

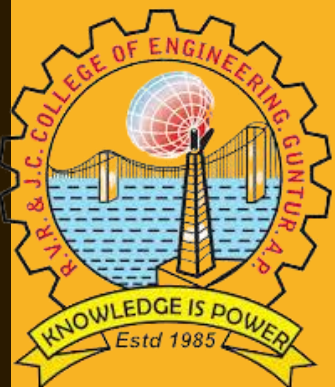
VOL4 | ISSUE 1 | JANUARY 2019

MECHZINE

GET TO KNOW THE WORLD !



The rise of Machines and AI
And threat of jobless future



A STUDENT INITIATIVE TECHNICAL MAGAZINE

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A STUDENT INITIATIVE TECHNICAL MAGAZINE

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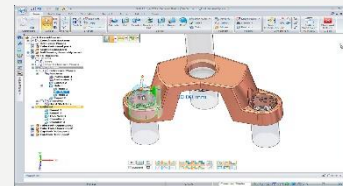

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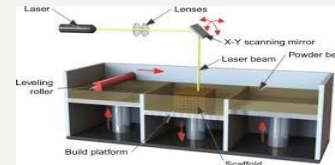
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**TOP OF THE BEST
MECHANICAL ENGINEERING SOFTWARE**

- Venkata Krishna Reddy, Asst. Manager at thermax

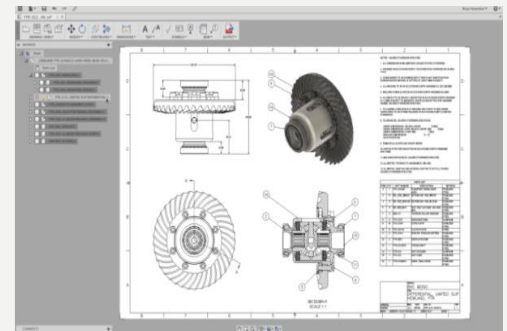


Best 3D modeling software for mechanical engineering

3D modeling software is now an essential tool for a lot of industries. Engineers and designers are actually making the most of these advanced software tools, useful for many applications, from simulation to manufacturing. There are many software solutions with advanced features that will allow you to work on really technical projects. Here is the selection of the best software to work with for your next mechanical engineering projects. Find out all the modeling and design tools that you need.

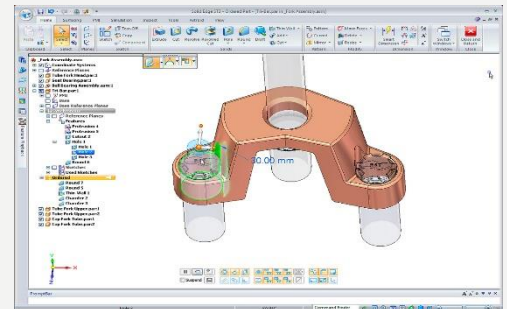
Fusion 360

Fusion 360 is a great CAD software tool developed by Autodesk. This a cloud-based program, that will allow you to improve your teamwork thanks to better communication around your mechanical projects. This program has advanced software tools, you will be able to work on solid modeling, mesh modeling and parametric modeling.



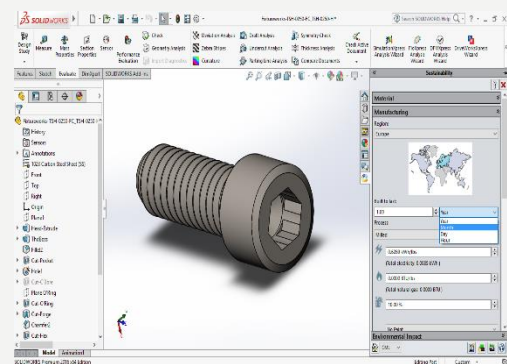
Solid Edge

Solid Edge is developed by Siemens. It is the perfect 3D software for engineers for complex projects but also to give shape quite quickly to your ideas. It has a great 2D orthographic view functionality, really convenient for mechanical designers. It also has powerful engineering simulation capabilities for Computer-Aided Engineering. This software is essential and will surely allow you to go further with all of your technical 3D projects!



