**Exploring Kinect Device**

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**What is Kinect?**

Kinect is is a motion-sensing device which was originally developed for

the Xbox 360 gaming console. One of the distinguishing flactors that makes this device stand out among others in this genre is that it is not a hand-controlled device, but rather detects your body position, motion, and voice.

Kinect has ushered a new revolution in the gaming world, and it has completely changed the perception of a gaming device. Since its inception it has gone on to shatter several records in the gaming hardware domain. No wonder Kinect holds the Guinness World Record for being the "fastest selling consumer electronics device". One of the key selling points of the Kinect was the idea of "hands-free control", which caught the attention of gamers and tech enthusiasts alike and catapulted the device into instant stardom. This tremendous success has caused the Kinect to shatter all boundaries and venture out as an independent and standalone, gesture-controlled device.

It has now outgrown its Xbox roots and the Kinect sensor is no longer limited to only gaming. Kinect for Windows is a specially designed PC-centric sensor that helps developers to write their own code and develop real-life applications with human gestures and body motions. With the launch of the PC-centric Kinect for Windows devices, interest in motion-sensing software development has scaled a new peak.

**About Kinect Project**

Project Milo, 2009.

After Kinect's E3 2009 reveal, under code name "Project Natal," Microsoft garnered an equal amount of amazement and ridicule as a result of its now-infamous demo "Milo & Kate," which, while billed as a live demo, turned out to be conceptual at the very best. Kinect sadly never lived up to the promises made by that near-10-year-old demo, which arguably contributed to its demise.

Ex-Lionhead Studios lead Peter Molyneux claimed that Project Milo would recognize the emotional tone in people's voices and faces, and respond realistically in real time. The demo (among other things) would earn Molyneux a reputation for over-promising and under-delivering. I only had a casual interest in Xbox at the time (due in large part to a massive World of Warcraft addiction), but even still, news about Milo filtered beyond the hardcore crowd and into the mainstream, owing to its sci-fi like promises of full, virtual, interactive artificial intelligences.

Kinect V1

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Almost ten years later, Microsoft (or any other company for that matter) hasn't realized this futuristic vision, but Kinect went on to become the fastest selling accessory of all time. And probably, the fastest selling paperweight of all time, as a lack of apps and games, in addition to poor recognition and weak processing, prevented the camera array from achieving consistent adoption.

Microsoft went to surprisngly lengths to market the first Kinect despite its foibles, [enlisting Oprah Winfrey](https://www.youtube.com/watch?v=4Nh9Fk_c_iA), Jimmy Fallon, and various other celebrities to promote the tech to casual audiences in an attempt to capture the runaway success of the Nintendo Wii, which had its own motion-tracking controllers. Microsoft also reportedly hosted a star-studded L.A. party to launch the device, [reportedly](https://web.archive.org/web/20101031193809/http:/www.bsckids.com/2010/10/ashley-tisdale-hosts-the-xbox-kinect-event/)attended by a-listers like David Beckham.

Reviews of the device were generally positive, with Kotaku [calling](https://kotaku.com/5680501/review-kinect) it "magical." Indeed, many comparisons were drawn between Kinect and the sci-fi movie Minority Report, which has motion-controlled computer interfaces. I have to say, when I used Microsoft's upgraded Kinect V2 with the Xbox One for the first time, I completely felt the same way.

Indeed, Microsoft released a second version of Kinect to ship with the Xbox One in 2013, although its inclusion was mired in controversy. Hardcore gamers never wanted the thing, but now they were forced to purchase it with the Xbox One, which inflated its price point $100 above that of the PS4. Microsoft's attempt to drive adoption, and thus get more developers on board, was a gamble that ultimately didn't pay off. Arguably, the mis-step contributed to Xbox's position far, *far*behind that of the PlayStation 4. Xbox has been playing catch up ever since.

