DEPARTMENT OF INFORMATION TECHNOLOGY

Welcome to the Department of Information Technology.

As we all know, this is an era of Information Technology, and almost every one of us uses some kind of gadgets which invariably leverages the benefits of Information Technology. The advent of Information Technology has revolutionized the way we live. Moreover, Internet and mobile wireless technology are the boons of Information Technology. So, the department strives hard to groom our students with this cutting edge technology, thereby instilling high valued ethics and morals. The department prepares them to take up the challenges of ever changing dynamic IT industry.

To fulfill the vision and mission of Information Technology Department towards imparting quality education to our students we conduct various activities like expert lecture, seminar, workshop and industrial visit to make teaching process effective. We provide a platform to our students to participate in many extra-curricular activities through various technical, non-technical contests for their overall personality development.

All India Shri Shivaji Memorial Society's

Institute of Information Technology

Department of Information Technology

VISION

To equip students with core and state of the art Information technology.

MISSION

Imparting knowledge of Information Technology and teaching its application through innovative practices and to instill high moral, ethics, lifelong learning skills, concern for the society and environment.

PROGRAM EDUCATION OBJECTIVES (PEO)

i. To prepare graduates to solve multifaceted and complex problems IT industries.

ii. To inculcate core professional skills with latest information technology to prepare graduates for employment and higher studies.

iii. To develop cross domain competences that prepares graduates for lifelong learning in diverse career paths.

iv. To make graduates aware of their social responsibilities toward environment and society.

PROGRAM SPECIFIC OUTCOMES (PSO)

1. Graduates will be able to demonstrate database, networking and programming technologies.
2. Graduates will be able to apply core professional state of the art Information Technology.

All India Shri Shivaji Memorial Society's

Institute of Information Technology

Department of Information Technology

PROGRAM OUTCOMES (POS)

Graduates will be able to

PO1. Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems. [Engineering knowledge]

PO2. Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. [Problem analysis]

PO3. 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 cultural, societal and environmental considerations.[Design/ development solutions]

PO4. 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. [Conduct investigations of complex problems]

PO5. Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations. [Modern tool usage]

PO6. 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. [The engineer and society]

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

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

PO9. Function effectively as an individualand as a member or leader in diverse teams and in multidisciplinary settings. [Individual and team work]

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

PO11.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. [Project management and finance]

PO12. 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. [Lifelong learning]

MESSAGE FROM HOD

It gives me an immense pleasure and pride that the Department of Information Technology is publishing its 5th annual technical magazine ***"Eminence-2k18"****. It is a presentation of student's hidden talents and caliber. In today's fast growing era, presentation skills in terms of writing are certainly essential. "****Eminence-2k18****"is the golden platform for and by our students for gathering, sharing and presenting creative ideas which leads towards their all our development.*

This technical magazine is a collection of technical papers, articles, etc. which will be the hub for the students and readers to broadcast and enhance their knowledge.

Finally I express my sincere gratitude and thanks to Shri MalojirajeChhatrapati-Hon.Secretary All India Shri Shivaji Memorial Society and Dr. P.B. Mane-Principal AISSMS IOIT for their valuable guidance and support.

I thank the chief editor Prof. Mrs. P. P. Mahale and her team of staff and students editors for providing students the area for creative thoughts and knowledge expansion.

Prof. Pritesh A. Patil
HOD-IT Department
AISSMS IOIT,Pune

MESSAGE FROM EDITOR

I proudly present 5th successive edition of our department's annual technical magazine ***"Eminence 2k18"****.*

This year we are showcasing innovative ideas and hidden talents of our young minds on the theme "ISRO". The objective of the magazine is to provide platform for our students to augment the technology focus and scope of it. The technical section of this magazine elaborates importance of IT in the field of space and research.

On behalf of the entire magazine team I would like to extend my gratitude to our respected Principal Sir Dr. P.B.Mane and HOD Sir Prof. Pritesh Patil for their invaluable guidance and support towards accomplishment of ITSA events successfully.

Special thanks to team of enthusiastic and dynamic students for their incredible contribution in making of the magazine. There is remarkable contribution of the student's editorial team to make this magazine amazing. I congratulate all the participants for sharing notable articles in the magazine.

Mrs. Pragati P. Mahale
Chief Editor and Magazine Coordinator
Assistant Professor
Department of Information Technology

EDITORIAL TEAM

Technical Magazine Team Members(L-R):

Shaikh Muskan (S.E)
TithiChoudhary (S.E)
Pragya Kumari (B.E)
EktaBhushan (S.E)
RichaSirwani (S.E)

MESSAGE FROM EDITORIAL TEAM

"TECHNOLOGY LIKE ART IS A SOARING EXERCISE OF THE HUMAN IMAGINATION"

—DANIEL BAFL

We take it in our pride to present to you the 5th edition of technical magazine ***"Eminence 2k18"***

This issue will take you through the technological advancements in space sciences and globally evolving technologies.

This tech-crozier is a collection of a perfect balance of technology, knowledge,creativity and expression-exactly what we ENGINEERs are made of!

Rendering through the magazine will take you through the ennoblement of our indigenous spacecraft byISRO along with the breakthrough in the Information Technology.

We hope this edition serves to enlighten and gladden all the readers.

Feedback has always been the breakfast of the champions.

Good feedback will give us the opportunity to improve; hence any suggestions are always welcome!

Mail us at:*itsa.technicalmag@gmail.com*

INDEX

- *ISRO: From late APJ Abdul Kalam to Vikram Sarabhai, journey and people behind its success.*
- *PSLV-C37 Successfully launches 104 satellites in a single flight.*
- *Chandrayaan Mission*
- *Dark Web*
- *Deep Learning*
- *Digital Currency*
- *Future of Virtual Reality*
- *Intel i9 Processor*
- *IoT simplified*
- *ISRO vs SpaceX*
- *Latest Linux kernel advancements*
- *Mars Orbiter Mission*
- *NovaSAR-1*
- *Ransomware*
- *Introducing Sophia: First AI robot*
- *Steam's UI*

ISRO: From late APJ Abdul Kalam to Vikram Sarabhai, journey and people behind its success

Every approach, every distant reach into space is a result of years of hard work. The Indian Space Research Organisation, or ISRO, has been India's flagbearer in the global space exploration community. The state-run organisation has come a long way since its inception in 1969—from building the country's first satellite, Aryabhata, to creating a world record by launching 104 satellites from a single rocket in 2017, ISRO has done it all. But what we read in the papers is just a fraction of what transpires behind the stage.

R Aravamudan, a former director of the Satish Dhawan Space Centre at Sriharikota and ISRO Satellite Centre in Bengaluru, has given an eloquent description of ISRO's journey in his memoir, ISRO: A Personal History, which he has co-authored with his wife, Gita Aravamudan. Most readers consider the organisation's recent world record as its finest moment, but one of ISRO's earliest achievements was India's first sounding rocket launch in November 1963 from the Thumba Equatorial Rocket Launching Station in Kerala.

The rocket, as Aravamudan writes, was assembled in a church building.

The most gripping parts are Aravamudan's descriptions of two of the most important people behind ISRO's growth—Vikram Sarabhai and APJ Abdul Kalam. Sarabhai, under whom the Indian National Committee for Space Research (INCOSPAR, which eventually became ISRO in 1969) was set up in 1962, was called the father of the Indian space programme, but he was also an ideal mentor for young scientists.

The author recalls how ISRO went into disarray after Sarabhai's unexpected demise in 1971. "Sarabhai's death was so sudden and shocking… We were transitioning. And at this very crucial time, we were left leaderless," he writes. Aravamudan shared a close bond with Kalam.

He recalls how Kalam had a fondness for traditional Iyengar food and how the former president loved talking to Gita about his favourite book, Atlas Shrugged.

The author not only explains technical terms, but also provides his views on certain issues—for instance, the deal between ISRO and Russian firm Glavkosmos in 1991 to procure cryogenic engines for the GSLV project. The deal faced objections from the US, which said ISRO's agreement with the USSR "violated the Missile Technology Control Regime (MTCR)".

The memoir could have done with more detailed insights into Mangalyaan.

Aravamudan does describe the moment his "Laptop screen glowed with the colours of Mars" in the prologue, but a detailed chapter on India's Mars mission would have been a fitting addition.

