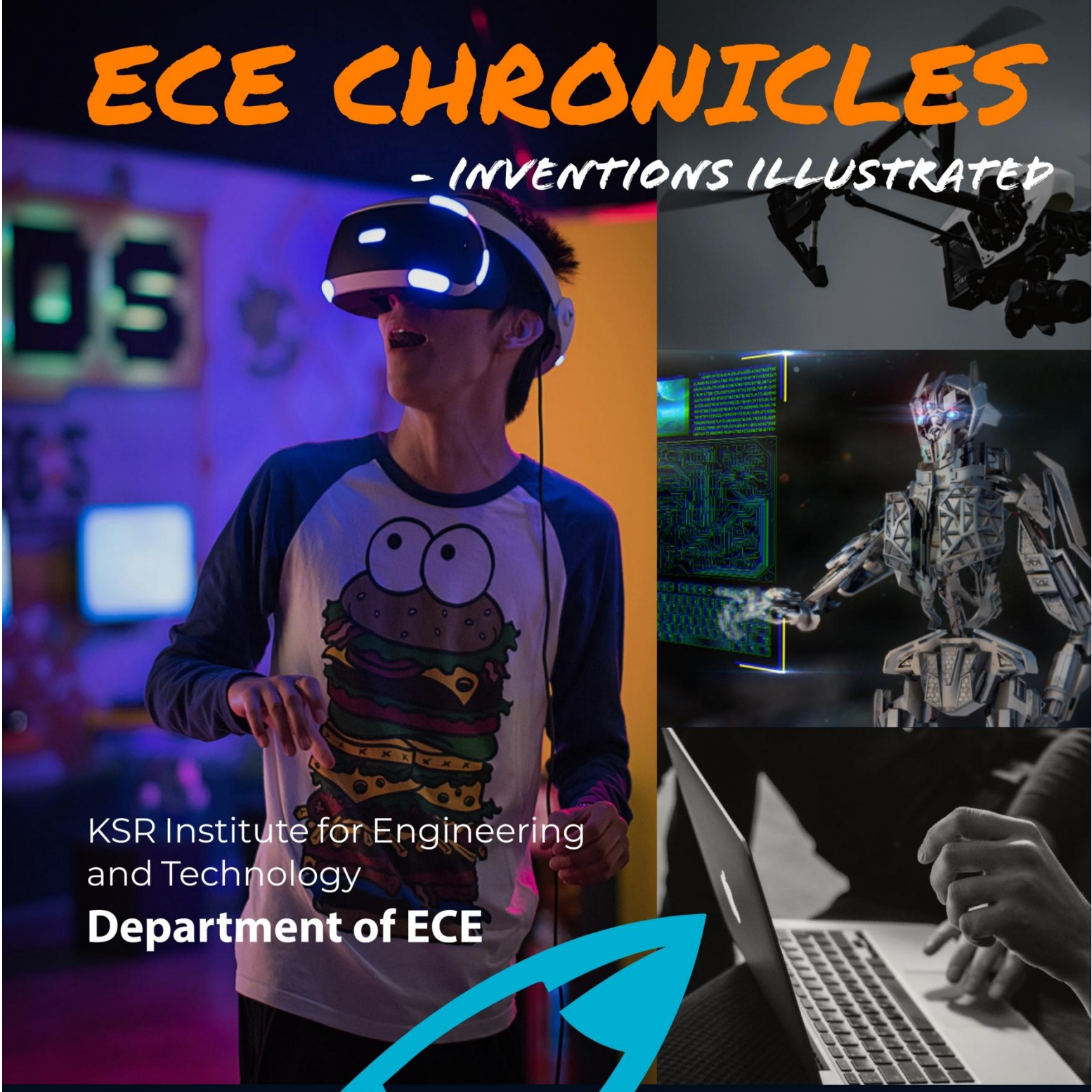
ECE CHRONICLES

- INVENTIONS ILLUSTRATED



KSR Institute for Engineering and Technology

Department of ECE

2018-19 October
Volume - 5
Issue - 1

Vision and Mission of the Department and Institute

Vision and Mission of the Institute

VISION

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

MISSION

M1:	Accomplish quality education through improved teaching learning process.
M2:	Enrich technical skills with state of the art laboratories and facilities.
M3:	Enhance research and entrepreneurship activities to meet the industrial and societal needs.

Vision and Mission statements of the Department

VISION

- To produce globally competitive Electronics and Communication Engineers and Entrepreneurs with ethical values.