It's a shame how it all played out, because for me, Kinect coupled with voice control was a key differentiator between the Xbox One and other consoles, and something I felt was key to Microsoft's general living room computing strategy. Kinect V2

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Kenict 's role in our life

When I finally kicked the Warcraft habit and jumped back on the Xbox train, I found myself thoroughly enraptured by Kinect V2 on the Xbox One. Far beyond its clunky Project Milo roots and Wii Sports clones, Kinect V2 allowed me to yell voice commands at my TV, leveraging the console's IR blaster to turn the TV off and on, control volume, and even change channel. And my friends, it all *just worked*.

Developers had also picked up Kinect, building a wide array of homebrew solutions and non-gaming applications, in both [medicine](https://www.techrepublic.com/article/gaming-health-care-how-microsoft-kinect-is-revolutionizing-the-future-of-rehab/) and [sign language translation](https://www.windowscentral.com/e?link=http%3A%2F%2Fclkde.tradedoubler.com%2Fclick%3Fp%3D259740%26a%3D2542549%26g%3D0%26epi%3DUUwpUdUnU53238YYwYg%26epi2%3Ddwp%26url%3Dhttps%253A%252F%252Fwww.microsoft.com%252Fen-us%252Fresearch%252Fblog%252Fkinect-sign-language-translator-part-1%252F%253Ffrom%253Dhttp%25253A%25252F%25252Fresearch.microsoft.com%25252Fen-us%25252Fcollaboration%25252Fstories%25252Fkinect-sign-language-translator.aspx&token=8-dnIFRQ), and more.

Combined with the Universal Windows Platform (UWP) which arrived on Xbox a little later, it was easy to envision a world where developers could incorporate Kinect into entire smart home systems. Some of them did, too, creating third-party apps for smart bulbs and other home automation devices. "Xbox, turn on the lights." "Xbox, who's at the front door?" etc. I [previously](https://www.windowscentral.com/kinect-and-cortana-should-have-been-xboxs-amazon-echo) wrote about how Kinect could have been Microsoft's Amazon Echo. All of the pieces were in place, Microsoft just never made the play.

**Kinect Hardware**

Kinect is a horizontal device with depth sensors, color camera, and a set of microphones with everything secured inside a small, flat box. The flat box is attached to a small motor working as the base that enables the device to be tilted in a horizontal direction. The Kinect sensor includes the following key components (Figure 2-1 shows a Kinect without its protective cover):

