia device. The ‘Arcade’ model formally came with 256 MB memory unit, but now has 512 MB of built-in-flash memory.
Higher end version of Xbox 360-dubbed the ‘Pro’ and elite – come with 20, 60, or 120 GB hard disk. The hard disk for the 360 is in propriety Microsoft format, and thus cannot be swapped for higher capacity storage.

Connectivity

While the arcade version does not allow for internet connectivity of any kind, the pro and elite Xbox 360 comes with Ethernet ports so that you can play online with your friends.
A composite cable comes bundled with any of the version, while a pro will get you a component cable too, and Elite will throw in HDMI. Still, all three versions do support composite, component and HDMI connectivity. The pro and elite packages also have a headset included, along with a basic controller.
The console also sports three USB ports (two in the front, one at the back), and can connect to the wireless controller via a proprietary protocol.
It also has two fronts, mounted memory card slots for the systems’ proprietary Memory Unit. These can be used to transfer personal game data from one Xbox 360 to another.

The Xbox 360 Controller

B- ACCESSORIES

Xbox 360 controller

The most criticised aspect of the original Xbox led to the most widely appreciated aspect of the Xbox 360; the controller.
The original Xbox had one of the ugliest and most cumbersome controllers in the history of video games. In fact, in the Guinness World Records Gamers' Edition (2008), the original Xbox controller was actually awarded a world record for 'biggest controller '.
Microsoft seems to have taken these stories to heart as the Xbox 360's controller has been nothing short of magnificent. Pristine white and with a matte finish, the controller comes in both a wired and wireless version, where the former connects to the 360 via USB and the latter is operated by batteries.
It is almost as all the controller went on diet and has come out sleeker and more ergonomic than ever before. When Sega Genesis first came out, its controller seemed to have custom made for your hand; the 360 controller gives you that same feeling.
The design of the 360 controller underwent a radical change, with Microsoft dumping the earlier six button interface for a four-button one, akin to the DualShock. However, the button on the 360 controller is made of hard plastic in a bubble like shape, thus giving a nice 'clicked' feel to the user.
MS did stick with one aspect of the original controller using an analogue stick in the top left corner for movement, and moving the navigation pad to where the left analogue stick lies on the DualShock. Honestly, this makes a world of a difference, as your thumbs are aligned while playing any game.

The controller still uses eight button, with the R1 and L1 buttons being relegated to small stubs, while the R2 and L2 buttons are long triggers. Whether it's a coincidence that the SixAxis also went with a trigger-format or not is up for debate, but what is of importance is that the 360's triggers feel a lot more comfortable to hold and pull.

In the wireless controller, the added weight of the dual AA batteries tends to throw the weight ratio off just a little bit, but it is never so inconvenient that you would strain any muscle. A set of high-alkaline batteries, such as Duracell or Energizer, will easily last you for about 20-25 hours of gameplay.

The Xbox 360 game controller also has a new guide button in the center of its face that provide new functionally. This button is divided into four quadrants that light up to provide gamers with different types of information during game play. For instance, during a split screen multiplayer match, a particular quadrant will light up to indicate to a player which part of the screen he or she is playing on at that time.

The guide button can also light up to let a player know he has received a message from another gamer. In this case, when the user pushes the button, he or she visits the Xbox dashboard, which provides access to features such as messaging friends, downloading content , voice chat and customising soundtracks, all while staying in the game. The guide button also allow user to turn off the controller or the console by holding the Guide button longer.

Xbox 360 Chatpad

Messenger kit

Just like the PS3 felt the need for a keyboard-like add-on for the SixAxis, Microsoft figured that the 360 controller needed something to let users chat with their friends. In comes the Messenger Kit, complete with a ChatPad and a wired headset.
The ChatPad connects to the 360 controller, docking between its two arms. This convenient location makes it easy to use one's thumb to type out messages in games and on the Xbox Live Windows Live Messenger.
The ChatPad itself also allow one to connect another accessory, the wired headset, so that a user can go both audio-video connectivity as well as textual input and must have when you are playing a large multiplayer game and need to send a large multiplayer game and needed to send a quick message to your team.

Live Vision

Xbox Live Vision

Xbox Live Vision is a webcam designed for the 360, which can be used for video chat, personal gamer picture, in-game video chat and still picture. The camera can record 640x480 video at 30 frames per sec and is capable to taking still picture at 1.3 megapixels.
It allow for video chat and picture message using an Xbox Live Gold Subscription with video effects along with in-game compatibility.
It also features three camera effects, in which the currently captured video image is overlaid on the dashboard background. The three effects are 'watery' 'edgy' and 'dotty'.
The camera uses a standard USB 2.0 connection and is also window and Mac OS X (v 10.4.9 and newer) compatible.

