Programme Educational Objectives(PEOs)

PEO1 (Core Competency) : Graduates will acquire a strong foundation in mathematical, scientific and engineering fundamentals necessary to formulate, solve and analyze Computer Science and Engineering problems.

PEO2 (Professionalism) : Graduates will practice the profession with ethics, integrity and leadership to relate engineering to global perspective issues and social context.

PEO3 (Higher Studies and Entrepreneurship) : Graduates will be prepared for their careers in the software industry or in higher studies leading to research and for applying the spirit of innovation and entrepreneurship in their career and continuing to develop their professional knowledge on a life long basis.

Programme Outcomes(POs)

PO1: Engineering knowledge: Ability to apply the knowledge of mathematics, physical sciences and computer science and engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Ability to identify, formulate and analyze complex real life problems in order to provide meaningful solutions by applying knowledge acquired in computer science and engineering.

PO3: Design/development of solutions: Ability to design cost effective software / hardware solutions to meet desired needs of customers/clients.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions in the field of computer science and engineering.

PO5: Modern tool usage: Create, select and apply appropriate techniques, resources and modern computer science and engineering tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

PSO1: Software System Design and Development: The ability to apply software development life cycle principles to design and develop the application software that meet the automation needs of society and industry.
PSO2: Computing and Research ability: The ability to employ modern computer languages, environments and platforms in creating innovative career paths in SMAC (Social, Mobile, Analytics and Cloud) technologies.

K S R INSTITUTE FOR ENGINEERING AND TECHNOLOGY
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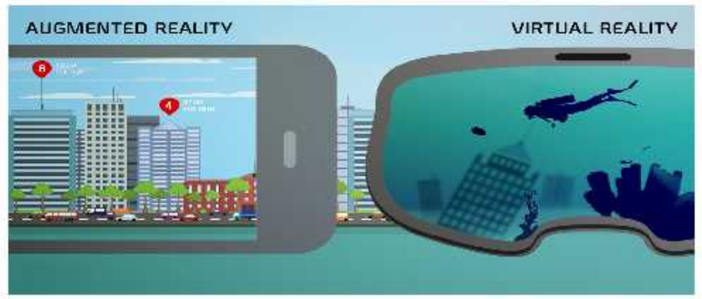
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KSRIET
TECH ZEST
Fuel Your Mind
July - 2018- Volume VI / Issue I

Virtual Reality / Augmented Reality



K S R Institute for Engineering and Technology

Vision

To become a globalLy recognized Institution in Engineering Education, Research and Entrepreneurship.

Mission

IM1: Accomplish quality education through improved teaching learning process.
IM2: Enrich technical skills with state of the art laboratories and facilities.
IM3: Enhance research and entrepreneurship activities to meet the industrial and societal needs

Department of Computer Science and Engineering

Vision

To produce globally competitive Computer Science Engineers and Entrepreneurs with moral values.

Mission

DM1 (Quality Education) : Provide quality education to enhance problem solving skills, leadership qualities, team spirit and ethical responsibilities.

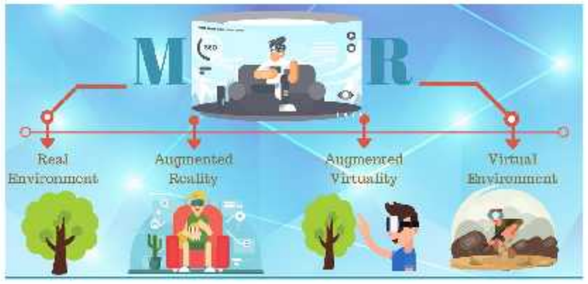
DM2 (State of art Laboratory) : Enable the students to adapt to the rapidly changing technologies by providing advanced laboratories and facilities.

DM3 (Research and Development) : Promote research based activities in the emerging areas of techno-environment in order to meet industrial and societal needs.

Virtual Reality

Virtual reality (VR) is an interactive computer generated experience taking place within a simulated environment. It incorporates mainly auditory and visual feedback, but may also allow other types of sensory feedback like haptic. This immersive environment can be similar to the real world or it can be fantastical.

Current VR technology most commonly used as virtual reality headsets or multi-projected environments, sometimes in combination with physical environments or props, to generate realistic images, sounds and other sensations that simulate a user's physical presence in a virtual or imaginary environment. A person using virtual reality equipment is able to "look around" the artificial world, move around in it, and interact with virtual features or items. The effect is commonly created by VR headsets consisting of a head mounted display with a small screen in front of the eyes, but can also be created through specially designed rooms with multiple large screens.