Prof. Mrs. P.P. Mahale

Assistant Professor

PSLV-C37 Successfully Launches 104 Satellites in a Single Flight

In its thirty ninth flight (PSLV-C37), ISRO's Polar Satellite Launch Vehicle successfully launched the 714 kg Cartosat-2 Series Satellite along with 103 co-passenger satellites today morning (February 15, 2017) from Satish Dhawan Space Centre SHAR, Sriharikota. This is the thirty eighth consecutively successful mission of PSLV. The total weight of all the 104 satellites carried on-board PSLV-C37 was 1378 kg.

PSLV-C37 lifted off at 0928 hrs. (9:28 am) IST, as planned, from the First Launch Pad. After a flight of 16 minutes 48 seconds, the satellites achieved a polar Sun Synchronous Orbit of 506 km inclined at an angle of 97.46 degree to the equator (very close to the intended orbit) and in the succeeding 12 minutes, all the 104 satellites successfully separated from the PSLV fourth stage in a predetermined sequence beginning with Cartosat-2 series satellite, followed by INS-1 and INS-2.3 satellites were Indian satellites, while the remaining were foreign commercial satellites. 96 satellites were from US, while the others came from Israel, the UAE, Kazakhstan, the Netherlands, Belgium and Germany.

The total number of Indian satellites launched by PSLV now stands at 46.After separation, the two solar arrays of Cartosat-2 series satellite were deployed automatically and ISRO's Telemetry, Tracking and Command Network (ISTRAC) at Bangalore took over the control of the satellite. In the coming days, the satellite will be brought to its final operational configuration following which it will begin to provide remote sensing services using its panchromatic (black and white) and multispectral (color) cameras.

Of the 103 co-passenger satellites carried by PSLV-C37, two – ISRO Nano Satellite-1 (INS-1) weighing 8.4 kg and INS-2 weighing 9.7 kg – are technology demonstration satellites from India.

The remaining 101 co-passenger satellites carried were international customer satellites from USA (96), The Netherlands (1), Switzerland (1), Israel (1), Kazakhstan (1) and UAE (1).

With today's successful launch, the total number of customer satellites from abroad launched by India's workhorse launch vehicle PSLV has reached 180.

EktaBhushan
SE IT

Chandrayaan Mission

Chandrayaan-1:

ISRO has done Chandrayaan-1 mission in the past and is very close to launch the Chandrayaan-2. Both are Moon missions and when the first one was an orbiter with a hard-landing probe, the second one consists of another orbiter, a lander for soft-landing and a rover for lunar surface exploration. Both are scientific missions to study the Moon in depth.

This mission had the following objectives:

- To design, develop, launch and orbit a spacecraft around the Moon using an Indian-made launch-vehicle

- To conduct scientific experiments using instruments on the spacecraft that would yield data:

1) For the preparation of a three-dimensional atlas (with high spatial and altitude resolution of 5–10 m or 16–33 ft.) of both the near and far sides of the Moon

2) For chemical and mineralogical mapping of the entire lunar surface at high spatial resolution, mapping particularly the chemical elements magnesium, aluminum, silicon, calcium, iron, titanium, radon, uranium, and thorium

3) To increase scientific knowledge

- To test the impact of a sub-satellite (Moon Impact Probe – MIP) on the surface on the Moon as a fore-runner to future soft-landing missions

- To detect water-ice on the Moon

Major findings:

MIP and M3 (Moon Mineralogy Mapper) instruments on-board Chandrayaan-1, had discovered water on the Moon

M3 has confirmed the magma ocean hypothesis, meaning that the Moon was once completely molten.

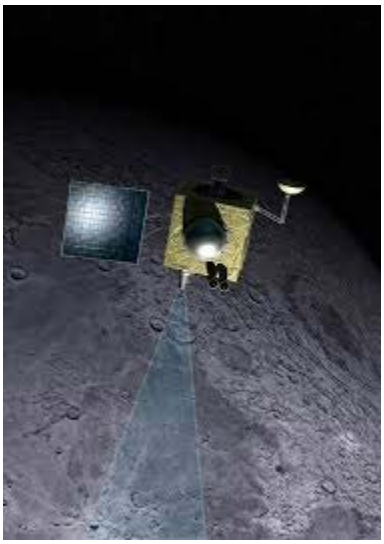
The terrain mapping camera on board Chandrayaan-1, besides producing more than 70,000 three dimensional images, has recorded images of the landing site of U.S. spacecraft Apollo 15.

TMC and HySI payloads of ISRO have covered about 70% of the lunar surface, while M3 covered more than 95% of the same and SIR-2 has provided high-resolution spectral data on the mineralogy of the Moon.

Interesting data on lunar polar areas was provided by Lunar Laser Ranging Instrument (LLRI) and High Energy X-ray Spectrometer (HEX) of ISRO as well as Miniature Synthetic Aperture Radar (Mini-SAR) of the USA.

LLRI covered both the lunar poles and additional lunar regions of interest, HEX made about 200 orbits over the lunar poles and Mini-SAR provided complete coverage of both North and South Polar Regions of the Moon.

Chandrayaan-1 imaging X-ray Spectrometer (C1XS) – detected more than two dozen weak solar flares during the mission duration. The Bulgarian payload called Radiation Dose Monitor (RADOM) was activated on the day of the launch itself and worked until the mission's end.



The Chandrayaan-1 payload has enabled scientists to study the interaction between the solar wind and a planetary body without a magnetic field like the Moon.

In its 10-month orbit around the Moon, Chandrayaan-1's X-ray Spectrometer (C1XS) detected titanium, confirmed the presence of calcium, and gathered the most accurate measurements yet of magnesium, aluminum and iron on the lunar surface.

Lunar caves and past tectonic activity on the Lunar surface have been found.

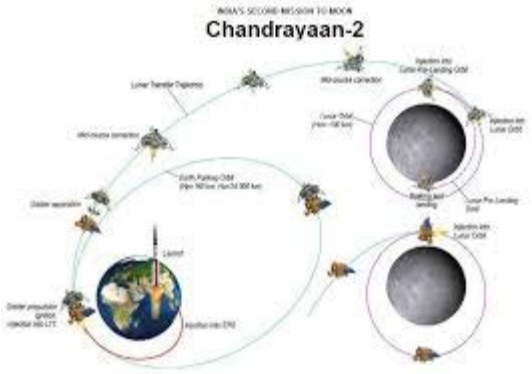
Chandrayaan 2:

This is the follow up mission by ISRO and this mission will use and test various new technologies and conduct new experiments to know the Moon in more details. The orbiter will be placed in an orbit around Moon. The lander will soft-land on Moon and dispatch the rover. The wheeled rover will move on the lunar surface and will perform on-site chemical analysis. All three components will carry a number of payloads for scientific study. The data will be relayed to Earth through the Chandrayaan-2 orbiter.

The payloads to be carried by the orbiter, lander and rover of Chandrayaan-2 are as follows:

Orbiter payload:

- Large Area Soft X-ray Spectrometer (CLASS) and Solar X-ray monitor (XSM) for mapping major elements present on the lunar surface.
- L and S band Synthetic Aperture Radar (SAR) for probing the first few tens of metres of the lunar surface for the presence of different constituents, including water ice. SAR is expected to provide further evidence confirming the presence of water ice below the shadowed regions of the Moon.
- Imaging IR Spectrometer (IIRS) for mapping of lunar surface over a wide wavelength range for the study of minerals, water molecules and hydroxyl present.



- Neutral Mass Spectrometer (ChACE-2) to carry out a detailed study of the lunar exosphere.
- Terrain Mapping Camera-2 (TMC-2) for preparing a three-dimensional map essential for studying the lunar mineralogy and geology.

Lander payload:

- Seismometer for studying Moon-quakes near the landing site
- Thermal probe for estimating the thermal properties of the lunar surface
- Langmuir probe for measuring the density and variation of lunar surface plasma
- Radio occultation experiment for measuring the total electron content

Rover payload:

- Laser induced Breakdown Spectroscope

Alpha Particle Induced X-ray Spectroscope (APIXS) both for chemical analysis on lunar surface

DurveshPalkar

SE -IT

Dark Web

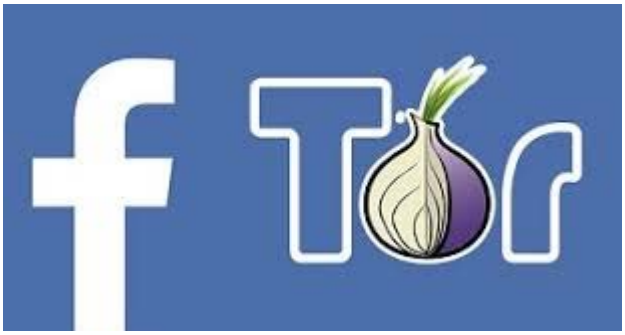
The dark web is a part of the internet that isn't indexed by search engines. You've no doubt heard talk of the “dark web” as a hotbed of criminal activity — and it is. Researchers Daniel Moore and Thomas Rid of King's College in London classified the contents of 2,723 live dark web sites over a five-week period a couple of years ago and found that 57 percent host illicit material.