C- INTERFACE

Dashboard

While the Xbox 360 might not hold a candle to the PlayStation 3 in terms of hardware, Microsoft's years of experience with software has enabled it to come out with a GUI that makes the PS3 look outdated. The 'dashboard ' is equivalent of a windows desktop, in that it is your one stop main launching point for any task you want to perform. The interface of the dashboard is periodically updated over the internet, and the current version is titled the New Xbox Experience (NXE).

The most significance aspect of the NXE is the introduction of the ability to create avatars; players are able to customised avatars by changing body shapes, facial features, hair and cloths, as well as new clothing being released from time to time. The avatar becomes your gateway profile to any game or other Xbox Live environment.

The Xbox guide has also been redesigned. Players are not only able to view their friends and messages, but are able to access their game library. If user gas installed any game onto their Xbox 360 hard disk, they are able to immediately start the game from the guide, whether they are in the game or in the dashboard.

The most significant aspect of NXE is that it allows players to install video games on their hard drives, or download them off the internet. When playing a game from disk, there can often be problem arising from the disk skipping, the drive being dusty, unwanted whirring noises. All of this eliminated by playing a game directly off the hard drive. For most games this feature also reduces the amount of time spent reading the disk, therefore helping to extend the life-span of the optical drive mechanism.

NXE also introduces a feature called Parties, which allow players to take the celebration online, connecting up to eight friends in one venue to catch up on chat, share photos real time, etc. In the future, parties will also enable friends to watch movies or TV shows together.

However, user will be disappointed to note that the Xbox 360 does not support the DivX video format and instead relies purely on WMV files.

Xbox Live

Xbox Live, the online platform for the Xbox 360, is dividing into two types of accounts: Gold and Silver. The silver account is free, allowing users to use minimal aspect of Xbox Live. The paid Gold account opens up the entire suite of Xbox Live goodies! The two main feature of Xbox Live are The Marketplace and the Arcade.

The Xbox live Marketplace is an e store that allow user to download and buy content such as movie and game trailers, video store, game demos, Xbox Live Arcade games, Xbox live Community Games, Xbox originals. Downloadable contents such as map packs, gamer picture and Xbox 360 dashboard themes.

The choice of currency in the Xbox Live world is Microsoft points which can be earned by finishing games and certain mission within games. Points can also be digitally purchased with credit cards or bought through ‘point cards’ and used digitally.

The Xbox Live Arcade is a game e-store that has some of the coolest arcade title from days of yore. Games which usually don’t deserve a full-fledged DVD usually fall into this category, with 2D platform titles like Sonic being the most popular of the lot.

C. NINTENDO Wii

Nintendo had been making video game consoles before Microsoft and Sony even made it big in their respective fields. From the original Nintendo Entertainment Systems to the GameCube, the company has been the most consistent console manufacturer over the past 25 years.

But somewhere, it never quite caught up with the PlayStation 2 and the original Xbox when it comes to the showdown during the last generation of console. People wrote off the company, saying it was past its prime. If anything, the Wii delivers an important lesson: never underestimate Shigeru Miyamoto.

The grand daddy of video games and the creator of Mario set about envisioning a new console that would transcends the current gaming audience and truly appeal to a whole family at large. And boy, did he ever succeed.

Nintendo soon came out with the motion –sensing Wii. Why the name? The company explain; “Wii sounds like ‘we’ , which emphasize that the console is for everyone. Wii can easily be remembered by people around the world, no matter what language they speak. No confusion. No need to abbreviate. Just Wii “ Launched on September 14th 2006, the Wii has sold almost 50 million units worldwide so far. That’s not a typo- fifty million unit!

Wii sounds like 'We', which emphasizes that console is for everyone.

HARDWARE

Broadway Processor

With Sony and Microsoft both going to IBM for the microprocessor in their next gen console, why would Nintendo be left behind?

The company approached IBM for a new processor as well, although its request was completely different from that of Sony and Microsoft. Nintendo was looking for something that provides apple punch at a small size was easy to manufacture and was not power hungry.

This was a different challenge for IBM from the 'cutting–edge technology' demands that it regularly gets. Soon the broadway processor was born.
Nintendo has notoriously shied away from discussing the details of its hardware, probably because of how poorly it compares to the other next gen consoles. Still, a few details have managed to leak over time.