G.Karthikeyan, IV / CSE

Augmented Reality

Augmented reality (AR) has been a peak topic in software development circles for a number of years, but it's getting renewed focus and attention with the release of products like Google Glass. Augmented reality is a technology that works on computer vision based recognition algorithms to augment sound, video, graphics and other sensor based inputs on real world objects using the camera of your device. It is a good way to render real world information and present it in an interactive way so that virtual elements become part of the real world.

A simple augmented reality use case is: A user captures the image of a real-world object, and the underlying platform detects a marker, which triggers it to add a virtual object on top of the real-world image and displays on your camera screen. Augmented reality displays superimpose information in your field of view and can take you into a new world where the real and virtual worlds are tightly coupled. It is not just limited to desktop or mobile devices. As mentioned, Google Glass, a wearable computer with optical head-mounted display, is a perfect example.

V.Vinotha, IV / CSE

Basic Characteristics of Augmented Reality
Overlay of Real and Digital world / Real-time interaction / Registration and Alignment in 3D

Language Corner

Java Script

JavaScript (JS) is a lightweight, interpreted or JIT compiled programming language with first-class functions. JavaScript itself is genuinely minimal yet exceptionally adaptable. Engineers have composed a huge assortment of instruments over the center JavaScript dialect, opening an immense measure of additional usefulness with least exertion. One of JS's greatest advancements is that it empowers engineers to portray a framework, for example, the UI of a web or versatile application, as an arrangement of decisive parts.

JAVA

Java is object-oriented programming language developed at sun Micro system and currently owned by Oracle. Java is great choice for VR applications especially building algorithms such as language processing, search and neural network algorithms and those are the essential aspects of any VR application which works online. JAVA is pretty flexible when it comes to re-using code and updating software. Moreover, there is JAVA 3D API which enables VR application to generate 3D images, track the position & orientation of head and other body parts, and incorporate this information into image creation process for overall control and mind blowing VR experience.

C++ (unreal)

Most of the developer considers Unreal the more "expert" language, essentially in light of the fact that it's somewhat harder to learn yet it has a huge amount of extensibility in it. Unreal is nearest rival of 'Unity' and is the major component in the Game engine. A considerable measure of AAA titles are composed of Unreal engine. For smaller PC based VR applications developer may choose Unity, yet in the event that it's enormous and confounded and need to do significantly require more execution administration one should use Unreal.

C# (unity)

The Unity Game Engine is a noteworthy player in VR/diversion improvement, and C# is frequently the prescribed programming language to create Unity applications in. Unity is, by a long shot, the most famous engine. It will give you a chance to target most stages, from PC to versatile android and IOS applications. It has C# as its scripting dialect and is presumably the most straightforward. Unity has a substantial group with more than 4.5 million enlisted designers, so you'd effectively have the capacity to get help and advanced development tool worked by Unity engineers.

SWIFT

Swift is the result of the latest research on programming languages, combined with decades of experience building Apple platforms. Named parameters brought forward from Objective-C are expressed in a clean syntax that makes APIs in Swift even easier to read and maintain. Inferred types make code cleaner and less prone to mistakes, while modules eliminate headers and provide namespaces. Memory is managed automatically, and you don't even need to type semi-colons. These forward-thinking concepts result in a language that is easy and fun to use.

Swift have many other features to make your code more expressive:

- Closures unified with function pointers
- Tuples and multiple return values
- Generics
- Fast and concise iteration over a range or collection
- Structs that support methods, extensions, and protocols

Visual Development Tools

- Node-RED
- Visuino
- Embrio
- XOD
- Modkit
- Zenodys

S.Stelinbercia, III / CSE
M.Pooja, II / CSE

Jaron Lanier created a virtual reality device in the 1980's (EyePhone 1/HRX) and costed up to $49,000 for the goggles and gloves.

Google Glass vs Microsoft HoloLens

Google Glass

It leverages voice commands to give you access to everything that matters while still allowing you to go through your daily

Designed to look like regular glasses which makes it comfortable to wear all day long.

Comes in multiple color options, shades and frames to suit every style.

Make it a little tough to interact with the world with voice-based

No socket for 3.5mm audio jack.commands.

Extremely lightweight yet strong.

Comes with 16GB internal storage space.

It cannot track your position.

It doesn't have an electronic display.

It does not include support for a game controller.