MISSION

DM1:	Impart quality education through student centric teaching and learning process.
DM2:	Equip students with Industry driven skills by providing excellent Infrastructure and continuous interaction with academia and Industry.
DM3:	Empower students towards research, entrepreneurship and lifelong learning to meet societal needs

State the Program Educational Objectives (PEOs)

PEOs of ECE Department

PEO	Keywords	Description
PEO 1	**Core Competency**	Graduates will have strong foundation in Engineering, Science and Technology for a successful career in Electronics and Communication Engineering.
PEO 2	**Professionalism**	Graduates will have effective communication skills, interpersonal skills and ethical values to exhibit professionalism in multidisciplinary environment.
PEO 3	**Higher studies and Entrepreneurship**	Graduates will pursue professional development through higher studies and have entrepreneurial attitude to address technological changes and societal needs.

ECE CHRONICLES

TALKING POINT

"Scientists dream about doing great things....

Engineers do them..."

-James A. Michener

THE MOST ENTHRALLING ROBOTIC INVENTIONS OF 2018

UBTECH ROBOTICS WALKER

Ubtech has been a pioneer in the industry with its humanoid robots, including an Alexa-enabled robot that can perform yoga too. However, the robot Ubtech previewed at the Consumer Electronics Show (CES) expo is its most ambitious project.

The Ubtech Robotics Walker is a four-foot tall bot that has true bipedal motion, which enables it to not only walk around but go up and down stairs and even kick a soccer ball.

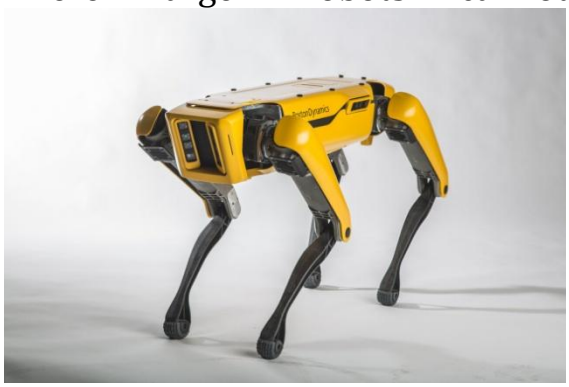
The version that was showcased in the CES 2018 was an early model and did not have arms but by the time Ubtech Robotics Walker becomes available in 2019, it will have all of its limbs, with a host of new abilities according to company representatives. The technology marvel Walker is studded with sensors like cameras in its head and torso, and auto detection sensors in its feet and sides, which help the robot, know when it is close to an object.

When armed with the right programming, the robot can avoid things such as chairs and tables which come in its way. Ubtech Robotics Walker responds to vocal commands as well as visual cues and its head is a large touchscreen which has a camera on the top to control your smart home, help schedule your calendar, play music and dance, patrol the home, and provide visual surveillance and motion detection.

BOSTON DYNAMICS SPOTMINI

Boston Dynamics, known to come up with uncannily agile robots, has unveiled its first commercial product to market, a small, dog-like robot it calls the SpotMini.

The launch was announced in May with the founder Marc Raibert adding that by July next year; Boston Dynamics will manufacture SpotMini at the rate of around 1,000 units per year. According to Raibert, SpotMini is currently in the testing stage for use in construction, security, delivery and home assistance applications. The SpotMini moves with the same smooth confidence as its processors rolled out by Boston Dynamics robots with names like Cheetah, Spot and BigDog. SpotMini is 3 feet high and weighs around 55 pounds, and can go where larger robots cannot.



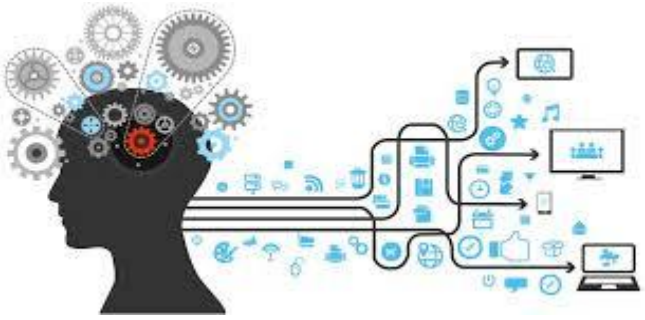
The robot comes with an optional snake-like arm, which attaches where a real dog's head would be, and can perform tasks like opening doors.

KURI

Kuri looks bright for a massive adoption with its pre-orders already starting to ship. The robot is full of features, including its ability to answer questions and monitor the user's home which works on an array of sensors. Simple in design and useful around the house, it seems likely that Kuri is the first robot that may soon become a reality in everyday life. These are just a handful of exciting innovations that 2018 has seen so far. With some months more to go, further eye-catching development in the robotics inventions will be soon witnessed. With new developments and inventions in place, it looks like 2018 will be a milestone in the field of robotics development.