Using a 90 nm fabrication process, the Broadway still manages to use 20 percentages less power than the Gekko processor of the Nintendo GameCube, which was also designed by IBM.

With the core clock running at just 729 MHz, the Wii is barely s fast as the original; Xbox , whose processor clocked in at 733 MHz. Based on the IBM's silicon-insulator Power Architecture , it provides impressive processing power without consuming much energy.

Hollywood GPU

If there was a little information available about the Broadway processor, there is even less about the ATI-produced graphic processing unit (GPU), dubbed the Hollywood.

IGN.com was among the few who found out any details about this ultra secretive GPU. When a source from a game developer studio told them: “The ‘Hollywood’ is a large-scale 90nm integrated chip that includes the GPU, DSP, I/O Bridge and 3MBs of texture memory.”

Further information has leaked that it clocks in at 243 MHz by comparison, GameCube’s GPU ran at 162 MHz, while the GPU on the original Xbox was clocked at 233 MHz. The internal memory of the device includes 3 MB of embedded graphic memory and 24 MB of high speed main memory. Externally, the device uses just 64 Mb of DDR3 memories.

But any modern standards, this is not a device that can churn out awe-inspiring visuals at super-high resolutions. But the Wii was never meant for that anyway, after all. The Wii is all about fun, not about setting new graphic benchmarks.

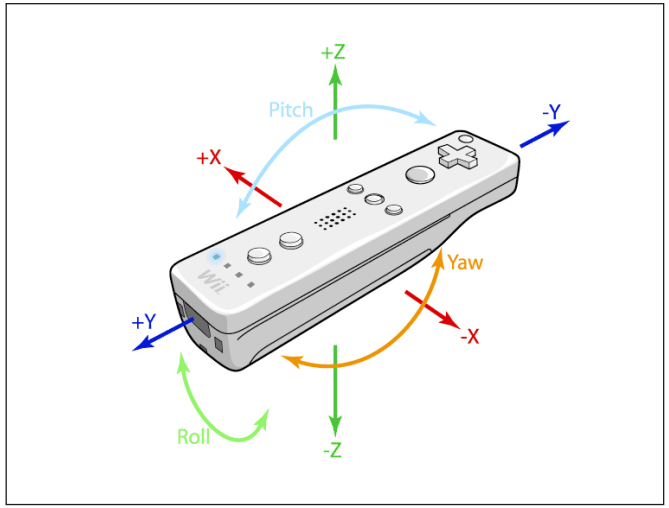
DVD-ROM

The Wii utilise a simple, slot –loading DVD-ROM as its optical drive. The illuminated drive accepts both Wii DVDs as well as GameCube game disks.
Given the low graphic requirement of the Wii, most of the games designed for the system fit on simple 4.5 GB DVDs, thus leading to a lot of piracy for the system's titles.

Surprisingly, though, the Wii cannot playback DVD-video or DVD-audio disks. Nintendo was apparently not looking at making this a convergence box and instead focussed solely on the ability to bring out a video game console alone.

HARDDRIVE

The Wii comes equipped with 512 MB of internal flash memory, which can be expanded via an SD card of upto32 GB in size. This SD card has various uses such as uploading photos, backing up saved games; create customised in-game music from stored MP3 files, etc. The lack of a physical hard drive in the Wii is no surprise, given the low memory requirement its data and its games have.



ACCESSORIES

The Wii remot, or Wiimote, and the sensor bar are the centre of the entire motion sensing technology of the console. The console bar also allow for standardisation of game play, as the size of your TV screen does not factor into the ability to detect your movement and how they are depicted on screen.

The position and motion tracking of the WiiMote allow the players to mimic actual game actions, such as swinging a sword or aiming a gun, instead of simple pressing of buttons. But how exactly does it work? Well, it's all about the marriage of the WiiMote and sensor Bar.

The sensor Bars cable almost 12 feet in length- enough to be placed above or below the television, preferably at the center. If placed above, the center should be in line with the front of the television and if below it should be in line with the front of the surface the television is placed on.

The WiiMote can be used accurately in conjunction with the Sensor Bar up to a distance of 16feet away. The WiiMote's image sensor is used to locate the bar's points of light in the remote's field of view.

The light emitted from each end of the sensor bar is focused onto the image sensor which sees the light as the two bright dots separated by a distance on the image sensor. The second distance between the two clusters of the light emitters in the sensor bar is a fixed distance. From these two distances, the Broadway CPU calculates the distance between the WiiMote and the sensor bar using triangulation.