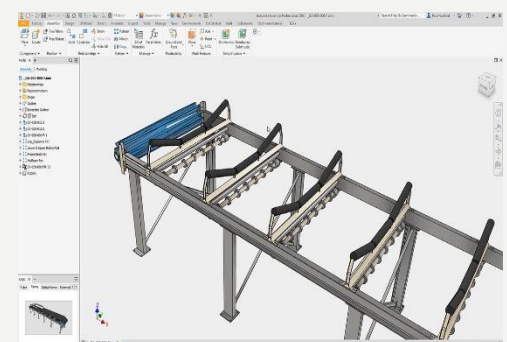
SolidWorks

SolidWorks is the perfect 3D modeling software for engineers and 3D designers. SolidWorks is a powerful and complete tool that will help designers and engineers to build innovative mechanical models. This 3D software has a user friendly interface and can be used for design, or to create machinery parts, for example. It will perfectly fit engineering students looking for a great tool to make mechanical drawings! SolidWorks is used by automotive manufacturers working on utility truck bodies, or the motorcycle manufacturers



Inventor

Here is one of the best modeling software tools available on the market to design your mechanical projects: Inventor. It has various modeling options and great simulation tools. No doubts, this CAD software solution will help you to improve your performance. DIS-TRAN, a company specialized in the conception of complex steel structure arrangements such as H-Frame Transmission Structures, are actually using this software solution in order to design their electrical engineering projects. It is the proof that Inventor can help you to develop any of your complex mechanical parts, even the big ones.



To be continued.....



ADDITIVE MANUFACTURING

- B. Dhanwanth Dhreekar, Y18ME011

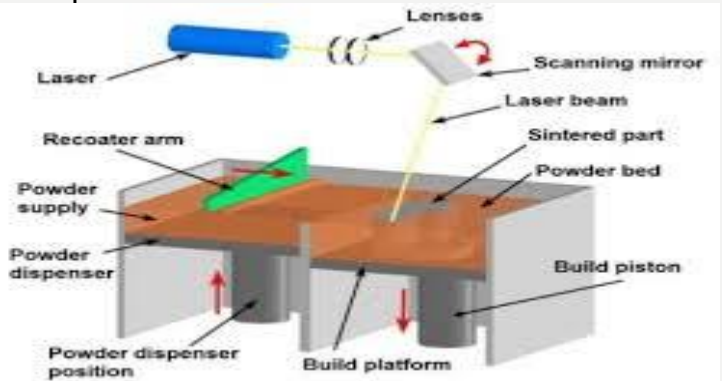
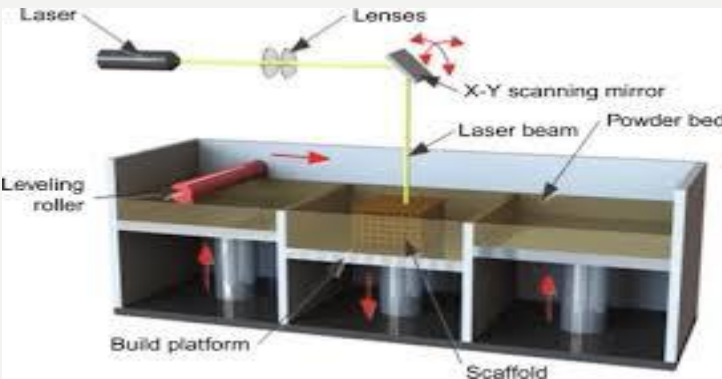
The term “additive manufacturing” references technologies that grow three-dimensional objects one superfine layer at a time. Each successive layer bonds to the preceding layer of melted or partially melted material. Objects are digitally defined by computer-aided-design (CAD) software that is used to create .stl files that essentially “slice” the object into ultra-thin layers GE Additive specializes in developing Powder Bed Fusion (PBF) machines for the additive manufacturing of metal parts. The three processes GE offers with in the PBF category, recognized by the American Society for Testing and Materials (ASTM), inparts Direct Metal Laser Melting (DMLM) Electron Beam Melting (EBM) Binder Jetting.

Direct Metal Laser Sintering (DMLS)

Within DMLS, a laser sinters each layer of metal powder so that the metal particles adhere to one another.

DMLS machines produce high-resolution objects with desirable surface features and required mechanical properties.

With SLS, a laser sinters thermoplastic powders to cause particles to adhere to one another.



Powder Bed Fusion:

Powder Bed Fusion (PBF) technology is used in a variety of AM processes, including direct metal laser sintering (DMLS), selective laser sintering (SLS), selective heat sintering (SHS), electron beam melting (EBM) and direct metal laser melting (DMLM). These systems use lasers, electron beams or thermal print heads to melt or partially melt ultra-fine layers of material in a three-dimensional space. As the process concludes, excess powder is blasted away from the object.