ROBOTICS FACTS:

1. The first 'Robot homicide'... Occurred in 1981 in a Japanese factory. A robotic arm accidentally crushed a worker or so they say.
2. The first humanoid robot was... Debuted in 1939.Elektro, built by Westinghouse, was seven feet tall and could 'speak' 700 words.
3. Robots will emerge on their own... (as their own species) by 2040 according to Hans Moravec, founder of Carnegie Mellon's Robotics Institute.
4. The world's first cyborg is... Professor Kevin Warnick, who uses a chips in his arm to remotely operate doors, an artificial hand and an electronic wheelchair.
5. The smallest robot... is called *Nanometers*. It measures 10 nanometers in size or less than one thousandth of a millimeter.



HISTORY OF ROBOTICS

Fully autonomous only appeared in the second half of the 20th century. The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal from a die casting machine and stack them. Commercial and industrial robots are widespread today and used to perform jobs more cheaply, more accurately and more reliably, than humans. They are also employed in some jobs which are too dirty, dangerous, or dull to be suitable for humans. Robots are widely used in manufacturing, assembly, packing and packaging, mining, transport, earth and space exploration, surgery, weaponry, laboratory research, safety, and the mass production of consumer and industrial goods.

By, Muthukumar.M, S.Ramesh-VI/ECE-B

LATEST GADGET REVIEWS

Apple MacBook pro with Touch Bar

-the best macbook pro ever, now with touch bar..

If you're after the latest laptop from Apple, we suggest you welcome the 13-inch Macbook Pro with Touch Bar. Microsoft claims the Surface Book 2 is twice as powerful, but it's not available in India.

Of course, the headline feature is the Touch Bar – a thin OLED display above the keyboard that can be used for various applications. If you're a fan of the Macbook Pro 2017, you'll be happy with this model but there are some serious reasons why you should consider one of the Windows alternatives too.

The Macbook Pro isn't as powerful, has a lower resolution display and has no touchscreen support. Plus, its battery is a tad disappointing. We'd recommend this only to diehard Apple fans and those who are already invested in the ecosystem.

PU : Dual-core Intel Core i5 – i7
Graphics : Intel Iris Plus Graphics 640 – 650
RAM : 8GB – 16GB

Screen : 13.3-inch, (2,560 x 1,600) IPS
Storage : 256GB – 512GB PCIe SSD

Pros :

- The best Macbook Pro ever
- Super fast performance

Cons :

- Expensive
- Disappointing battery life

Hands on : Polar Vantage M

Though it's more expensive than the M430, first impressions suggest the Polar Vantage M is a powerful multisport training tool that might be worth the extra investment. It's a much better looker and with better wrist heart rate and loads more training insights, it's definitely worth a look.

Pros :

- Lightweight, More style Design

Cons :

- No Music, Less Grippy Buttons

By G.Dhanadharshini/III/ECE-A

ANDROID CENTER

Latest Android Addicts

PUBG - PlayerUnknown's Battlegrounds is an online multiplayer battle royals game developed and published by PUBG Corporation, a subsidiary of South Korean video game company Bluehole.

Initial release date : 23 March 2017

Designer : Brendan Greene

Composer : Tom Salta

Publishers : Bluehole, Microsoft Studios, Kakao Games, Lightspeed & Quantum

Did you know..?
PlayerUnknown's Battlegrounds is the best-selling Xbox One video game by total copies sold (8 million)

Android Releases

Developers

An Interesting "P" series of android version is released at the date of 6th August 2018. Basically the android version 9.0 is called Android P. "P" stands for Android Pie. This is the 16th version of android version. This should be launched in some particular android devices soon including Google Nexus, Pixel series.

Features of Android PIE :

- Enhanced Battery life
- App Timer to control the usage of applications continuously.
- Google has redesigned the way you navigate the OS by introducing Gesture Navigation in Android P similar to iPhone X.
- And supporting Lockdown mode, Zoom in fonts, Gestures as Recent Apps, Easy access of Notification center and Media panels are changed.

Android Sparks :

BY K.R Sharvesh Ram/III/ECE-A

To get the latest news about your android phone, make an account in the link , "www.XDA-Developers.com" and

Explore your device updates, information, and etc, by the developers forum.