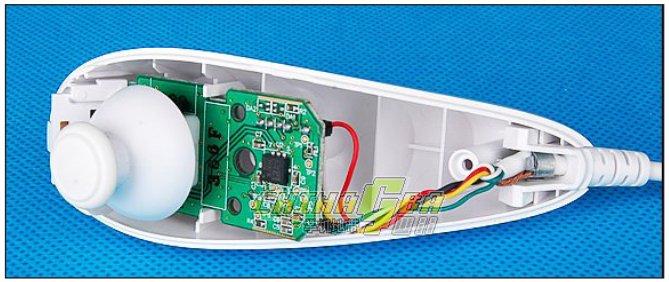
In addition, rotation of the WiiMote with respect to the ground can also be calculated from the relative angle of the two dots of light on the image sensor. Because the system is required when the WiiMote is controlling up-down, left-right motion of a cursor or reticule (a pointing cursor such as a cross-hair) on the TV screen to point to menu option or objects such as enemies in first-person shooters.

Because the system can also calculate the distance between WiiMote and the Sensor Bar, the remote can also control slow forward – backward motion of an object in a 3-dimensional game. Rapid forward-backward motion, such as punching in a boxing game, is controlled by the acceleration sensors. Using these acceleration sensors (acting as tilt sensors), the WiiMote can also control rotation of a cursor.

Wii Remote (WiiMote)

The Wii remote's motion–sensing capabilities are dependent on accelerators and gyroscopes fitted in the device.
Ever since gamepads first made an appearance replacing the previously popular joysticks, the underlying design has been the same: you hold a controller in two hands, with your thumbs operating the buttons and navigational sticks.

As stated earlier, the WiiMote also has a speaker built into it. The Wii switches between its main audio output and that of the remote speaker quite smartly to create some cool effects. Also, in games such as No more Heroes, the WiiMote speaker is used to answer cell phone calls, where once you hold the controller up to your ear, a message starts playing from the tiny speaker.



Interior of Nunchuck

The Wii Remote can also be turned horizontally and used like an NES controller, or in some cases like a steering wheel. It is also possible to play a single player game with a WiiMote in each hand, as in the Shooting Range game contained in Wii Play.

Nunchuck

So with the WiiMote requiring only one hand to play, what exactly are you supposed to do with the other?

The Wii package also comes with an attachment for the WiiMote, called the 'Nunchuck', which resembles the kung-fu weapon Nunchaku. Connected to the remote via a small cord, the device has a little joystick along with two buttons, and acts as the movement-controlling analogue stick in a lot of games, especially first person shooters.

Interface

The Wii Menu – the default interface for the Nintendo Wii has been based on the idea of television channels and dubbed the 'Wii menu'. The 4x3 grid of channels can be navigated by using the WiiMote's pointer capability or the 4 – way navigational pad. There are six pre-loaded channels in the Wii Menu: Disk, Mii, Photo, Wii Shop, Forecast and News.

The Disk channel allows users to play Wii and GameCube titles, displaying the name of the disk that is present in the drive and playing an introductory audiovisual clip. This is the only channel that cannot be moved across the fully customisable Wii Menu without the use of third party tools.

Nintendo was the first of the next-gen consoles to utilise the concept of avatar with ‘Mii’, where users can design 3D caricatures of people by selecting from a group of facial and bodily features. Users can select from pre-made caricatures or create their own by choosing custom facial shapes, colours and positioning in some form of game play. Up to ten Miis can be stored on WiiMotes remotes and taken to other Wii consoles.

The Wii shop channel allows users to download games and other software by redeeming Wii points, which can be obtained by purchasing Wii Points (Nintendo Points) cards from retail outlets or directly through the shop channel using MasterCard or Visa credit card online.

When Wii is connected to the internet, the Forecast and News channels, obviously, show status updates about the latest weather and news headlines from across the globe.

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The Future of game Design

After going through almost every important subject related to Gaming as well as their technologies and approach till today and are already available, we face the future prospect of Gaming that deserves more print space.

Intel's former President Gordon Moore has made a famous prediction that has come to be known as Moore's Law, where he stated the number of transistors you could fit on a circuit of a certain size double every year or so. This leads to the current trend of faster processors and GPUs that we see coming out every year. As hardware progresses, its applications in the gaming industry obviously multiply manifold. With a field that is a mash-up of creativity and technological skill, it leads to new and different ways of using what one person has manufactured.