You can buy credit card numbers, all manner of drugs, guns, counterfeit money, stolen subscription credentials, hacked Netflix accounts and software that helps you break into other people’s computers. Buy login credentials to a $50,000 Bank of America account for $500. Get $3,000 in counterfeit $20 bills for $600. Buy seven prepaid debit cards, each with a $2,500 balance, for $500 (express shipping included). A “lifetime” Netflix premium account goes for $6. You can hire hackers to attack computers for you. You can buy usernames and passwords.

But not everything is illegal; the dark web also has a legitimate side. For example, you can joina chess club or BlackBook, a social network described as the “the Facebook of Tor.”

All of this activity, this vision of a bustling marketplace, might make you think that navigating the dark web is easy. It isn’t. The place is as messy and chaotic as you would expect when everyone is anonymous, and a substantial minority are out to scam others.

Accessing the dark web requires the use of an anonymizing browser called Tor. The Tor browser routes your web page requests through a series of proxy servers operated by thousands of volunteers around the globe, rendering your IP address unidentifiable and untraceable. Tor works like magic, but the result is an experience that's like the dark web itself: unpredictable, unreliable and maddeningly slow.



Still, for those willing to put up with the inconvenience, the dark web provides a memorable glimpse at the seamy underbelly of the human experience – without the risk of skulking around in a dark alley.

Dark web search engines exist, but even the best are challenged to keep up with the constantly shifting landscape. The experience is reminiscent of searching the web in the late 1990s. Even one of the best search engines, called Grams, returns results that are repetitive and often irrelevant to the query. Link lists like The Hidden Wiki are another option, but even indices also return a frustrating number of timed-out connections and 404 errors.

Dark web sites look pretty much like any other site, but there are important differences. One is the naming structure. Instead of ending in .com or .co, dark web sites end in .onion. That's "a special-use top level domain suffix, designating an anonymous hidden service reachable via the Tor network," according to Wikipedia. Browsers with the appropriate proxy can reach these sites, but others can't.

The dark web has flourished thanks to bitcoin, the crypto-currency that enables two parties to conduct a trusted transaction without knowing each other's identity. "Bitcoin has been a major factor in the growth of the dark web, and the dark web has been a big factor in the growth of bitcoin," says Tiquet.

Nearly all dark web commerce sites conduct transactions in bitcoin or some variant, but that doesn’t mean it’s safe to do business there.

Hrishikesh Joshi

SE IT

Deep Learning

Deep learning (also known as deep structured learning or hierarchical learning) is part of a broader family of machine learning methods based on learning data representations, as opposed to task-specific algorithms. Learning can be supervised, semi-supervised or unsupervised. Deep learning architectures such as deep neural networks, deep belief networks and recurrent neural networks have been applied to fields including computer vision, speech recognition, natural language processing, audio recognition, social network filtering, machine translation, bioinformatics, drug design and board game programs, where they have produced results comparable to and in some cases superior to human experts.

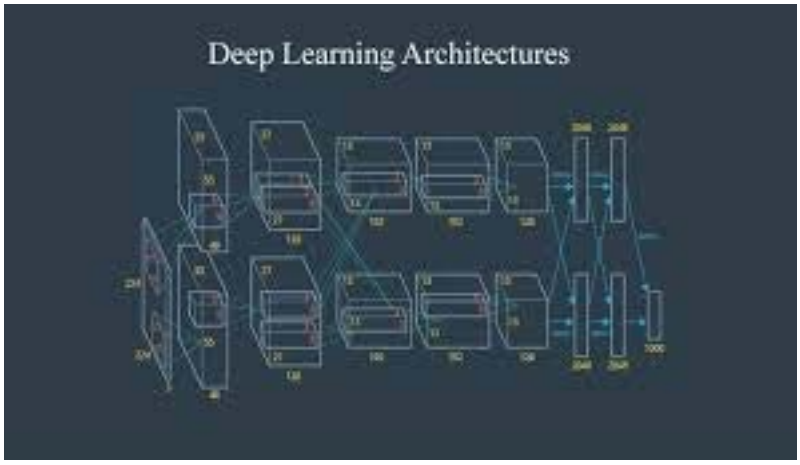
Deep learning models are vaguely inspired by information processing and communication patterns inbiological nervous systems yet have various differences from the structural and functional properties of biological brains (especially human brain), which make them incompatible with neuroscience evidences.

Most modern deep learning models are based onan artificial neural network, although they can also include propositional formulas or latent variables organized layer-wise indeep generative models such as the nodes in Deep Belief Networks and Deep Boltzmann Machines.

In deep learning, each level learns to transform its input data into a slightly more abstract and composite representation. In an image recognition application, the raw input may be a matrix of pixels; the first representational layer may abstract the pixels and encode edges; the second layer may compose and encode arrangements of edges; the third layer may encode a nose and eyes; and the fourth layer may recognize that the image contains a face. Importantly, a deep learning process can learn which features to optimally place in which level *on its own*. (Of course, this does not completely obviate the need for hand-tuning; for example, varying numbers of layers and layer sizes can provide different degrees of abstraction.)

The "deep" in "deep learning" refers to the number of layers through which the data is transformed. More precisely, deep learning systems have a substantial *credit assignment path* (CAP) depth. The CAP is the chain of transformations from input to output. CAPs describe potentially causal connections between input and output. For a feedforward neural network, the depth of the CAPs is that of the network and is the number of hidden layers plus one (as the output layer is also parameterized). For recurrent neural networks, in which a signal may propagate through a layer more than once, the CAP depth is potentially unlimited. No universally agreed upon threshold of depth divides shallow learning from deep learning, but most researchers agree that deep learning involves CAP depth > 2. CAP of depth 2 has been shown to be a universal approximator in the sense that it can emulate any function. Beyond that more layers do not add to the function approximate ability of the network. The extra layers help in learning features.

Deep learning architectures are often constructed witha greedy layer-by-layer method. Deep learning helps to disentangle these abstractions and pick out which features improve performance.



For supervised learning tasks, deep learning methods obviate feature engineering, by translating the data into compact intermediate representations akin to principal components, and derive layered structures that remove redundancy in representation.

Deep learning algorithms can be applied to unsupervised learning tasks. This is an important benefit because unlabelled data are more abundant than labelled data. Examples of deep structures that can be trained in an unsupervised manner are neural history compressors and deep belief networks.

Ajay Jangid

SE IT

Digital currency

Digital currencies are intangible and can only be owned and transacted in by using computers or electronic wallets which are connected to the Internet or the designated networks. In contrast, the physical currencies, like bank notes and minted coins, are tangible and transactions are possible only by their holders who have their physical ownership.

Like any standard fiat currency, digital currencies can be used to purchase goods as well as to pay for services, though they can also find restricted use among certain online communities, like gaming sites, gambling portals, or social networks.

Digital currencies have all intrinsic properties like a physical currency, and they allow for instantaneous transactions that can be seamlessly executed for making payments across the borders when connected to supported devices and networks. For instance, it is possible for an American to make payments in a digital currency to a distant counterparty residing in Singapore, provided that they both are connected to the same network required for transacting in the digital currency.

Digital currencies offer numerous advantages. As payments in digital currencies are made directly between the transacting parties without the need of any intermediaries, the transactions are usually instantaneous and zero- to low-cost. This fares better compared to traditional payment methods that involve banks or clearing houses. Digital currency based electronic transactions also bring in the necessary record keeping and transparency in dealings. Since they exist in a lot of variants, digital currencies can be considered a superset of virtual currencies and cryptocurrencies. If issued by a central bank of a country in a regulated form, it is called the “Central Bank Digital Currency (CBDC).” While the CBDC only exists in conceptual form, England, Sweden and Uruguay are few of the nations that have considered plans to launch a digital version of their native fiat currencies.