HARDWARE HUB

Huawei's Kirin 980

Is The World's First 7-Nanometer Mobile Chipset With 5G Support

Introduced at the 2018 IFA, the overall core organization has changed from the **Kirin 970** which was introduced the previous year. The 980 features two high-performance big Cortex-A76 core operating at 2.6 GHz, 2 medium-performance big Cortex-A76 operating at 1.92 GHz, and four little Cortex-A55 cores operating at 1.8 GHz. Compared to the 970, the 980 features 40% power efficiency and 62.5% smaller die area due to the process shrink. The 980 ballooned to over 25% more transistors from 5.5 billion in the 970 to 6.9 billion. The 980 adds many enhancements, including a more powerful Mali G76 GPU and incorporates a new dual-neural processor designed for AI acceleration. The 980 has two improved ISPs and a more powerful LTE modem supporting up to User Equipment (UE) category 21 capable of reaching a maximum downlink of 1.4 Gbps.

Highlights of Kirin 980:

The Kirin 980 is the fastest, highest performing, most energy efficient, and most intelligent chipset on the market. These outstanding features allow the chipset to provide more powerful, rich, and smart experiences to mobile users.

The Kirin 980 is the world's first commercial 7nm processor manufactured with TSMC. The 7nm process technology allows the Kirin 980 to pack 6.9 billion transistors within a $1cm^2$ die size, which is 1.6x more than the current 10nm process. Therefore, the Kirin 980 is able to deliver 20% better performance and 40% more power efficiency than the 10nm chipsets found in most flagship smart phones today.

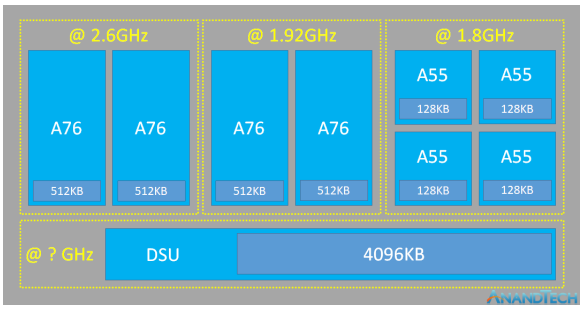
The Kirin 980 is also the world's first processor to use Cortex-A76 cores, which are 75% more powerful and 58% more efficient than the previous generation. The octa-core CPU configuration consists of two high-performance Cortex-A76 cores, two high-efficiency Cortex-A76 cores and four extreme efficiency Cortex-A55 cores. Huawei integrates the world's first modem capable of supporting LTE CAT 21 with a peak download speed of 1.4Gbps. The Kirin 980 can support carrier aggregation across

frequency bands so that consumers can choose their telcos and enjoy the same connectivity experience everywhere they go.

To take advantage of this configuration, Huawei developed an innovative Kirin CPU subsystem with Flex-Scheduling technology that flexibly allocates the right cores to the right tasks. In real-world usage conditions, the Kirin 980 should enable faster app launch times, better multi-tasking and an overall smoother user experience.

The Kirin 980 also packs a punch in the graphics department; it is integrated with the Mali-G76 GPU for 46% greater graphics processing power at 178% improved power efficiency over the previous generation. The Mali-G76 GPU utilizes a clock boosting technology powered by AI to identify gaming workloads and adjust resource allocation for optimal gaming performance.

Building on the success of the Neural Processing Unit (NPU) of the Kirin 970, Huawei adds the industry's first dual NPU to the Kirin 980 which can recognize up to 4,500 images per minute. This is a 120% improvement over the NPU of the Kirin970. There is Huawei's proprietary 4th generation ISP built into the Kirin 980. The 4th-gen ISP



boasts 46% increase in data throughout compared to its predecessor, provides better support for multi-camera configurations, an all-new HDR color reproduction technology which can alter picture contrast to highlight objects on various parts of an image, and improved motion tracking.

Features of Kirin 980 :

Designer: HiSilicon, ARM Holdings

Manufacturer: TSMC

Model Number : 980

Market: Mobile

Introduction: August 31, 2018 (announced) August 31, 2018 (launched)

Family : Kirin

Frequency : 2,600 MHz, 1,920 MHz, 1,800 MHz**ISA** : ARMv8 (ARM)

Microarchitecture : Cortex-A76, Cortex-A55

Core Name: Cortex-A76, Cortex-A55

Process: 7 nm

Transistors: 6,900,000,000

Technology: CMOS Die 74.13mm^2

Cores: 8

Word Size: 64 bit

Threads: 8

P.Thangavel/III/ECE-B

RIDE INTO VIRTUAL REALITY

Introduction & History

The exact origins of virtual reality are disputed, partly because of how difficult it has been to formulate a definition for the concept of an alternative existence. The development of perspective in Renaissance Europe created convincing depictions of spaces that did not exist, in what has been referred to as the "multiplying of artificial worlds". Other elements of virtual reality appeared as early as the 1860s. Antonin Artaud took the view that illusion was not distinct from reality, advocating that spectators at a play should suspend disbelief and regard the drama on stage as reality The first references to the more modern concept of virtual reality came from science fiction.