It supports Wi-Fi and Bluetooth connectivity.

Microsoft HoloLens

It recognizes your gestures and eye movement to connect to the virtual world which in a way, interferes with the elements from the real world.

Looks like a head-mounted display which focuses on the virtual world, thereby restricting your vision for the real world.

It's a stand-alone device with no customizations whatsoever.

Tracks eye movement to make it easy for you to manipulate the content.

You can use the device with almost every earphone, thanks to the 3.5mm audio jack socket.

Weighs a whole lot more than the Glass.

Comes with 64GB of internal storage space.

It can track your position and warn you if you're about to hit

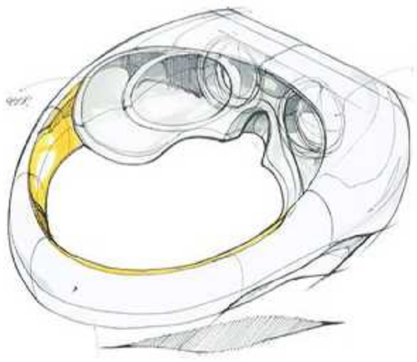
Comes with an electronic display for a more realistic experience.

It comes with a game controller.

It does not support Wi-Fi and Bluetooth connectivity.

D.Kavin, IV / CSE

Student Article



R.Pradeep Kuamr, IV / CSE

P.Siva Sakthivel, IV / CSE

☢ Virtual I/O created a $1000 pair of virtual reality glasses called "iGlasses" in 1995. ☢

Applications of VR

In Military

Virtual reality has been adopted by the military – this includes all three services (army, navy and air force) – where it is used for training purposes. This is particularly useful for training soldiers for combat situations or other dangerous settings where they have to learn how to react in an appropriate manner. A virtual reality simulation enables them to do so but without the risk of death or a serious injury. They can re-enact a particular scenario, for example engagement with an enemy in an environment in which they experience this but without the real world risks. This has proven to be safer and less costly than traditional training methods.

Military uses of virtual reality

- Flight simulation
- Battlefield simulation
- Medic training (battlefield)
- Vehicle simulation
- Virtual boot camp

Virtual reality is also used to treat post-traumatic stress disorder. Soldiers suffering from Battlefield trauma and other psychological conditions can learn how to deal with their symptoms in a 'safe' environment. The idea is for them to be exposed to the triggers for their condition which they gradually adjust to. This has the effect of decreasing their symptoms and enabling them to cope to new or unexpected situations.

V.Vaisnavi, II / CSE

In Construction

Virtual reality can be extremely useful in the construction industry, which is often known as having a very high amount of inefficiency and low profit margins. Using a virtual environment, an organization can not only render the resulting structure in 3D but also experience them as they would in the real world. Building a construction project in a virtual environment offers many key benefits. One of the most obvious of these is having the ability to test a number of factors without the time and cost of building the structure, reducing the number of errors present in the completed building. One important factor that needs to be thoroughly tested is the viability of an architectural design. For many years, human judgement and scale models were the only methods to determine

Although it's impossible to tell when exactly virtual reality in construction will become the norm, it's only a matter of time before it does. Virtual reality will allow us to make grander and more robust buildings in a shorter space of time – a very desirable property indeed. The benefits of VR for collaboration are especially relevant when building in difficult or remote sites, where teams may be communicating across substantial distances and site conditions make visits challenging For example, nonprofit organization Build Change constructs buildings all over the world including in developing countries and disaster-prone areas.

S.B.Chowmiya, II / CSE

☢ PSVR headset was developed from Sony engineers tinkering in a Lab building quietly without any executive direction. ☢

Application of AR

In Healthcare

Healthcare workers have been quick to realize the benefits of AR technologies. Education is an obvious application of augmented reality in the healthcare field. Healthcare workers have to learn a huge amount of information about anatomy and the way the body functions. AR applications give learners the ability to visualize and interact with three-dimensional representations of bodies. It proving hugely useful as a tool for patient education, allowing medical professionals to help patients understand surgical procedures and the way medicines work. Today, surgeons use augmented reality, which can project three dimensional representations of the patient's anatomy into the surgeon's field of view, is likely to improve accuracy and outcomes for patients. A practical application of augmented reality which is in use today is vein visualization. Many patients are uncomfortable with being injected or having blood taken, the experience is much worse when it's difficult to find a vein and the patient has to be "stuck" several times.