Along with the regulated CBDC, a digital currency can also exist in unregulated form. In the latter case, it qualifies for being called a virtual currency and may be under the control of the currency developer(s), the founding organization, or the defined network protocol, instead of being controlled by a centralized regulator. Examples of such virtual currencies include cryptocurrencies, and coupon- or rewards-linked monetary systems.

A cryptocurrency is another form of digital currency which uses cryptography to secure and verify transactions and to manage and control the creation of new currency units. Bitcoin and Ethereum are the most popular cryptocurrencies. Since cryptocurrencies are unregulated, they are also considered to be virtual currencies. Bitcoin (₿) is a cryptocurrency, a form of electronic cash. It is a decentralized digital currency without a central bank or single administrator that can be sent from user to user on the peer-to-peer bitcoin network without the need for intermediaries.

Transactions are verified by network nodes through cryptography and recorded in a public distributed ledger called a blockchain. Bitcoin was invented by an unknown person or group of people using the name Satoshi Nakamotoand released as open-source software in 2009. Bitcoins are created as a reward for a process known as mining. They can be exchanged for other currencies, products, and services. Research produced bythe University of Cambridge estimates that in 2017, there were 2.9 to 5.8 million unique users using a cryptocurrency wallet, most of them using bitcoin.

AlisterFernandes

SE IT

Future of Virtual Reality

As impressive and remarkable as the technology already is, many people believe it's still in its early days. That's because previous Virtual Reality-style efforts have been failure or flopped in the past (Nintendo's Virtual Boy what has come to my mind). Anyway, the latest crops of gadgets are seen as even more promising, thanks to their much-improved abilities, graphics, and more.

The next evolution of Virtual Reality would be where you participate physically in that VR world indeed. And it's not just about sitting down - if you're a quarterback on example, you actually get to throw a football, and thus you can interface with the team. This is a kind of stuff that it's going to happen. Headsets today are doing a great job at catering to your visual senses, and as well a little bit of audio. And that's just 2 of the senses. Since you begin catering to the rest of the senses - temperature-wise, body-wise, and smell, the reality factor of VR becomes stronger and the virtual piece begins to fade.

Everyone rallied the PC gaming industry and now we have what we have today. VR is the same type of thing - no one company can solve all of the problems.

There are so many people that don't want to live a "normal" life. They deserveto be able to explore, live, and to experience the wonder of the world.
The most obvious use for virtual reality is gaming! It offers an immersive, intense, and impressive experience that elevates gaming to practically, a whole new level.

The potential to fly around in space using a style interface similar to Google maps would be fun and interesting.

Not so long in the future, VR would allow tours of museums for people that aren’t able to get to the building, also would let estate agents to give potential buyers a look around for the property without them having to leave the comfort of their own home.

Pragya Kumari
BE IT

Intel i9 Processor

Ever since Intel announcedits first Core i9 processor for desktops last year, it's only been a matter of time until the company brought that branding to laptops, too. Today, Intel is announcing its first Core i9 chip for laptops, with what it claims is "the best gaming and creation laptop processor Intel has ever built."

The top-of-the-line model being announced today is the Intel Core i9-8950HK, which can reach speeds of up to 4.8 GHz with turbo boost, and is the first mobile Intel processor to offer six cores and 12 threads. Intel claims that translates to up to a 29 percent overall speed boost over the previous seventh-generation Intel chips, with 41 percent improvement for gaming and up to 59 percent faster 4K video editing.

Along with the Core i9 processors, Intel is also announcing i5 and i7 processors for laptops, which will also be based on the company's 14nm++ architecture (known as Coffee Lake) instead of the first wave of the eighth-generation Kaby Lake R chips, which were enhanced versions of the same 14nm+ architecture of the seventh-generation chops.

Unlike those earlier eighth-generation chips (part of the U-series of Intel's processors), these new i9, i7, and i5 Coffee Lake chips are part of the company's H-series lineup(along with Intel's collaboration with AMD on the hybrid Radeon RX Vega M processors with integrated GPUs). But while the Radeon RX Vega M processors are meant for thinner and lighter laptops for companies looking to cut down on space, these new Coffee Lake chips are designed for hardware manufacturers' top computers (presumably with more powerful discrete graphics cards) where firepower is of chief concern.

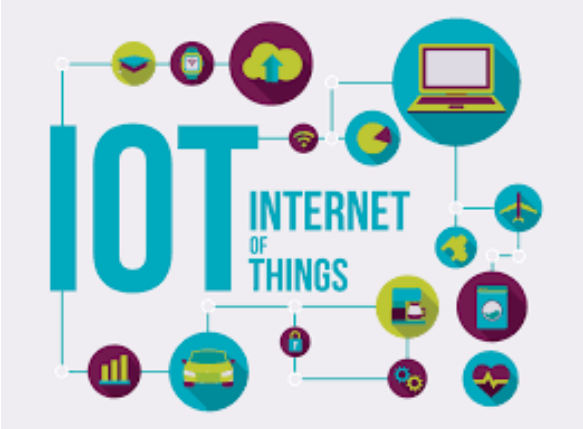
Along with the new Coffee Lake chips, Intel is adding support forits Optane memory to both the eighth-generation mobile and desktop chips, which should help increase overall speeds compared to more traditional memory systems. Intel is also introducing new tel Core i5+, i7+, and i9+ badges to indicate that new computers feature both new Intel processors and Optane memory from the start.

AtharvaShewale

SE-IT

IoT Simplified

Imagine you wake up at 7am every day to go to work. Your alarm clock does the job of waking you just fine. That is, until something goes wrong. Your train's cancelled and you have to drive to work instead. The only problem is that it takes longer to drive, and you would have needed to get up at 6.45am to avoid being late. Oh, and it's pouring with rain, so you'll need to drive slower than usual.



A connected or IoT-enabled alarm clock would reset itself based on all these factors, to ensure you got to work on time. It could recognize that your usual train is cancelled, calculate the driving distance and travel time for your alternative route to work, check the weather and factor in slower travelling speed because of heavy rain, and calculate when it needs to wake you up so you're not late. If it's super-smart, if might even sync with your IoT-enabled coffee maker, to ensure your morning caffeine's ready to go when you get up.

In a nutshell, the Internet of Things is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a giant network of connected things and people – all of which collect and share data about the way they are used and about the environment around them. That includes an extraordinary number of objects of all shapes and sizes –from

smart microwaves, which automatically cook your food for the right length of time, toself-driving cars, whose complex sensors detect objects in their path, to
Wearable fitness devices that measure your heart rate and the number of steps you've taken that day then use that information to suggest exercise plans tailored to you. There are even connected footballsthat can track how far and fast they are thrown and record those statistics via an app for future training purposes.

Devices and objects with built in sensors are connected to an Internet of Things platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs.
These powerful IoT platforms can pinpoint exactly what information is useful and what can safely be ignored. This information can be used to detect patterns, make recommendations, and detect possible problems before they occur.
For example, if I own a car manufacturing business, I might want to know which optional components (leather seats or alloy wheels, for example) are the most popular. Using Internet of Things technology, I can:

- Use sensors to detect which areas in a showroom are the most popular, and where customers linger longest;
- Drill down into the available sales data to identify which components are selling fastest;
- Automatically align sales data with supply, so that popular items don't go out of stock.

The information picked up by connected devices enables me to make smart decisions about which components to stock up on, based on real-time information, which helps me save time and money.
With the insight provided by advanced analytics comes the power to make processes more efficient. Smart objects and systems mean you can automate certain tasks, particularly when these are repetitive, mundane, time-consuming or even dangerous.

RichaSirwani
SE IT

ISRO vs SpaceX

India’s premier space agency Indian Space Research Organisation (ISRO) has built a reputation for launching rockets into space at very convenient prices.

The consequent effect

A lot of customers from around the world have come flocking to avail India’s economical rocket-launching services and this has helped the country make some extra bucks from its space exploration program.

However, it’s a pretty competitive space.Elon Musk’s SpaceX has had a decent run in the past couple of days and the recent successful launch of the Falcon Heavy rocket has paved the way for launching heavy satellites into space.

SpaceX and ISRO are competitors of sorts in the business of commercial satellite launches. The question is, how big of a threat is SpaceX to India’s space agency?

Okay, first some facts. ISRO is an experienced campaigner in the field of space exploration as it’s been launching rockets into space since as early as 1975. From sending India’s first satellite into space (Aryabhata), to successfully launching some of the most historic missions like Chandrayaan-1 (2008) and Mangalyaan (2013), ISRO has done it all.