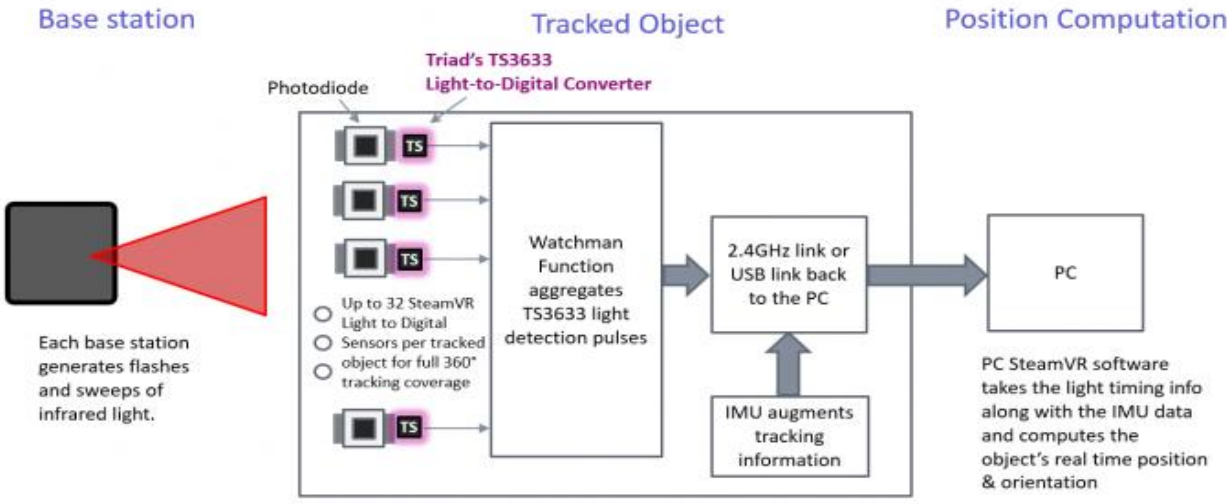
A new chip that Valve is recommending for use in future SteamVR headsets and accessories brings improved performance and significant power reduction compared to the first generation solution along with potential manufacturing savings. Each divot has a Lighthouse sensor at its base An essential component in the first generation HTC Vive is the cratered sensors that cover the headset and controllers. Each of these sensors consists of a photodiode and discrete circuit which detects and interprets pulses of light from the Lighthouse 'base stations'. Elegant as the system is, there's room for improvement in the sensor design; a new chip that Valve is recommending for use in future SteamVR tracked headsets and peripherals brings enhancements ranging from reduced costs to improved performance and power savings.

The First VR Headset came out in the 1960's Coined as the "Telesphere Mask" by inventor Morton Heilig. This device features stereoscopic (3-D) TV, wide vision and true stereo sound.

That chip is the TS3633 integrated circuit from Triad Semiconductor, a US firm which specializes in creating custom analog and mixed signal integrated circuits. We learned recently that Valve worked with Triad to architect the chip, and that it sits next to

the photodiode as an interpreter of the raw signals from the Lighthouse base stations. The TS3633 is now available for purchase from Triad, and we're learning more about what improvements it brings to the table for future headsets using SteamVR Tracking.

Like the smartphone, widespread adoption of VR headsets will come as the devices, and the components in them, mature and become less expensive and easier to manufacture. The first generation HTC Vive—the first (and so far, only) VR headset using SteamVR tracking—uses a discrete circuit sensor design consisting of 41 individual components. The TS3633 cuts that number down to 9, which means more streamlined manufacturing. Triad's VP of Marketing & Sales, Reid Wender, explained that the chip is cost-optimized for high volume manufacturing. For a complete system (including headset and controllers), which has around 80 sensors, the chip reduces component placements by 2,560 over the 41 component per-sensor design of the first-generation Vive. That brings savings in component placement and also opens the door to simplifying circuit board designs which can further reduce cost, says Wender. Less components can also mean better reliability which can cut down further on tangential costs that go beyond



Blocks of VR

You can think of the system as radio system with a link budget. The base stations are the transmitters and the tracked objects are the receivers. Extending this analogy, the photodiode takes the place of the antenna that would be there in an RF system. The Triad TS3633 is the front end of the receiver that provides 'lots of

amplification, filtering and extracts the signal from the noise.' So, instead of simply making the photodiode larger (slower, more expensive overall system) it may be a better-engineered system (lower jitter, higher performance, lower cost, smaller size) to have a somewhat smaller, faster photodiode and get more sensitivity & gain from the Light-to-Digital converter IC.