It is not possible to predict just what exactly the next generation of video game consoles will turn out to be. What we can put our finger on, though, are the trends that seem to be emerging. So for reasonable approach of future game design some of the present aspect come across are

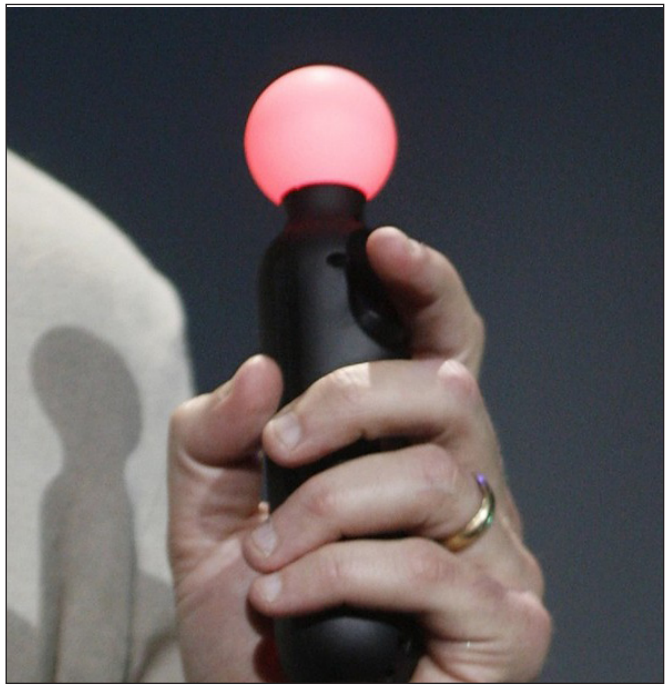
1- Motion Sensing
2- Stereoscopic 3D Games
3- Brain-computer interfaces

1.Motion Sensing

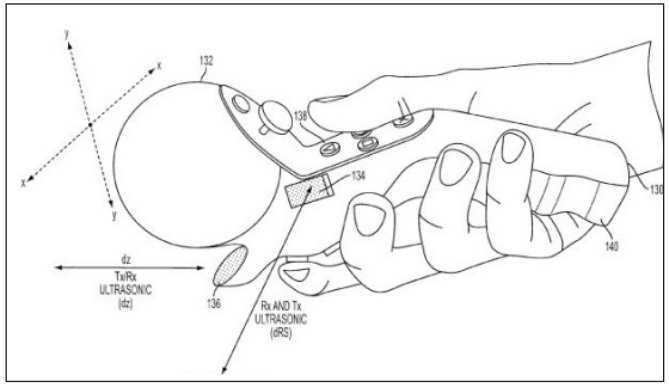
Seasoned video game players used to laugh when beginners waved the controller up in the air, using Mario to jump a little further, but now these frantic motions have become a part of the game. Given all the hype around us, it seems that the Nintendo, with the Wii, is the propagator and inventor of the idea of using physical motion as a mean to control virtual environments via high-precision sensors. But how the controllers able to, precisely and accurately measure physical movement? At the heart of the controller technology are tiny accelerometers. Inside these chips, silicon springs anchor a silicon wafer to the rigid controller. As you wave the controller through the air at an attacking enemy, the wafer presses onto the springs, just as are pressed against the seat of a car when you stomp on the gas pedal. The faster the controller accelerates, the more the wafer moves relative to the rest of the chip.

The accelerometer monitors the position of the wafer by measuring capacitance, or the ability to store electric charge, in different directions. When you move the controller forward in a punch, the capacitance increases at the back of the wafer and decreases at the front. Using capacitance to measure how far and in what direction the wafer moves, the system translates your real-life movements into the perfect jab to your opponent’s face.

It can be fairly be argued that this is the trend that will define the technology behind the current lot of video game consoles, especially since at this year’s E3, Sony and Microsoft unveiled their own takes on motion-sensing gaming. Let’s take a look at the PlayStation Motion Controller and Xbox Project Natal.