Recent Applications of Additive Manufacturing in daily usage

1. Aerospace

In August 2013, NASA successfully tested an SLM-printed rocket injector during a hot fire test that generated 20,000 pounds of thrust. In 2015, the FAA cleared the first 3D-printed part for use in a commercial jet engine. CFM’s LEAP engine features 19 3D-printed fuel nozzles. At the 2017 Paris Air Show, FAA-certified, Boeing 787 structural parts fabricated from titanium wire were displayed, according to Aviation Week.

2. Health care

At the New York University School of Medicine, a clinical study of 300 patients will evaluate the efficacy of patient-specific, multi-colored kidney cancer models using additive manufacturing. The study will examine whether such models effectively assist surgeons with pre-operative assessments and guidance during operations.

3. Automotive

CNN reported that the McLaren racing team is using 3D-printed parts in its Formula 1 race cars. A rear wing replacement took about 10 days to produce instead of five weeks. The team has already produced more than 50 different parts using additive manufacturing

Metal–Matrix Composites

- Sneha H. Dhoria, Assistant Professor



MMCs are classified into different categories depending upon their matrix materials. Some examples of most commonly used metallic matrix configurations are:

- Aluminum-based composites; aluminum as matrix can be either cast alloy or wrought alloy (i.e., AlMgSi, AlMg, AlCuSiMn, AlZnMgCu, AlCu, AlSiCuMg)
- Magnesium-based composites
- Titanium-based composites
- Copper-based composites
- Super alloy-based composites

Aluminum–matrix composites are most commonly studied MMC as they are widely used in the automotive and aerospace industries. Reinforcement compounds such as SiC, Al₂O₃, and B₄C can be mixed easily and effectively in molten aluminum. Magnesium–matrix composites have similar advantages, but due to limitations in fabrication and lower thermal conductivity, they are not widely used as compared with aluminum-based MMCs. Magnesium–matrix composites have been developed for the space industry thank to the low density of magnesium and its alloys. Titanium alloys are used as matrix material in fabricating MMCs due to their good strength at elevated temperatures and excellent corrosion resistance.

Compared with aluminum, titanium alloys hold their strength at higher temperature, which is advantageous in manufacturing aircraft and missile structures, whose operating speeds are very high. However, their main problem lies with processing of highly reactive titanium with reinforcement materials. Fiber-based titanium composites are widely used in developing aircraft structures. In terms of thermal conductivity and high-temperature strength properties, copper–matrix composites are superior compared with other MMCs. Super alloys are commonly used as candidate materials for manufacturing gas turbine blades, where they operate at higher temperatures and speeds.

APPLICATIONS

MMCs can be used in various areas, such as automotive engineering, aviation industry, and other light and heavy industries. Light alloy composites are already used in the fabrication of valve trains, piston rods, piston and piston pins, cylinder head, crankshaft main bearing, and part-strengthened cylinder blocks in the automotive industry. Titanium matrix composites have been proven to be viable as a material for propulsion components in the aviation industry. Piston rods in the F-119 engine of F-22 fighter aircraft are made from titanium matrix composites.

Aluminum–graphite composites are used in power electronic modules because of their high thermal conductivity, the adjustable coefficient of thermal expansion, and the low density. Dymalloy, an MMC consisting of 20% copper and 80% silver alloy matrix with type 1 diamond is used in microelectronics as a substrate high power and high density multichip modules, where it aids with removal of waste heat. MMCs are also commonly used in the manufacture of high- and low-performance cutting tools. Cobalt matrix is usually used in the high-performance tools while other metals, such as bronze are used in low-performance tools. MMCs have also been used in the manufacture of bicycle frames. However, due to its restrictive cost, they are usually used for specialized applications or top of the line products.



Vishwamitra - The Inventor of Missiles

Vishwamitra was first a king and then a sage. He ended up becoming one of the most venerated and appreciated sages of India. He is a Rishi in the third book of the Rigveda. Thousands of years ago he discovered missiles. He was also a strong warrior, so he taught Rama the way missiles work and function. The missiles described by this sage were of many types. Some had fire, others had smoke. In addition, there were also missiles like the moon and sun.