By S. Sharumathi/II/ECE-B

IDEA CORNER

Latest Ideas and Projects Going On

DESIGN AND IMPLEMENTATION OF AN ADVANCED SECURITY SYSTEM-INVISIBLE EYE (POWER SAVING SYSTEM) (Wireless)

ABSTRACT -- The main agenda of this work is to design and implement an advanced security with affordable and less complex system. In this modern era, property crimes are more predominant. This necessitates our need to develop an advanced security system which is the INVISIBLE EYE. It is basically a single camera based security system that can be used to protect valuables kept in a room of a house or property.

DESIGN OF AN NEXT GENERATION BRAILLE SYSTEM IMPLEMENTATION: MOBILE COMMUNICATION DEVICE FOR THE BLIND (Embedded Systems)

ABSTRACT - Braille is a tactile writing system used by the blind and the visually impaired in this project we are used a vibration motors for to detect the letters it will run in predefined pattern for each letters and also by using gesture sensors we will give a reply to the messages.

DESIGN & IMPLEMENTATION OF SIXTH SENSE DEVICE (MatLab)

ABSTRACT - In this paper we present an approach for to create a Sixth Sense device which works of the principles of gesture recognition and image processing to capture, zoom(in and out) and toggle pictures with ease just by the help of colored caps/LED worn on the fingertips of the user.

Some Useful links:

1. https://www.globalspec.com/ - One of the engineering websites targeted more towards engineers already in the field, GlobalSpec offers a useful product and supplier list for any engineering project. Product alert emails are easily configured.

It is an interesting editorial answering important questions from "What is the Real Cost of an Industrial Robot" to "What Chemical Lab Equipment is Most Popular."

2. http://www.efunda.com/ Efunda features an incredible directory of all things relevant to engineering. It features an immense array of engineering formulas structured into various categories. It includes formulae for fluid mechanics, composite vibrations, heat transfer and more. Along with it comes a handy Wolfram Calculator able to solve calculus, matrices, and transformations.

By P.Gowri, L.Ramkumar/VI/ECE-A

THE TOBII 4C

History:

John Elvesjo, Marten Skogo and Henrik Eskilsson founded the company in 2001. All three founders play an active role in the company: Henrik Eskilsson is the CEO, John Elvesjo is vice president and CTO, and Marten Skogo is Chief Science Officer. The Tobii Group consists of three business units: Tobii Dynavox from an acquisition of US based , DynaVoxS Tobii Pro, and Tobii Tech. Tobii is based in Stockholm, Sweden, with offices in the US, Japan, China, Germany, Norway and Ukraine. Tobii became publicly traded on April 22, 2015,[3] trading on the Stockholm Stock Exchange.

In 2012, Tobii took home the award for best prototype at the consumer technology tradeshow 2012 CES and Laptop Magazine named Tobii the winner in its best new technology category.

Eye tracking for gamers:

(Seeing is believing)

Tobii is the largest company in the space, so TechRadar tried out its flagship eye tracker – the 4C – and spoke to its head of gaming to find out

Tobii 4C Eye Tracker

Gaming with an eye tracker feels like virtual reality-lite. It's cheaper, easier to set up, and is already available in some of your favorite games. It offers some of the same features as VR, too: you can swivel

the camera by moving your gaze or turning your head, for example.
But can it fundamentally change the way you play? And what's next for the tech?