PS3 Motion Controller

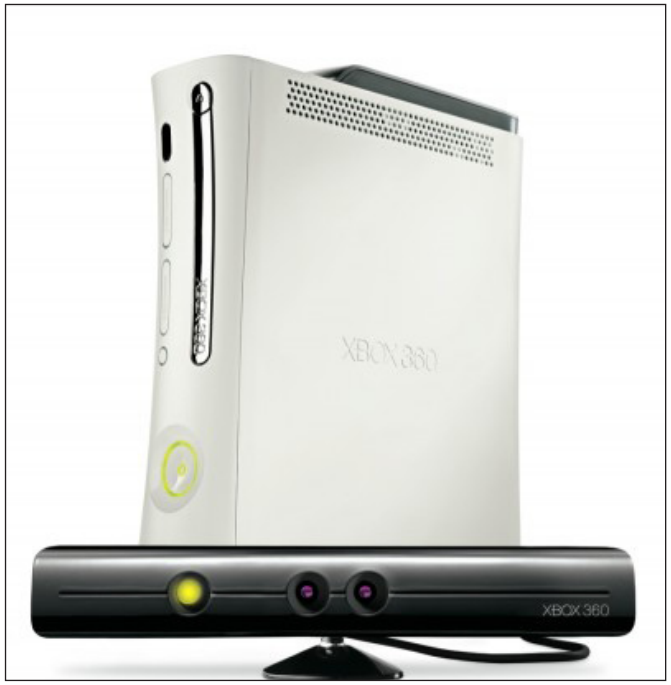


1A. PlayStation Motion Controller

Nobody had predicted that the Nitendo Wii would be the winner of this latest competition among three video game giants, but the motion sensitive Wiimote won over the hearts of many, many millions. Sony wants in on the action and so has unveiled its own Motion Controller. Shaped like a wand, the technology is dependent on the PlayStation Eye; much like the Wii depends on the Sensor Bar.

The PlayStation motion controller features an orb at the end which glows in full range of colours according to the RGB colour model using LEDs. The coloured light serves as an active marker, the position of which can be tracked along the image plane by the PlayStation Eye.

The uniform spherical shape and known size of the lights also allow the system to simply determine the wands' distances from the PlayStation Eye through the image size, thus enabling the wands' positions to be tracked in three dimensions. Combined with internal motion sensors, such as accelerometers and gyroscopes, this allows for highly accurate real-time motion capture with orientation in three dimensions.



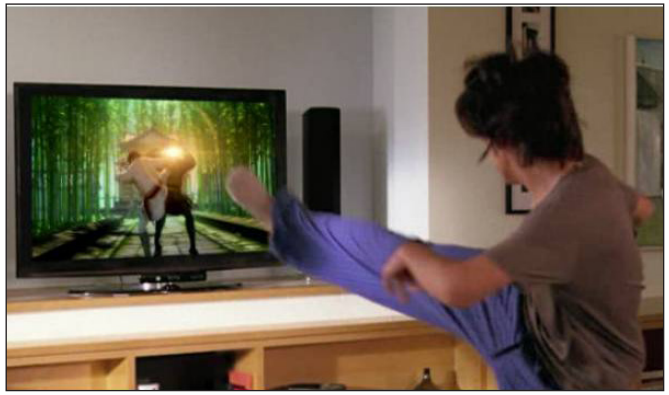
The simplicity of the sphere-based distance calculation allows the controller to operate with minimal processing lag, as opposed to other camera-based control techniques on the PS3.

The PlayStation motion controller will feature buttons on the wand, as well as vibration-based haptic technology. In addition to provide a tracking reference, the wands' orb light can be used to stimulate aesthetic effects, such as the muzzle flash of a gun, or the paint on a brush.

Using different orb colours for each controller, as well as those in which the user wields two controllers, with one wand in each hand.

2B. Project Natal

While Nintendo and Sony battle it out to figure out whose motion-sensitive controller is better, Microsoft has more ambitious plans with Project Natal – an add-on for the Xbox 360. It sounds like an exaggeration right now and perhaps we are placing our expectations a bit high, but we dare say that this generation of consoles will be remembered more for the Project Natal's motion-sensing technology than the Nintendo Wii and its Wiimote.



Project Natal Motion Sensing Games

It all started with a subtle hit by Microsoft's founder and ex-CEO Bill Gates during a free-wheeling chat at the AllThingsD conference in 2007, when he casually remarked:
"Imagine a game machine where you are just going to pick up the bat and swing it or the tennis racket and swing it." The interviewer teased him, saying that the Wii already does that.
"No, that's not it. You can't pick up your tennis racket and swing it," Gates retorted. "You can't sit there with your friends and do those natural things. That's a 3D positional device. This is video recognition."

Cut to 2 years later and at the E3 game developers' conference, Microsoft unveiled its foray into the motion-gaming world – the 3D body-tracking Project Natal. Project Natal can be operated completely by using gestures of your hands on any object, without the need to even touch the controller. In 2008, Microsoft had brought out an Israeli firm named 3DV systems, which specialized in motion-tracking cameras. The technology has often been cited to be the backbone of the Natal system, which uses a sensor bar akin to the Nintendo Wii's.