Cable Labs, the cable and broadband industry research organization, is at the forefront of research into applications of augmented reality. Their vision of the future of AR in the healthcare field - The Near Future, A Better Place - provides a fascinating insight into the way advances in network technology and augmented reality will radically change the quality of life for seniors and others who depend on the healthcare industry. For example, AccuVein.

P.Sneha, II / CSE

In Gaming

Augmented reality gaming (AR gaming) is the integration of game visual and audio content with the user's environment in real time. Unlike virtual reality gaming, which often requires a separate room or confined area to create an immersive environment, augmented reality gaming uses the existing environment and creates a playing field within it. While virtual reality games require specialized VR headsets, only some augmented reality systems use them. An augmented reality game often superimposes a pre-created environment on top of a user's actual environment. The game itself can be as simple as a game of virtual checkers played on a table surface. More advanced AR games may actually build an environment from user surroundings. Such a game could involve, for example, in-game characters climbing from coffee tables to sofas on virtual bridges. Environment creation is a time-consuming task in game making and there is a constant demand for new scenery because once a user has explored an environment fully they want to move on to a different one. AR gaming expands the playing field, taking advantage of the diversity of the real-world environment to keep the games interesting.

Pokemon GO, considered the breakthrough AR app for gaming, uses a smart phone's camera, gyroscope, clock and GPS and to enable a location-based augmented reality environment. A map of the current environment displays on the screen and a rustle of grass indicates the presence of a Pokemon; a tap of the touch screen brings up the capture display. In AR mode, the screen displays Pokemon in the user's real-world environment.

A.Sharmila, II / CSE

VR Headsets models are moving from computer and phone powered to standalone

Tech Updates

Oculus Rift

The Oculus Rift is the headset that started the new age of VR. Developed by Palmer Luckey, funded via Kickstarter and snapped up by Facebook for a cool $2 billion, the Rift plugs into your computer's DVI (or HDMI) and USB ports and tracks your head movements to provide 3D imagery on its stereo screens. The consumer edition Rift uses a 2160 x 1200 resolution, working at 233 million pixels per second, with a 90Hz refresh rate. It's high-tech stuff, and matches the HTC Vive for refresh. However, given its access to the power of the latest PCs, it's pushing a lot more pixels than Sony's PS VR headset.

The Oculus Touch controllers that arrived at the end of 2016 have made a world of difference. Compared to the other headsets' controllers, they're our favorite - they conform to your hand and allow for some finger recognition, like a thumbs-up. Not just that, but when it comes to games Oculus has come on leaps and bounds. That's been largely helped by some developer cash injections from Facebook, giving us quality, polished titles like Lone Echo and Robo Recall. Room-scale support has been added too, though you'll need to purchase at least one additional sensor to get it to Vive-level tracking, and even then the Vive tracking experience is a little better in our experience. But the Oculus Rift platform is finally a finished product that excels at giving you the VR experience the company initially promised. The price is a lot lower now too, especially now that Oculus is including the Touch controllers with every headset from here on out.

M.Venkatesh, III / CSE

Play Station

PlayStation VR will be a lot of people's introduction to 'good' VR. It's not perfect, but it's going after console gamers hard and, ultimately, it is still a truly awesome VR experience. There's nothing else in this category of 'quality but affordable' VR, meaning PS VR is the benchmark for mainstream console VR. Having now sold more than two million headsets, Sony is at least winning the VR war on sales and we're expecting it to maintain that momentum through the year 2018, with both familiar franchises and new IPs on course for PS VR.

Since launch there's been a steady stream of new titles, some from big franchises, with Resident Evil 7 being one of the most notable entries of late (and a 2017 Wareable Tech Award winner), plus Doom VFR and Skyrim, along with plenty more.

Setup for the PS VR is relatively simple compared to the Vive and Rift – the majority of the work is just plugging wires into the right ports. The PS VR, like the Vive, uses a halfway house where all the wires go. There's also just one sensor here to worry about, largely because most of the PS VR experiences are meant for sitting or standing in one position.

Despite being one of the big three in high-end VR, the PS VR is a noticeable step down from the Rift and Vive. It's got a 120Hz refresh rate, which is higher than the others, but it's not as crisp with its 1920 x 1080 resolution, which means things are a little more blurry. Plus, its PS Move controllers feel very long in the tooth; they're repurposed motion controllers from the days when the Nintendo Wii was popular, and feel very outdated when compared to the Rift's Touch controllers.

R.Yuvasree, II / CSE

The Technology used in AR combines Hardware, Software and Web server.