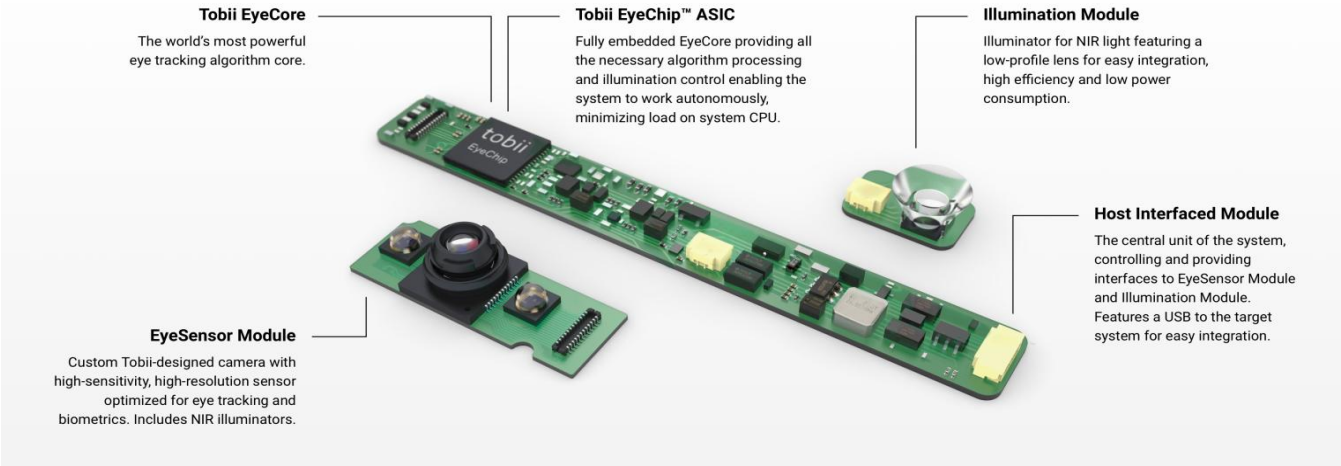
The Tobii 4C

The 4C is much larger than I expected. It's a black bar that stretches 13 inches across the bottom of your monitor, which is most of my laptop screen. It's chunky enough to stop you closing your laptop when you're finished playing, but it does at least have a discrete, sleek finish.

It plugs into your laptop or PC via a USB cable, and you attach it to the bottom of your monitor with a sturdy stick-on strip. It's easy to set up, and after some quick calibration you're ready to jump into one of the 120+ games that support it. The list includes everything from sprawling RPG Kingdom Come: Deliverance to space sim Elite Dangerous. Tobii has especially close ties with both Square Enix and Ubisoft, which means a lot of the games those studios publish or develop are compatible, including Assassin's Creed Origins, Final Fantasy XV and Deus Ex: Mankind Divided.

The tracker has two main components: cameras and illuminators. The illuminators shine infra-red light into your eyes, while the camera take pictures. Among other things, the camera is looking for the 'twinkle' of the screen's reflection in your eye, and measures the angle between that spot and your pupil to work out where you're looking; it's taking 90 pictures a second to make sure it stays responsive.

The results are reassuringly accurate. It picks up my eyes from a variety of angles and distances away from the screen, and it works even if I sit off-center.



Tobii Technology :

Traded as : Nasdaq Stockholm: TOBII

Industry : Hardware and software development

Founded : Sweden (2001)

Industry : Hardware and software development

Founded : Sweden (2001)

Area served : Worldwide

Key people : Kent Sander (Chairman) John Elvesjö (vice President and CTO) Henrik Eskilsson (CEO) Marten Skogo (CSO)

Products : AAC devices Eye tracking products for research and market analysis. Eye tracking components for industrial integration.

By J.Tamilarasi/VI/ECE-B

Founders : John Elvesjo, Marten Skogo, Henrik Eskilsson

DO WE NEED MUSIC?

INTRODUCTION

The music's effects on the human body in terms of physical health, emotions, and mental health have been considered, focus is shifted to the mental and intelligence aspects. One way music involvement may be beneficial to intelligence is by the changes it makes in your brain. One of the major music centers in the brain is part of the middle mammalian layer of the brain, which is also important in emotions. Developing the middle brain leads to better attention maintenance skills, memory, motivation, and critical thinking skills.

MUSIC AS THERAPY

Music has a vast influence over the nations and peoples on this planet. It has been used in every culture, and is often connected with anxiolytic (meditation) and analgesic (pain killer) properties. Today it is used in many hospitals to help patients relax and help relieve or ease pain, confusion and anxiety. Music is also commonly used in counseling. Music therapy techniques may include guided listening or improvisational playing and are used within the context of many theories, and for many types of mental disorders, from depression to schizophrenia. music therapy for mental disease patients is thought to have emerged in the early 1900s as a consolatory activity of musicians in mental hospitals. It seems very

unlikely that the actual sound waves created by the music played have a physical impact on any physical system in the body, such as the nervous system 23 feeling pain, the respiratory system, blood pressure, pulse rate, as well as the emotions and thoughts. How, then, can music have any effect at all on such things? The effect must be mental, leading one's focus to the center of mental activity

MUSIC AS MEDITATION

Throughout history, man has created and listened to music for many purposes. Music has served to express emotions such as joy or sorrow, and has done so very effectively. Music has been a tool of communication in this way, helping one man to understand another and providing a medium of interconnection. Music has been perceived to have transcendental (deep state) qualities, and has thus been used pervasively (widely) within forms of religious worship. Music is an ever-changing, ever-increasing gift from God, free and available to all who seek it. Music has been associated with physical and emotional healing throughout history.