The Project Natal sensor is an approximately 9-inch wide horizontal bar, which is designed to be positioned lengthwise above or below the video display. The device features an RGB camera, depth sensor, multi-array microphone, and a custom processor running proprietary software, which provides full-body 3D motion capture, fatal recognition and voice recognition capabilities.

In fact, depending on the person's distance from the sensor, project natal is capable of tracking models that can identify individual fingers! Microsoft is expected to release it in 2010.

High-definition 3D spec

2.Stereoscopic 3D Games

While video game technologies are rapidly progressing with new graphics cards and faster processors, the output module has remained the same – a television set. However, it is not as if the TV industry has remained placid; we have seen the conversion from CRT-based bulky sets to thin LCD screens, and the jump from standard 4:3 video to HD and full HD resolutions.

The next jump being predicted is the jump to stereoscopic 3D television, possibly without the use of those red and blue 3D glasses. Whether the glasses will stay or go is a discussion for another forum, but what is certain is that making standard TVs render stereoscopic 3D images is definitely on the anvil. And the game industry would be the ideal platform to capitalize. Imagine a combination of Project Natal and such a stereoscopic 3D TV, where you act out a boxing match in first-person view and really get the arm of your opponent jumping out of the screen and right at your face! Simply brilliant!

And a lot of graphics manufacturers and researchers are already working on making this happen, as 3D is seen as the future of video game software.

In December 2008, the CTO of Blitz Games announced that they would bring stereoscopic 3D gaming and movie viewing to the Xbox 360 and PlayStation 3 with their own technology. Stereoscopic 3D games were first demonstrated publicly on the PS3 in January 2009 at the Consumer Electronics Show. Journalists were shown Wipeout HD and Gran Turismo 5 Prologue in 3D as a demonstration of how the technology might work if it is implemented in the future.

Nvidia, on the other hand, has already been working overtime to get 3D gaming out and about. The company has already come out with its Nvidia 3D Vision kit, that relies on a pair of custom glasses (and no, they don't look like the ridiculous red and blue ones), an underlying software and compatible Nvidia hardware.

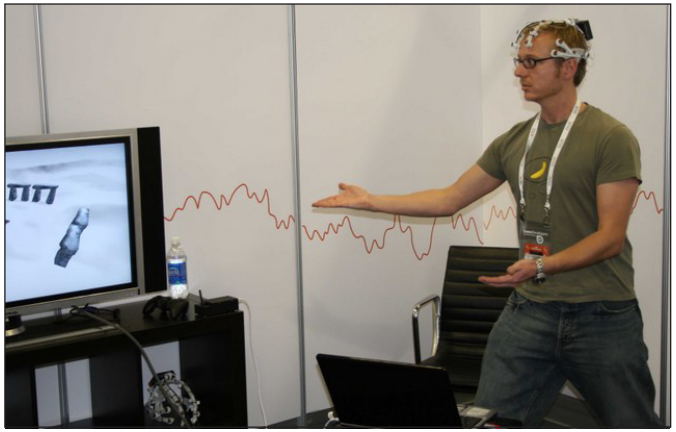
The company has previously stated that it is in talks with video games developers and console manufacturers about integrating the technology in the next generation of devices. Last year, Oscar-winning director James Cameron was quoted as saying that Ubisoft had already developed a stereoscopic 3D game for the Xbox 360 and got it working. The title in question was the game based on Cameron's recent 3D released film, Avatar.

While it is not known whether the next generation of games or not, one thing is for sure – this is one technology that is bound to hit gamers in the near future.

3.Brain-computer interfaces

Motion-sensitive gaming is great and definitely a very real part of the future of video games. The world gaming is unlikely to be going into the field of touch-sensitive screens, as the technology has pretty much skipped that for the next generation of user interface with Project Natal – gestures.

Similarly, most technology pundits are predicting that voice-based interfaces will be the next thing is how you use your computer. While the idea might suit simply daily operations, it simply is not rich enough to encompass the complex mechanisms of playing a video game.