Apart from the above, it has various other goals, ranging from maintaining the communication satellite constellation around the Earth to sending manned missions into space. Not easy by any means.

Meanwhile, SpaceX is the new kid on the block and really isn’t a big space exploration agency (at least not as big as ISRO).

SpaceX was founded in 2002 by maverick entrepreneur Elon Musk with an aim to provide economically efficient ways to launch satellites and also colonise Mars!

So, in terms of experience, SpaceX still has some catching up to do. But in terms of success rate, it's tough to beat at 96 percent.

SpaceX is a privately-owned enterprise and is funded by big companies like Google and Fidelity. According to a Forbes, SpaceX is valued at more than $20 billion (Rs 13.035 crore) as of December 2017.

ISRO on the other hand is a state-owned entity and is run and controlled by the Government of India. Each year, the agency is allocated a certain part of the nation's budget. For the year 2018-19, the Centre has allocated Rs 8,936 crore to the space organisation.

SpaceX is a privately-owned enterprise and is funded by big companies like Google and Fidelity. According to a Forbes, SpaceX is valued at more than $20 billion (Rs 13.035 crore) as of December 2017.

ISRO on the other hand is a state-owned entity and is run and controlled by the Government of India. Each year, the agency is allocated a certain part of the nation's budget. For the year 2018-19, the Centre has allocated Rs 8,936 crore to the space organisation.

The size of the payloads is different as the Falcon 9 carries much heavier bulk than India's rockets.

Currently, India makes very less on commercial missions as most of them carry small or Nano-satellites. Between 2013 and 2015, ISRO charged an average of $3 million per satellite. That’s peanuts compared to a SpaceX launch, which costs $60 million.

According to a 2016 report, India’s premier space agency earned revenue of around Rs. 230 crore through commercial launch services, which is about 0.6 percent of the global launch services market.

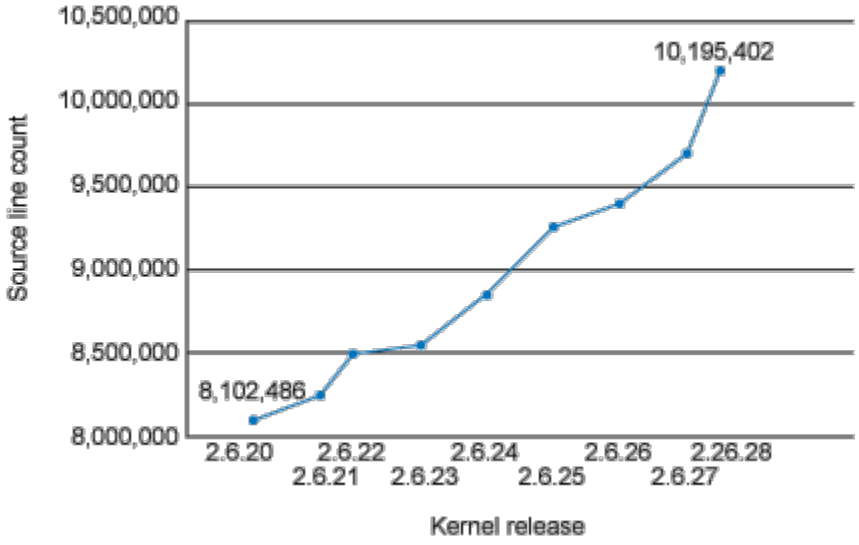
India is still to make big ‘moolah’ from their launches as small satellites don’t pull in a lot of money as compared to bigger ones.
Despite the fact that ISRO is considered competition for Elon Musk’s SpaceX in the business of commercial satellite launches, he doesn’t shy away from acknowledging how he is “impressed” by India’s frugal methods of conducting successful launch missions.
Last year in February, India launched 104 satellites into space using a single rocket, which really caught Musk’s attention. This is a world record that India holds till date.

TithiChoudhary
SE-IT

Latest Linux kernel advancements

At the end of 2008, the 2.6.28 kernel surfaced. Subsequently, the merge window for the next release—2.6.29—opened. As the Linux kernel uses a distributed development process, it's not always clear what's coming (or will be integrated) into a given kernel release, but the last two have been interesting from both a short- and long-term perspective. One interesting milestone for 2.6.28 is that it's the first time Linux has exceeded 10 million lines of source code (see Figure 1, which uses source line count data from Heise Online).

Figure 1. Lines of source code in recent 2.6 kernels



These releases have introduced new file systems (one stable, one experimental), new support for graphics and virtualization, and new enterprise storage features. I start with a review of some of the major new features in 2.6.28, and then I explore what you might expect from 2.6.29.

What's new in 2.6.28?

Linux kernel 2.6.28 was released on December 24, 2008 (at release 5 as of early February, 2009). This first release of 2.6.28 includes a large number of changes—so large that the change-log text file is itself almost 6MB in size. This release is viewed as so stable that it's the kernel of the next Ubuntu distribution, version 9.04, Jaunty Jackalope.

The fourth extended file system

The fourth extended file system (ext4) file system was renamed from *ext4dev* to *ext4*, which means that it's stable enough for regular use. Ext4 is the successor to the standard third extended file system (ext3) available today, but with better performance, features, and reliability. Ext4 permits Exabyte file systems that can support larger numbers of files, larger files, and deeper directory

structures. It also includes extents with multi-block and delayed block allocation for performance. Ext4 is both forward and backward compatible (meaning that you can mount an ext4 file system on an ext3 disk format and vice versa, depending upon the features used). You can also gradually migrate a file system from ext3 to ext4 online with a mass change.

And although ext4 will be the new standard Linux file system for some time to come; other file systems are coming that offer even better scalability and features. One such file system, Btrfs, is available in an experimental form in the 2.6.29 kernel. Btrfs is a Linux-compatible file system (read GNU Public License [GPL]) that competes in features with the well-known ZFS.

Graphics Execution Manager Memory management

One of the areas that have seen solid improvements over the past year is the Linux graphics stack. Not surprisingly, it's also an area where graphics processor units (GPUs) provide useful assists for rendering. In many cases, GPUs are more powerful than the central processing units (CPUs) they assist.

To support the GPUs of today and tomorrow, one area of the Linux graphics stack that needed improvement was memory management, including buffer management, page mapping, placement, and caching. This was necessary because graphics applications—particularly three-dimensional applications—can consume a vast amount of memory. The Graphics Execution Manager (GEM) helps here by providing ways to manage graphics data that blends into the kernel using the existing kernel subsystems (such as using the shared memory file system, or shmfs, to manage graphic objects).

Boot tracer

Although the time required to boot Linux has shrunk over time, expectations are still that it takes too long. For that reason, boot times remain under scrutiny. This kernel includes a new feature to measure and record the timings of init calls. The timings can be used later to visualize the flow and performance of the boot process. This process is configurable (it requires enabling to collect the data), but once collected, the data can be analyzed using offline scripts (including graphical depictions), which will ultimately lead to better boot times and a more optimized boot process. This update incorporates the process identifier (PID) of the calling thread so that the parallelism of the boot process can be viewed

Freezer

Based conceptually on the idea of suspending an operating system for the purpose of migrating it to a new host (for example, virtual machine, or VM, migration), a new capability called *freezing* (and *thawing*) has been committed. This new feature allows either a group of tasks or a file system to be frozen and kept in its freeze-time state, later to be thawed to reintroduce the task group or file system.

You freeze tasks in the context of a *container,* which is a scheme that virtualizes operating systems at the user-space level (a single kernel supports multiple user spaces). This new functionality is a step in the direction of migrating a set of processes between hosts, which can be very useful for load balancing. You can also freeze file systems to support snapshots for file system backup. Currently, file system freezing is achieved through an IOCtl with an argument of FIFREEZEor FITHAW.

Outside of containers, this new freeze/thaw scheme can find uses in check pointing. In this application, you could freeze a collection of related processes at specific intervals (*checkpoints*), and then thaw a particular epoch as a way to roll back to a known good state.

Improved virtual memory scalability

As Linux finds increasing use in virtualized systems—particularly those with many processors and vast amounts of memory—the ability to scale memory usage becomes critical to performance. Kernel 2.6.28 includes a number of scalability enhancements related to memory. For example, this kernel maintains separate Least Recently Used (LRU) lists, one for pages backed by files and another for pages backed by swap. This allows the kernel to focus on swap-backed pages, which are more likely to be written to disk, and pay less attention to file-backed pages.