The rise of Machines and AI & Threat of jobless future

- Dr.C.Tara Sasanka, Assistant Professor

The rising new era peeking through our horizon, emitting powerful beams of a promising future – is indeed “Artificial Intelligence” for our upcoming generation. This can be either for our best or for our worst, such is claimed by the world renowned theoretical physicist, Stephen Hawking. While his statement does put us in a tight spot thinking about what’s yet to come, we are again posed with the statements made by other pioneers in this field such as, Bill Gates about being worried about the threat posed by Artificial intelligence. So, are we going to fear this technological advancement which would someday bring us immense laurels, or are we going to conquer the horizon and make it a “powerful child of the human mind”? Well, that is exactly the question our approach to “reskilling” and “upskilling” is going to answer.

First off, **What is Artificial Intelligence?** In simpler language, if we ever hope to deliver to our population the real message. AI is simply the ability by which smart machines exhibit ‘sensory’ or ‘cognitive’ functions that humans are inherently born with. Perceiving a problem, attempts at solving it are the milestones our scientists have achieved along the way. What we need to focus on now, are the ever-growing worries, harbored by the vast working population of India regarding the effect of technologies like AI on their work in future, and most of them do have a strong basis.



What are the “Challenges” that we face today?

According to the publication of the Forbes, about 47% of jobs fall into the “high risk” category, are the most vulnerable to the phenomenon of “automation”. “The Economist” also adds that the figure might vary as these things tend to be influenced by other factors as well, such as the industry’s budget, regulations, political opinions and professional takes on the matter and of course, social resistance. Amidst all this, also keeping in mind the loss of around 600,000 jobs to the AI, as a consequence of “automation”, can we really sit around teaching our youth (which is yet to enter the job market) and the existing practitioners the existing set standard knowledge? Or is India ready for a glamorous update of its own?

Can we hope to tackle the situation? If so, how?

The only fear we have is not being “competent” enough in professional practice as the AI robots. As they are being enhanced every passing moment by an amazing human brain out there, and here, we feel hopeless about the future. Can we be “competent” enough too? The answer to that is a big loud “Yes!” “Reskilling” or upgradation of the one’s who have already set forth in their journey in the world on technological innovations – will help them not only to come across new ideas hence developing R&D, but also help them to reduce the degree of “vulnerability” that their job might face some day, if they do not equip themselves with the latest trends and stay in touch with the current happenings in the buzz of AI town. HOW? Promoting the formation of new technological courses that will enable the existing individuals to upgrade their knowledge and stay on par, and creating new platforms to encourage them to make known about new discoveries and areas of interests pertaining to Research and development; are the stepping stones to bring back the enthusiasm in the existing individuals and boosting up their morale. The reskilling will also add on the approach and quality of work these professionals invest in not just their work, but also research.

On the other hand, “Upskilling” is an approach mainly aiming at the “grassroot level”. This involves teaching the students in today’s world the skills that will equip them for their future. The whole idea of this is based on the retrospective sense – because today’s students are tomorrow’s leaders. Establishing state of the art colleges and research centers or educational institutions to nurture these young minds and guide them in the right direction is what “Upskilling” aims for. The skills in Computer science around a couple of decades ago are no longer of immense importance as they were at that time. New futuristic innovations hence need to be integrated into today’s learning experience.

AI is everywhere. There’s no backing out now, only charging into the system with full force. Alexa, Google Smart Home, Self-driving cars, Smart Navigation systems, Apps which are personalized for giving us the best experience, Vehicle booking apps, recommendations, and other futuristic innovations are not a thing of the future anymore. One of the many reasons that we need to look forward to developing AI is its application in the healthcare industry. When trained by experts to do so, they will detect minor changes in the radiology imaging that normally physicians might not notice. The use of AI is predicted to cut down medical costs, leading to more accurate diagnosis – wouldn’t that be a charm?

Another future use for AI include “Brain-computer Interfaces (BCI)” which are predicted to help those with trouble moving, speaking or with a spinal cord injury, hence using AI to help patients move and communicate by decoding neural activities .This was an eye opening point made during Mr. Anant Maheshwari’s talk – Innovation at its peak! Which also highlighted the importance of AI as in the welcoming windows of Microsoft. Pharmacogenomics enabled specialized individualized medicine was the central attraction of AI-Enabled healthcare as demonstrated as a part of “Imagining a perfect world” – A part of Dr. Sangita Reddy’s address at a recent Patient Safety Conference. So many opportunities! Yet, we’re still scared?