* Color camera
* Infrared (IR) emitter
* IR depth sensor
* Microphones

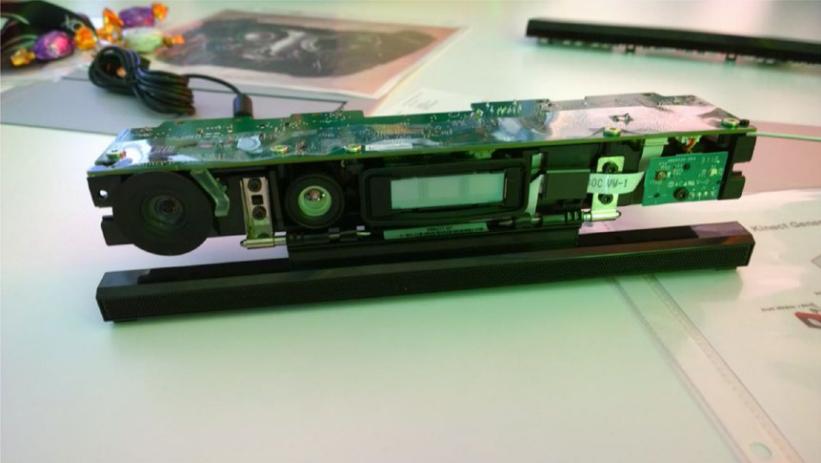


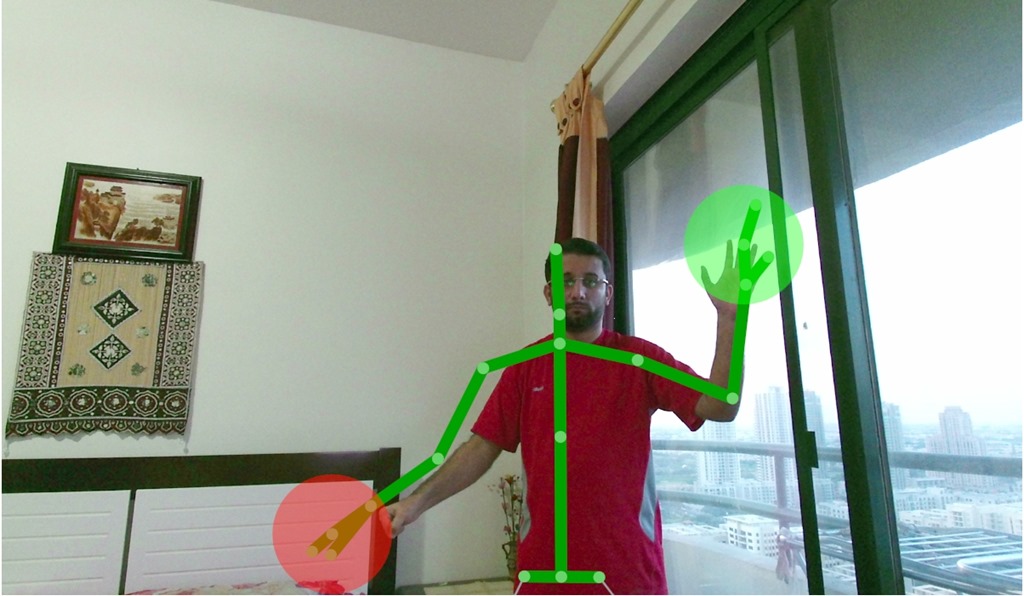
Figure 2-1

Table 2-1: show features of Kinect

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| **Feature** | **Kinect** |
| Color Camera | 1920 x 1080 x 16 bit per pixel 16:9 YUY2  @ 30 Hz (15 Hz in low light, HD) |
| Depth Camera | 512 x 424 x 16 bits per pixel 16-bit ToF  depth sensor  IR can now be used at the same time  as color |
| Range | Only one configuration:  0.5m to 8m (1.6 ft.–26.2 ft.)  Quality degrades after 4.5m (14.7 ft.) |
| Angular Field  of View | 70° Horizontal – 60° Vertical |
| Audio | 16-bit per channel with 48 kHz  sampling rate |
| Skeletal Joints | 25 joints tracked; the additional joints  are Neck, left and right Thumbs and  Hand Tips |
| Skeletons Tracked | 6 with joints (renamed to Bodies) |
| Vertical Adjustment | Manual, also ±27 degrees of freedom |
| Latency | ~50ms |
| USB | 3.0 |

**Color Camera**

This color camera is responsible for capturing and streaming the color video data. Its function is to detect the red, blue, and green colors from the source. The stream of data returned by the camera is a succession of still image frames. The Kinect color stream supports a speed of 30 frames per second (FPS) at a resolution of 1920 x 1080 pixels, The value of frames per second can vary depending on the resolution used for the image frame.



**Depth sensor**   
 Kinect depth sensors consist of an IR emitter and an IR depth sensor. Both of them work together to make things happen. The IR emitter may look like a camera from the outside, but it's an IR projector that constantly emits infrared light in a "pseudo-random dot" pattern over everything in front of it. These dots are normally invisible to us, but it is possible to capture their depth information using an IR depth sensor. The dotted light reflects off different objects, and the IR depth sensor reads them from the objects and converts them into depth information by measuring the distance between the sensor and the object from where the IR dot was read.



**Multi-array microphone**

This is an array of four microphones that can isolate the voices of the players from the noise in the room. This allows the player to be a few feet away from the microphone and still use voice controls