Another change separates the evictable pages from the unevictable pages (such as those that were locked through mlock). In this way, the page out code does not need to iterate unevictable pages in the LRU list, leading to improved performance in systems with very large numbers of pages.

Disk improvements

The 2.6.28 kernel includes a number of advancements for disks. In particular, improved use of solid state drives (SSDs) and protection for ATA devices are detailed in this section.

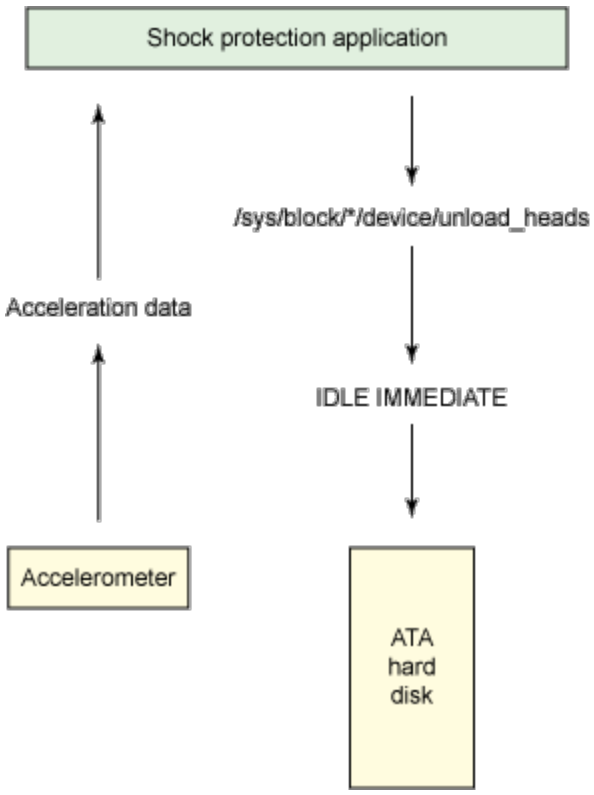
Improvements for SSD support

SSDs are a fantastic way to improve disk performance over traditional drives with rotating media. SSDs provide reduced latency and better random reads with less power and noise. But SSDs are fundamentally different from hard disk drives (HDDs), so changes to Linux are necessary to exploit them. A fundamental problem with SSDs is that they must wear-level the blocks in their internal flash, and wear-leveling can reduce the lifetime of the SSD. One way to reduce this effect is by telling the SSD when a block is no longer valid (perhaps because of a file deletion). When a block is freed in the SSD, it is no longer a target of wear-leveling and therefore can minimize the overall wear on the device. But to support this operation, the file system must be able to communicate this information to the drive.

The T13 standards committee has created a new ATA protocol extension to support this communication in the context of the trim command. When the SSD receives this new command, it can add the blocks defined to its free list and no longer worry about moving them around as part of wear-leveling. The Linux block layer component of this is called a *discard request*, which results from a higher-level file system file deletion. A discard request is part of the block layer and provides the means to discard blocks, eventually resulting in a trim command to a supporting ATA drive. Further enhancements include scheduling discard requests intelligently so that they can be coalesced with other requests as well as performing reorder operations on the block request queue to better deal with related discard and write requests.

Improvements for ATA HDDs

One very interesting reliability improvement for ATA HDDs is protection against shock, sudden jolts that can destroy HDDs in laptop computers. The ATAPI specification defines a command called IDLE IMMEDIATE that idles the HDD and retracts the disk heads to prevent them from hitting the platters. The kernel makes this command available through a proc file called /sys/block/*/device/unloads heads. After a value is written to this file and the subsequent ATA command is written to the respective disk, the heads are retracted and all input/output (I/O) is deferred for a small amount of time based on a timer. When the timer expires, I/O resumes normally. This feature was implemented previously for IBM laptops using access to an accelerometer to measure acceleration (to determine whether the laptop is falling).



What's next for 2.6.29?

Where 2.6.28 includes a number of useful new features, 2.6.29 improves even further.

Btrfs

One of the most important advances in 2.6.29 is the addition of the Btrfs (or *B-tree FS*), originally developed by Oracle. The Btrfs was developed as a response to Sun's ZFS, used to build a massively scalable file system with on-disk integrity assurance. In addition to many of the advanced features of ext4, Btrfs supports object-level mirroring and striping, copy-on-write functionality, snapshots (and snapshots of snapshots), integrity, and internal compression. It supports volumes and files up to 16 exabytes in size and up to 2^{64} files in a given volume. To aid in conversion, you can upgrade a file system from ext3 to Btrfs (and also back, but only to the point at which conversion was done).

Btrfs could define a new standard for massive enterprise file systems that include fault tolerance with online repair and simplified administration. Although still experimental (and not suitable for anything other than review), Btrfs includes a feature set that makes it ideal for future scalable Linux storage.

Networking changes

In addition to a large number of updates to various networking drivers, several enhancements are worth noting. The first is the Generic Receive Offload infrastructure, which offloads network sends (similar to Large Receive Offload, but protocol independent).

You'll also find support for *backward congestion notification* (BCN), which improves congestion management by actively tightening the control loop through messaging. This feature is a staple in new data center Ethernet deployments.
Last but not least, 2.6.29 introduces a WiMAX wireless broadband networking stack into Linux (currently based on the i2400m USB driver). Note that this is different from so-called Wi-Fi, as WiMAX uses licensed spectrum for point-to-point connection and offers improved quality of service.

Kernel mode setting

An interesting cosmetic change to the kernel boot process and graphics mode is called the *kernel-based mode setting*(KMS). This feature allows the kernel to control the graphics hardware after the required components are initialized (such as the PCI bus and graphics card). In this way, the kernel can enter the desired screen resolution much earlier in the boot process, which reduces some issues with flicker and display absence (because of a graphics chip reset) and allows the display to be properly set up before the X server is started.
The other advantage to KMS is improved re-initialization after suspend: because the initialization is done in the kernel, it's much more efficient. Finally, because the kernel manages the graphics chip, the X server may not be required to run with root privileges, hardening the operating system by removing another set of potential exploits.
Going further
At the time of this writing, 2.6.29 is in the stabilization process. But work continues, looking forward to 2.6.30. Other things that you'll find in 2.6.29 include Squashfs (a read-only file system) finally making its way to the mainline kernel, as well as the inclusion of a set of security hooks for path name-based mandatory access control. A new protocol, Fibre Channel over Ethernet (FCoE), has also found its way into the kernel, in addition to on-disk integrity checking using the standard Data Integrity Field (T10-DIF), which is understood by certain drives for end-to-end and at-rest integrity checking.
So, as Linux moves forward, we find new functionality, improved scalability, and increasing security. Like single-malt scotch, Linux continues to improve with age.

OmkarVichare& Rushikesh Daga

BE-IT

Mars Orbiter Mission

ISRO's Mars Orbiter Mission is to send a spacecraft to Mars, with the following objectives:

- a technology demonstrator project to develop technologies for planning, design, management and operations of an interplanetary mission.
- incorporating autonomous features to handle contingency situations.
- exploring Mars' surface features like Morphology, Mineralogy and Martian Atmosphere using indigenous scientific equipment.
- gaining experience on Deep Space communication and navigation.

This mission was planned and conceived in 2012, when former Prime Minister Dr. Manmohan Singh announced that India would send a spacecraft to Mars in his 2012 Independence Day speech. ISRO had a launch window during October and November 2013 which would give them a time of hardly 15 months. The spacecraft must be launched by 1st week of November 2013 because Mars will be closest to Earth by then, which will be a perfect time to making calculations for targeting Mars. ISRO started reviewing possibilities, identifying scientific payloads, designing, fabricating and integrating them to the spacecraft, building autonomous systems for deep space navigation etc. All of these were done in a record time of only 15 months as planned before.

Launch phase:

When the spacecraft has completed its integration and all its tests (like Thermal Vacuum test, Vibrations test, Solar array test etc.), it is taken to be integrated with the launch vehicle which is the PSLV C25. It is and XL (Extra Large) version of the Polar Satellite Launch Vehicle (PSLV), with a payload capacity of 1.45 tonnes into Sun Synchronous orbit (SSO).