Is there any hope for Indian hands shaping the AI?

Keeping in mind that the giant, Amazon announced earlier that it will invest \$700 million in order to train about 100,000 workers in the US by 2025, which will help take up highly skilled jobs, I say – “Yes. We do stand a chance.” This can be further cemented by stating according to The New York Times that -with this initiative, Amazon is acknowledging that” advances in automation technology will handle many tasks now done by people.” And yet, the investment it had made towards upskilling and reskilling its employees further proves that there is absolutely no room for fear of losing your jobs to these machines, rather you will be required to use your hands to create brilliant masterpieces with the knowledge you keep on “polishing”, and thus, breathing a new life into the future, for AI learns by looking at human culture. And we Indians can do that.

So fellow AI enthusiasts, the power of knowledge will surely come to the one who is willing to yield it. Conquering incompetency with upskilling and reskilling is indeed the way ahead! For AI doesn’t over power you, but rather you power the intelligence behind the AI.

UPCOMING GUEST LECTURES in the Department

- ❖ **Guest Lecture on "Motivation to Join Armed Forces" organized by RAJMEA on 24th June, 2019 (Guest speaker - Lt. V. Raj Akhil, Indian Military Officer)**
- ❖ **Guest Lecture on "Intelligent Hand Held Surgical Robotics" organized by RAJMEA on 18th July 2019 (Guest speaker - Dr.V.Kalyan Chakravarthy, Professor, Kyungpook National University, KOREA)**
- ❖ **Guest Lecture on "Design Thinking in Automotive HMI" organized by RAJMEA on 26th July 2019 (Guest speaker - Surya Teja Konijeti, (Alumni), Sr. Industrial Designer, ZF automotives, Germany)**

7 Humanoid Robots Which Were Made In India, and Their Success Stories



Humanoids robots have been gaining popularity in India for quite some time now. Although the country is still catching up with the developments in artificial intelligence and robotics as compared to others, Indian startups, as well as the government, are working at a rapid pace to integrate new age technologies. According to an IFR research, robot sales in India increased by 27 percent to a new peak of 2,627 units in India – almost the same as in Thailand. Another survey claims that India ranks third in implementing robotic automation.

Let us take a look at a few noteworthy humanoid robots that are designed and developed in India

MANAV

Manav is India's first 3D-printed humanoid robot. The two kilo, two-feet tall robot has an inbuilt vision and sound processing capability which allows it to walk, talk and dance – just in response to human commands. Developed by Delhi's A-SET Training and Research Institute, the humanoid robot is primarily meant for research purposes and is made available



Manav can also perform activities like push-ups, headstands and can also play football. It uses an open-source code so that it can also be taught to learn and respond like a human child. It also has WiFi and Bluetooth connectivity and has a rechargeable lithium polymer battery that can work for an hour with a single full charge. The parts of Manav are all made in India, the outer frame of the robot is made of plastic and was 3D printed from A-SET's own 3D printing venue, Buildkart Retail.

MITRA

The first indigenously built humanoid robot is capable of interacting with humans smartly. The five feet-tall humanoid robot is made of fibreglass and is programmed to greet customers using contextual help, autonomous navigation and facial and speech recognition. It also has a touchscreen on its chest which can be used to interact where speech is not possible. It can work for eight hours on a single charge. It can also understand multiple languages. The humanoid robot was launched by Prime Minister Narendra Modi and Ivanka Trump, First Daughter and advisor to the President of the United States Donald Trump, at the Global Entrepreneurship Summit (GES) conference last year.



Developed by a Bengaluru-based robotics startup Invento Robotics, the robot can be found floating in the corridors of the Canara Bank and PVR Cinemas in Bengaluru, chatting with the customers and making them feel welcome. According to the robot's official website, the robot is as handy in the service sector as it is as a host. In fact, one can rent the robot for any party. Depending on the requirement, the startup customizes the humanoids accordingly.