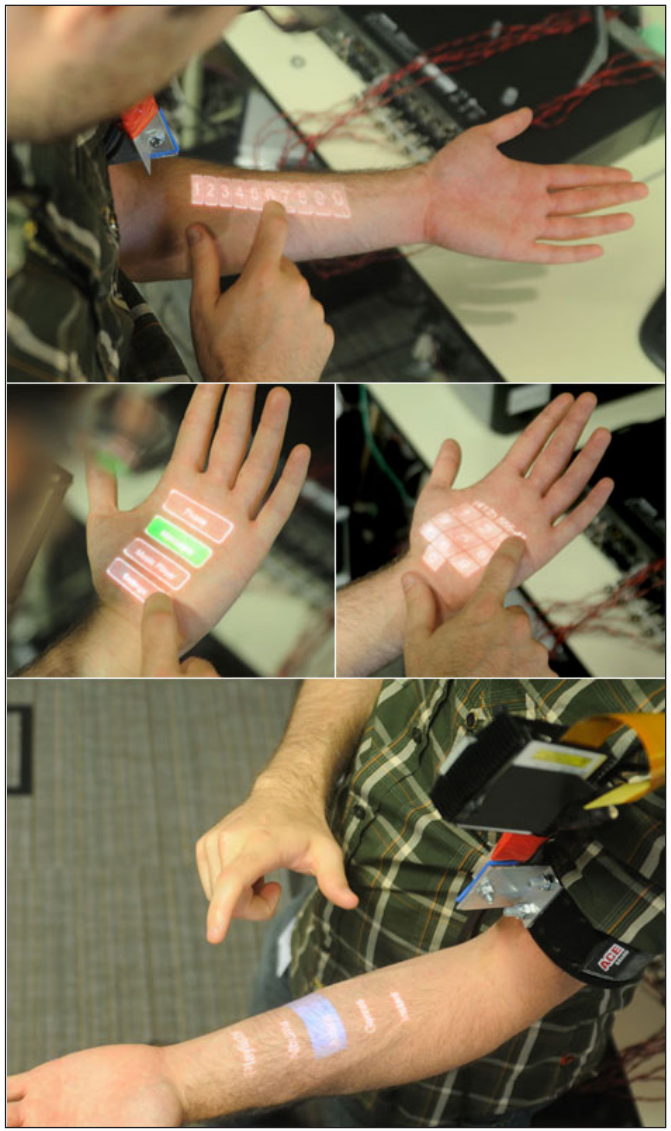


Honestly, can you imagine shouting “Shoot!” to start firing and “Halt!” to stop, with intermediary bursts of “Duck!”, “Take cover!”And “Retreat!”? Apart from an absolute absurd and loud way of playing a game, it would also completely ruin the concept of multiplayer chatting.

So it makes sense that if computers decide to go with speech recognition technologies for the interface, video games will again be skipping this one and moving on to a much cooler alternative; controlling your character by just using your thoughts! Scientists have long been working on brain-computer interfaces, with success stories of monkeys controlling robots, people controlling wheelchairs and much more.

The technology is based on electroencephalography (EEG), in which the user wears a hat with a bunch of electrodes that track the electrical signals being given out by your brain. Initially, the user has to program the device to understand how his brain’s electrical signals fire – a process calling ‘mapping’. Once the EEG cap is mapped to a certain user, scientists say it can accurately detect their thoughts.

One company using this technology in the field of gaming is Australia-based Emotiv, which is getting ready to launch its Epoc headset later this year. The Emotive Epoc has been making the rounds of various game developer conferences and other events as a way to “game with your thoughts”.



Prototypes of the device have already been demonstrated on Window PCs. Due to the complex detection algorithms involved, there is a slight lag in detecting thoughts, making the device more suitable for use in games like Harry Potter than FPS games. The Emotiv Epoc is currently not meant for video game consoles, instead preferring to concentrate on PC gaming. However, the company has stated that it is looking at working with major console manufacturers.

While the Epoc might not be ready for prime-time yet, the underlying technology behind it remains tried and tested. It is a viable alternative, and the scenario of controlling an entire game just by using your thoughts alone is extremely tantalizing.

3A. Microsoft `Skinput' using our body as a touch-screen

Carnegie Mellon University's Chris Harrison and Microsoft's Dan Morris and Desney Tan have all teamed up to create "Skinput," a system which has you using your own flesh as an input device to play games and music, as well as make calls and browse through mobile interfaces. It's all conceptual at the moment, but the system involves a Pico projector that maps various graphics onto your skin, as well as acoustic sensors that can discern where on your flesh you're tapping based on the sound. It's all pretty wild, but apparently there's quite a bit of acoustic distinction when it comes to where you're tapping on your body — even within a small range. So when would it come in handy? Always."This approach provides an always-available, naturally-portable, and on-body interactive surface," Chris Harrison
Apart from changing game play itself, the technology could also open up the field of video games to the physically disabled as well as paralyzed patients. We can only imagine.