ABOUT PITCHES

Pitch, tempo, and melodic pattern all influence music's effect on mood and physical processes. For instance, high pitch, acceleration of rhythm, and ascending melodic passages are all generally felt to increase anxiety and tension and sometimes even lead to loss of control and panic. The makers of arcade and video games commonly exploit this effect by increasing tempo and pitch on ascending melodies during a time of high pressure and necessity of precision in performance to succeed. Inversely, music with low pitch generally produces a calming effect. Slow tempos and descending melodies often cause feelings of sadness and depression.

MUSICAL EXPRESSIONS

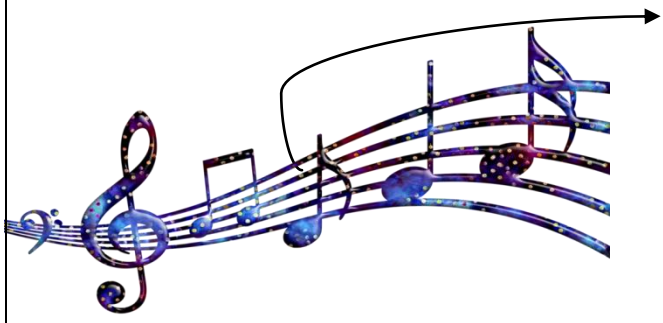
A 1990 study found that 80% of adults surveyed described experiencing physical responses to music, such as laughter, tears, and thrills. A 1995 study also revealed that 70% of young adults claimed to enjoy benefits for the emotions evoked by it.

RESULT

Most students reported listening to many types of music while they study while some listed only one or two. The most frequent type of music to listen to while studying was, somewhat surprisingly, classical

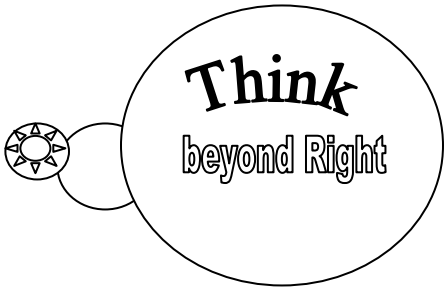
with 23% of participants. Following classical was rock with 20% of participants. Alternative took 19%; jazz had 15%; hip-hop/R&B and country music tied with 14% each; gospel had 10%; easy listening took 8%; rap finished last with 7%.

By P.Prabhu/VI/ECE-B



Each day of the week is repeated after 7 days.So,after 63 days it will be Monday . After 61 days,it will be Saturday.

Today is Monday. After 61 days, it will ??



6210001000

Find a 10-digit number where the first digit is how many zeros in the number, the second digit is how many 1s in the number etc. until the tenth digit which is how many 9s in the number.

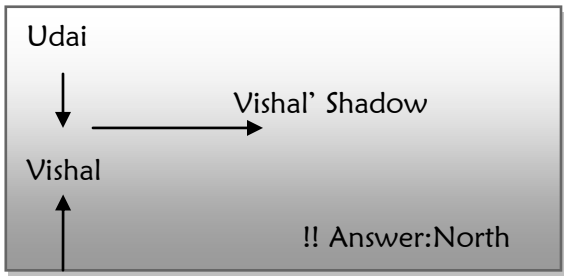
Solve this

By- S.Suganthi/VI/ECE –B

If one man or two women or three boys can do a piece of work in 22 days, then the same piece of work will be done by 1 man, 1 boy and 1 woman in:

12 Days

One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing?



What occurs once in every minute, twice in every moment, but never in a thousand years ?

The Letter "M"

Program Outcome for Electronics and Communication Engineering

PO 1: Engineering Knowledge: Apply knowledge of mathematics, science and engineering principles to solve problems in the domain of Electronics and Communication Engineering.
PO 2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3: Design/Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4: 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.
PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6: 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.
PO 7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
PO 8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10: 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.
PO 11: 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.
PO 12: 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.

Program Specific Outcomes (PSO)

PSO1: Embedded system design: Graduates will be able to analyze, design, construct and test electronic and embedded systems for desired specification.
PSO2 : Simulation Tools: Graduates will be able to solve emerging real world problems using suitable hardware and software tools.

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