ROBOCOP

Hyderabad-based AI and ML startup H-Bots Robotics has developed a police robot to assist in handling the law, order, and traffic management. The life-sized robot, which was deployed last year in Hyderabad, is equipped with cameras and an array of different sensors like ultrasonic, proximity and temperature sensors. The robot is designed to protect and secure places like offices, malls, airports, signal posts and other public spaces and can take care of security if deployed autonomously. Reportedly, the Robocop can diffuse bombs too. The beta version robot is made in India using all Indian components



KEMPA

Passengers visiting Bengaluru airport may soon be greeted by a special robot assistant. Built to suit the needs of the Kempegowda International Airport, the little bot assistant, named KEMPA, will answers queries of confused passengers in English as well as Kannada. The humanoid is built on AI by a Bengaluru-based startup Sirena Technologies. The advanced humanoid is completely designed and manufactured in Bengaluru. KEMPA is programmed to provide flight and check-in details and other information about flights. While the bot is still being tweaked and is getting ready for the official launch. It also suggests places to visit in the state also engages in casual conversation with passengers.



RADA

Vistara, a joint venture between Tata Sons and Singapore Airlines, has created a unique artificial intelligence-based robot called RADA to automate simple tasks and improve customer experience. According to a statement released by Vistara, the RADA will be placed at Vistara’s Signature Lounge at Delhi’s Indira Gandhi International Airport’s Terminal 3 from 5 July 2018 to assist customers before they board their flights. It will also help promote Vistara’s product and services with the help of distinct messages recited by the bot. RADA will be further developed over a period of time in terms of functionality and features for future use cases, after gauging customer feedback. It is conceived, designed and engineered by its team of technology experts and apprentices from Tata Innovation Lab with support from students of reputed institutions. Built on a chassis of four wheels, RADA can rotate 360 degrees and has three inbuilt cameras for cognitive interaction. Combining these components with an effective voice technology, Vistara has developed the robot to provide a simple solution to cater to the emerging and future trends.



IRA

Next time you enter the HDFC Branch, you may be greeted by a shiny white interactive humanoid called IRA (Intelligence Robotics Assistant). HDFC bank first launched IRA 1.0 in its Mumbai branch last year. Recently, it deployed an advanced version of IRA in its Koramangala Branch in Bengaluru. IRA 2.0 is a blend of the former model and EVA (Electronic Virtual Assistant). It has been trained to answer questions frequently asked by the customers and assist the customers to the correct counter as per their requirements. The humanoid interacts with customers with a voice-based technology. IRA 2.0 has been created by HDFC Bank in collaboration with its technology partner Invento Makerspaces and Sensorforth Technologies. The bank claims that it is

the first bank in India to introduce a humanoid for customer service.



INDRO

This is reportedly the tallest humanoid robot built in India. Created by researcher Santosh Vasudeo Hulawale, INDRO is an autonomous robot was made inside a house with easily available low-cost material like aluminium, wood, cardboard, plastic etc. According to a research paper, INDRO can be used for lightweight tasks like entertainment, education and a few household works. The autonomous humanoid robot is not fully autonomous and can be controlled both autonomously and manually. It has 31 motors and can perform actions like a human. In addition, it can lift objects weighing up to 2 kilos with its hands.



DRDO's DAKSH

This made-in-India robot is primarily designed to detect and recover Improvised Explosive Devices (IEDs). Developed by Defence Research and Development Organisation (DRDO), the robot was inducted by Indian Army around 2011. Reportedly, 20 Daksh robots are already being used by the Indian Army. Using its X-ray vision, Daksh can identify a hazardous object and can diffuse it with a jet of water. Daksh is capable of climbing staircase and negotiating cross-country

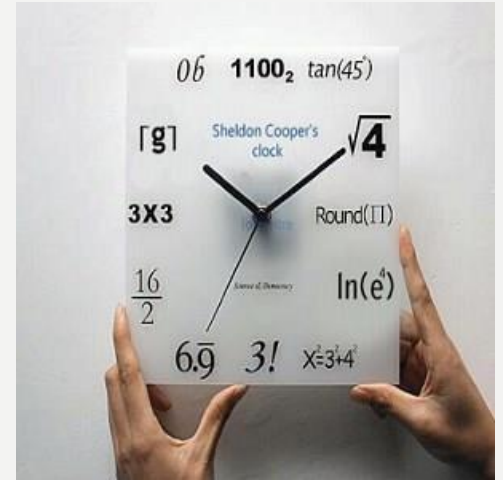
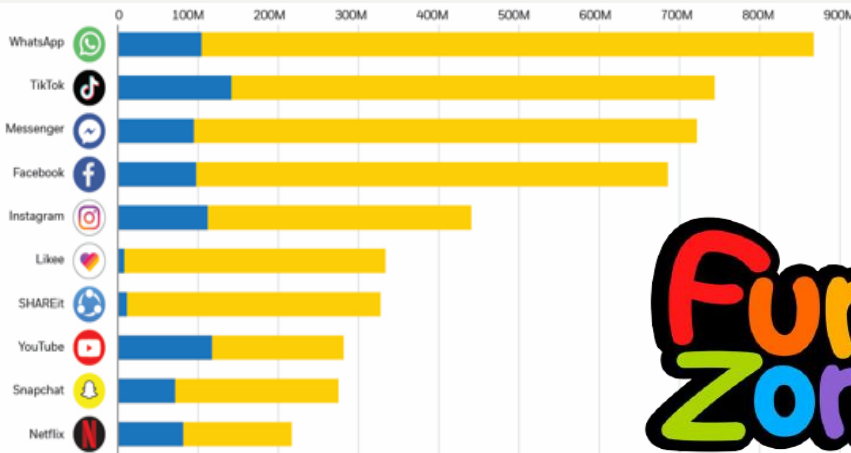