The spacecraft was launched on 5 November, 2013 from Srihari Kota, Andhra Pradesh to an elliptical orbit of 285 km x 23,550 km. The spacecraft's position was tracked from time to time by using antennae mounted over several ships placed at some parts of the Pacific Ocean. When the spacecraft is successfully placed into orbit, ISTRAC (Isro Telemetry and Tracking Center) takes over the operations of communicating and tracking the spacecraft via the Deep Space Antenna near Bangalore.

Orbit Raising Maneuvers:

When the spacecraft is still in Earth orbit, it doesn't have enough velocity to escape Earth's gravitational influence (which is 11.3 km/s). In order to propel the spacecraft to overcome the escape velocity, its LAM (Liquid Apogee Motor) is fired time and again whenever it reaches the closest point to Earth's surface in that elliptical orbit. This drastically increases the velocity of the spacecraft and pushes the elliptical orbit to further lengths.

Trans Mars Injection:

After several ORMs, the spacecraft gained more than enough velocity to escape Earth's gravitational influence and on December 1, 2013 was the last time that the LAM was fired in an Earth orbit. This action put MOM in a Heliocentric orbit (ie. orbit around the Sun), for nearly 300 days during which the spacecraft traveled more than 600 million km.

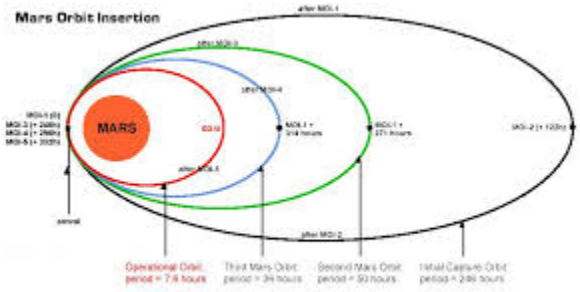
Trajectory Correction Maneuvers:

During the long journey around the Sun, it is highly possible that the spacecraft may undergo deviations from its designated path. In order to correct the trajectory (path of travel), ISRO planned 4 TCMs out of which only two were required. This

means that MOM was following the designated path so closely and accurately that two planned TCMs were found not required.

Mars Orbit Insertion:

After a nearly 10 month travel, MOM came close to Mars and the time had arrived to perform operations required to put it into Mars orbit. Relative to Mars, MOM was travelling in an excess speed, because of which a burn has to be performed for slowing down the spacecraft so that Mars would be able to capture it into its orbit. Now, the LAM has to be fired for nearly 24 minutes after a 300 day long sleep in the Heliocentric phase. On 22 September, 2014 the LAM and 8 small thrusters are test fired to make sure that the spacecraft was in good health. Finally, on 24th September, 2014 LAM fired for 24 minutes, as planned and slowed down the spacecraft by 1.4 km/s. MOM was successfully inserted into the Martian orbit.



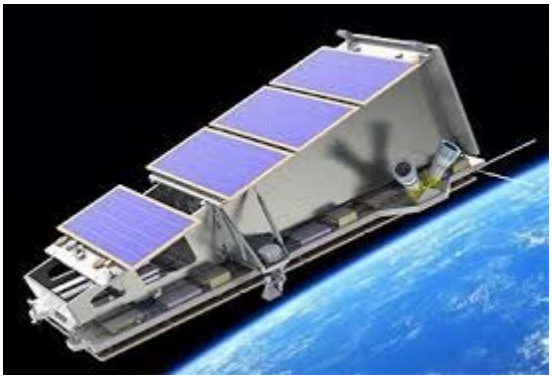
On September 24, 2014 ISRO's Mars Orbiter Mission spacecraft was the first in the world to successfully reach Mars orbit in the very first attempt.

RuchaKhartadkar& Neha Suryawanshi

SE-IT

NovaSAR-1

Surrey Satellite Technology Ltd (SSTL) has confirmed the successful launch of two satellites, NovaSAR-1, a Synthetic Aperture Radar (SAR) satellite, and SSTL S1-4, a high resolution optical Earth Observation satellite. The two satellites were launched into a 580km sun-synchronous orbit on board the PSLV launch vehicle from the Satish Dhawan Space Centre in Sriharikota, India on 16 September at UTC 16:38 by Antrix Corporation Limited, the commercial arm of the Indian Space Research Organization.



Sir Martin Sweeting, Executive Chairman of SSTL, said "I am pleased to confirm that successful contact has been made with both satellites and they are in good health. I would like to thank the Indian Space Research Organization and Antrix for a successful launch which achieves our long-held ambition to deliver low cost SAR remote sensing capabilities and services to our global customers and enhances our Earth observation capabilities with a sub one meter optical mission."

NovaSAR-1 is the first SAR spacecraft to be manufactured entirely in the UK and is a technology demonstration mission designed to test the capabilities of a new low cost S-Band SAR platform. NovaSAR-1 will be the world's first commercial SAR satellite to be operated at a 10:30 equator crossing time, providing time diversity for radar observations by affording increased daylight imaging opportunities in addition to night acquisitions. Synthetic Aperture Radar is a

powerful tool for monitoring the Earth from space due to its ability to see through clouds and image the Earth night and day, and a constellation of three NovaSAR satellites could image any point on the globe every day, regardless of local time or weather.

The UK Space Agency has invested £21M in the development of NovaSAR-1 and will benefit from access to data from the spacecraft, significantly boosting the UK's sovereign Earth observation capabilities and leveraging additional inward investment to the UK by creating highly skilled jobs in the UK space industry, and stimulating the growth of data analysis services.

Science Minister Sam Gyimah said: "The data from this satellite, backed by a £21 million investment from the Government, will help innovative start-ups develop new apps that could revolutionize the way we live. It's a great example of how we are working with the space sector through our modern Industrial Strategy, ensuring we remain at the forefront of pioneering science and exploration."

Dr Dave Williams, Executive Director of Digital, National Facilities and Collections at CSIRO, said "Through our share of NovaSAR-1 tasking and acquisition time we'll extend the significant role CSIRO – Australia's national science agency – already plays in managing a range of national research facilities. We'll be making time on NovaSAR-1 available to Australian scientists. The satellite provides significant opportunities to support a wide range of existing research, further develop Australia's Earth observation data analytics expertise, and create new opportunities in the field of remote sensing."

As manufacturer and owner of the satellite, SSTL will lease imaging capacity to 21AT for the lifetime of the satellite, designed to be in excess of 7 years. SSTL S1-4 will contribute sub one meter resolution image data into 21AT's existing TripleSat Constellation service, comprising three SSTL DMC3 satellites launched in 2015. SSTL S1-4 is capable of acquiring multiple targets in one pass, utilizing

spot, strip and mosaic imaging modes and 45 degree off-pointing agility for a range of applications including urban planning, agricultural monitoring, land classification, natural resource management and disaster monitoring. The very high resolution imager on board the spacecraft has been designed and manufactured by SSTL and will acquire sub one meter resolution images in panchromatic mode and sub four meter resolution images in multispectral mode, with a swath width of about 24km.

Nidhi Shah

SE IT

Ransomware

Ransomware is a subset of malware in which the data on a victim's computer is locked, typicallyby encryption, and payment is demanded before the ransomed data is decrypted and access returned to the victim. The motive for ransomware attacks is nearly always monetary, and unlike other types of attacks, the victim is usually notified that an exploit has occurred and is given instructions for how to recover from the attack. Payment is often demanded in a virtual currency, suchas bitcoin, so that the cybercriminal's identity isn't known.

Ransomware can be spread through malicious email attachments, infected software apps, infected external storage devices and compromised websites. A growing number of attacks have used Remote Desktop Protocol and other approaches that don't rely on any form of user interaction.