terrains and is capable of towing a suspected vehicle away from a crowded area. Additionally, it can be operated from a distance of 2.5 kilometers and can handle car explosives with its high-calibre shotgun. Reportedly, after it got an upgrade in 2015, it not only became lighter, faster and rugged, but has also been equipped with chemical, biological, radiological and nuclear hazard detection mechanism. The new Daksh is made of aluminium alloy which has reduced the weight and has become three-time faster, compared to the older version, which was made of steel.

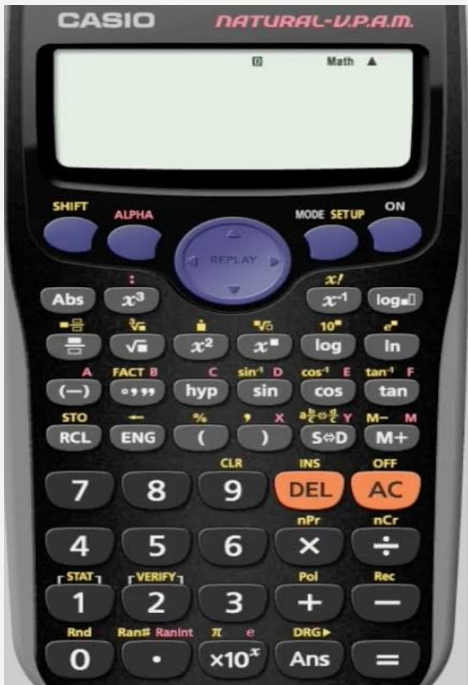
India's robotics industry is still small when compared with those of South Korea, Japan, US and China. Nonetheless, there are only three robots per 10,000 employees in India. But it is only a matter of time before the country becomes a major player in robotics design and development. India already has many of the basic elements in place to become a robotics industry, including established business, academic research, government support and an increasingly entrepreneurial business community



TRENDING APPS IN 2019



The Calculator Guide Display Modes

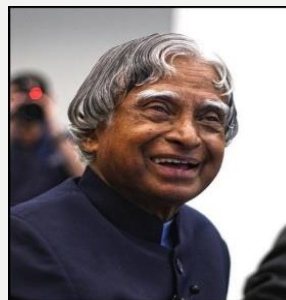


Input	Math	Line
$\frac{1}{4}$	Displays as fraction. Use the $\frac{\square}{\square}$ change to decimal.	Must press fraction button when you want line (vinculum). Same result as Math mode.
$2 \div 3$	Displays as fraction. Use the $\frac{\square}{\square}$ change to recurring then decimal approximation.	Displays as decimal approximation. Use the $\frac{\square}{\square}$ change to fraction then recurring decimal.
$\sqrt{8}$	Displays as simplified surd. Use the $\frac{\square}{\square}$ change to decimal approximation.	Must close bracket. Displays as decimal approximation and cannot change.
$2\frac{2}{5}$	Displays as improper fraction. Use the $\frac{\square}{\square}$ change to decimal and $(a\frac{b}{c} + \frac{d}{e})$ to mixed number.	Must press fraction button after integer and line. Same result as Math mode.

SOLVE SUDOKU



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— “ —
 The best brains of the nation may be found on the last benches of the classroom.
 — ” —





**Quad bike design challenge 2018,
Hyderabad**



QUAD TORC-2018, Bijnor, UP



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