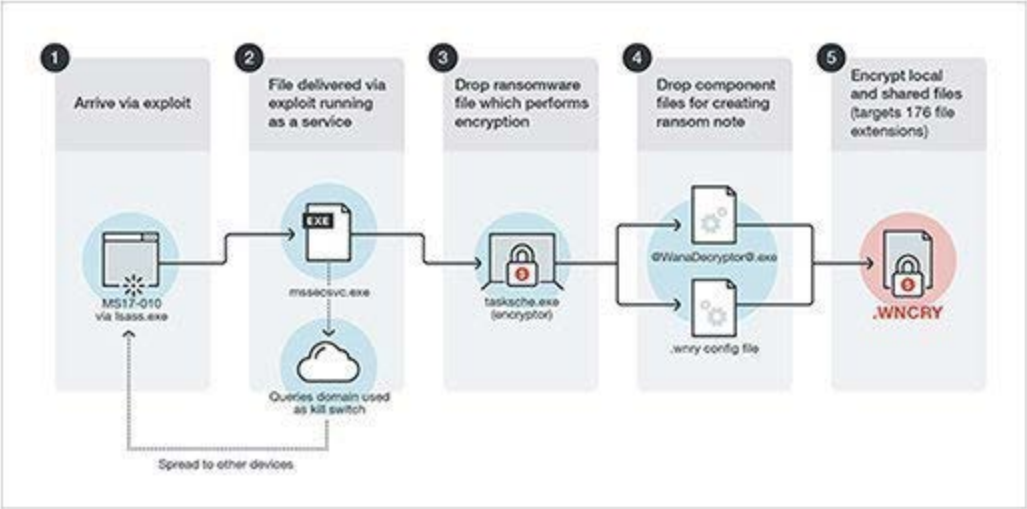
In a *lockscreen* variant of a ransomware attack, the malware may change the victim's login credentials for a computing device; in a data kidnapping attack, the malware may encrypt files on the infected device, as well as other connected network devices.

While early instances of these attacks sometimes merely "locked" access to the web browser or to the Windows desktop -- and did so in ways that often could be fairly easilyreverse-engineeredand reopened -- hackers have since created versions of ransomware that use strong, public-key encryption to deny access to files on the computer.

Famous ransomware: CryptoLocker and WannaCry

Perhaps the first example of a widely spread attack that used public-key encryption was Cryptolocker, that was active on the internet from September 2013 through May of the following year. The malware demanded payment in either bitcoin or a prepaid voucher, and experts generally believed that the RSA cryptography used -- when properly implemented -- was essentially impenetrable. In May 2014, however, a security firm gained access to a used by the attack and recovered the encryption keys used in the attacks. An online tool that allowed free key recovery was used to effectively defang the attack.

In May 2017, an attack called WannaCry was able to infect and encrypt more than a quarter million systems globally. The malware uses asymmetric encryption so that the victim cannot reasonably be expected to recover the (private and undistributed) key needed to decrypt the ransomed files.



How WannaCry ransomware works?

Payments were demanded in bitcoin, meaning that the recipient of ransom payments couldn't be identified, but also meaning that the transactions were visible and thus the overall ransom payments could be tallied. During the thick of the week in which WannaCry was most virulent, only about $100,000 in bitcoin was transferred (to no avail: There are no accounts of data having been decrypted after payment).

The impact of WannaCry was pronounced in some cases. For example, the National Health Service in the U.K. was heavily affected and was forced to effectively take services offline during the attack. According to the Symantec 2017 Internet Security Threat Report, the amount of ransom demanded roughly tripled from the previous two years in 2016, with the average demand totalling $1,077. For the most part, payment seems to work, though it's by no means without risk: A Kaspersky Security Bulletin from 2016 claimed that 20% of businesses that chose to pay the ransom demanded of them didn't receive their files back.

PrachiPingle

SE IT

Introducing Sophia: First AI Robot

Sophia, a delicate looking woman with doe-brown eyes and long fluttery eyelashes made international headlines. She'd just become a full citizen of Saudi Arabia -- the first robot in the world to achieve such a status.

"I am very honoured and proud of this unique distinction. This is historical to be the first robot in the world to be recognized with a citizenship," Sophia said, announcing her new status during the Future Investment Initiative Conference in Riyadh, Saudi Arabia. Standing behind a podium as she spoke, to all effects, she presented a humanoid form -- excepting the shimmery metal cap of her head, where hair would be on a human head.

Of course, Sophia's announcement was a calculated publicity stunt to generate headlines and keep Saudi Arabia forefront in your minds when you think about innovation, especially its commitment to a post-oil era. Through a mix of tourism, tech, and infrastructure, non-oil revenue is predicted to grow from $43.4 billion to $266.6 billion annually.

But Sophia's announcement also raises a number of Bladerunner-esque questions. What does it mean to be a citizen? What rights does Sophia hold? Saudi Arabia has not elaborated on this so far -- perhaps it will createa 'personhood' option, as proposed by the EU committee in January, regarding the rights of robots.

TheSophia-botwas dreamed up by the brains at Hanson Robotics, lead by AI developer David Hanson. In his published paper,upending the Uncanny Valley he extrapolates on how humanoid robots can be likable, despite the conception that anything to 'fake human' will trigger revulsion in people.

"We feel that for realistic robots to be appealing to people, robots must attain some level of integrated social responsivity and aesthetic refinement," he wrote.

"Rendering the social human in all possible detail can help us to better understand social intelligence, both scientifically and artistically.

DeepikaKunwar

BE IT

Steam's UI

An overhaul of Steam's UI is in the works and will focus on changes to the library and game launch pages, according to a Valve presentation at the recent conference Indigo 2017.

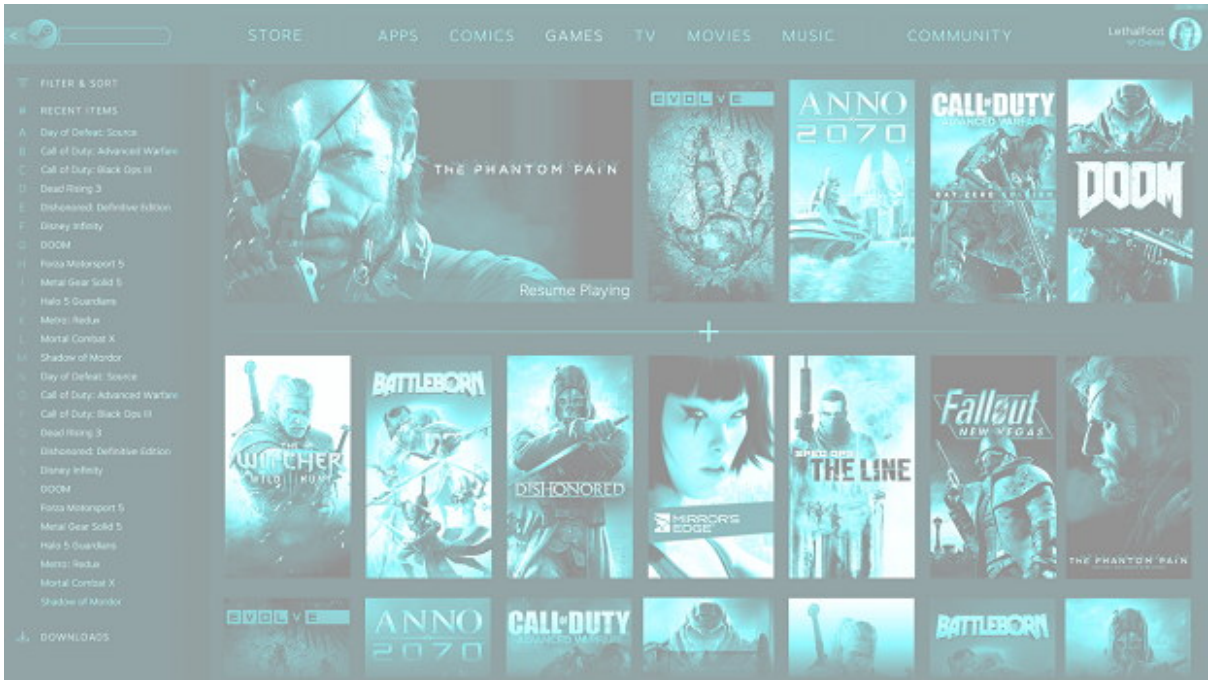
The slides from Valve's product designer Alden Kroll, posted on the ValveTime forum, say that there's an "overall UI refresh and update coming", but give no date for the changes. Specifically, Valve plans to add the option to quickly launch recently played games from the library home page. That'd be welcome – if you've got a large collection and you're juggling 3 or 4 games, it's a (very minor) pain to have to keep scrolling between them.

The tweaks will also highlight games in your library that currently have some activity, whether than be events, updates, or simply titles your friends are playing.

Valve also promised a new "rich display of content" on game launch pages. The company says the reworked pages will better highlight your friends' activity in that game and flag community screenshots, artwork, and guides.

The news does seem to back up images that were discovered in a Steam Client beta version released in February, asnoted by SteamDB. They showed a streamlined library with a 'recent items' section and a game launch page that gave links to current streams of that particular title.

Clearly it's something Valve have worked on in the past – whether the final result resembles these pictures or not remains to be seen.



Shaikh Muskan

SE IT