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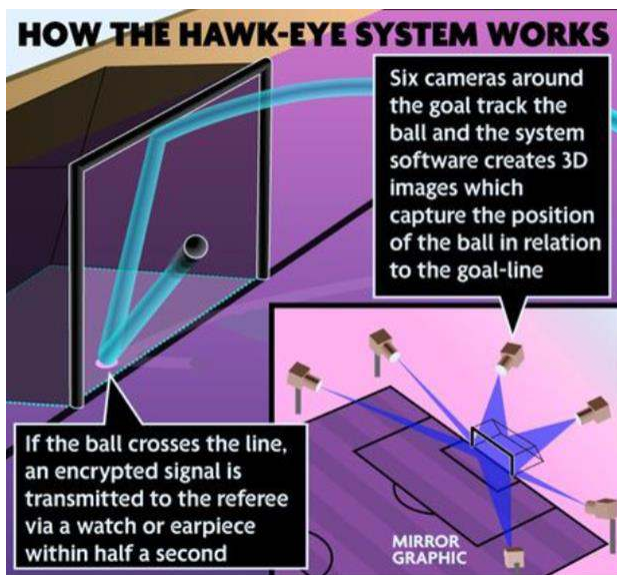
Expected Questions 2017 Computers and Information Technology

HAWK EYE

- Complex computer system
- Used in sports like cricket, tennis, Gaelic football, hurling and association football, to visually track the trajectory of the ball and display a record of its statistically most likely path as a moving image.
- Developed in the United Kingdom by Dr. Paul Hawkins
- Implemented in 2001 for television purposes in cricket
- Works with six or seven high-performance cameras, positioned on underside of the stadium roof to track ball from different angles.
- The video is then triangulated and combined to create a three-dimensional representation of the ball trajectory
- It is accurate to within 5 mm
- Trusted as an impartial second opinion in sports.

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HOW THE HAWK-EYE SYSTEM WORKS



Six cameras around the goal track the ball and the system software creates 3D images which capture the position of the ball in relation to the goal-line

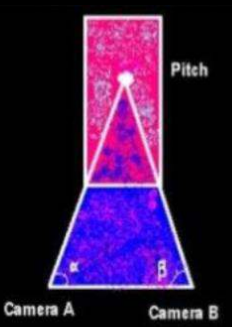
If the ball crosses the line, an encrypted signal is transmitted to the referee via a watch or earpiece within half a second

MIRROR GRAPHIC

A Hawk-Eye system is based on the principle of "Triangulation".

$$l = \frac{d}{\tan \alpha} + \frac{d}{\tan \beta}$$

Therefore

$$d = l / \left(\frac{1}{\tan \alpha} + \frac{1}{\tan \beta} \right)$$


Pitch

Camera A Camera B

Community Radio

- Third model of radio broadcasting in addition to commercial and public broadcasting
- Operated, owned, and influenced by the communities they serve.
- Non-profit & enable individuals, groups, and communities to tell their own stories, to share experiences
- India: Campaign to legitimize community radio began in the mid-1990s
- SC Judgment of 1995 that "airwaves are public property"
- 2002: Policy for the grant of licenses to set up of Community Radio Stations to well established educational institutions including IITs/IIMs.

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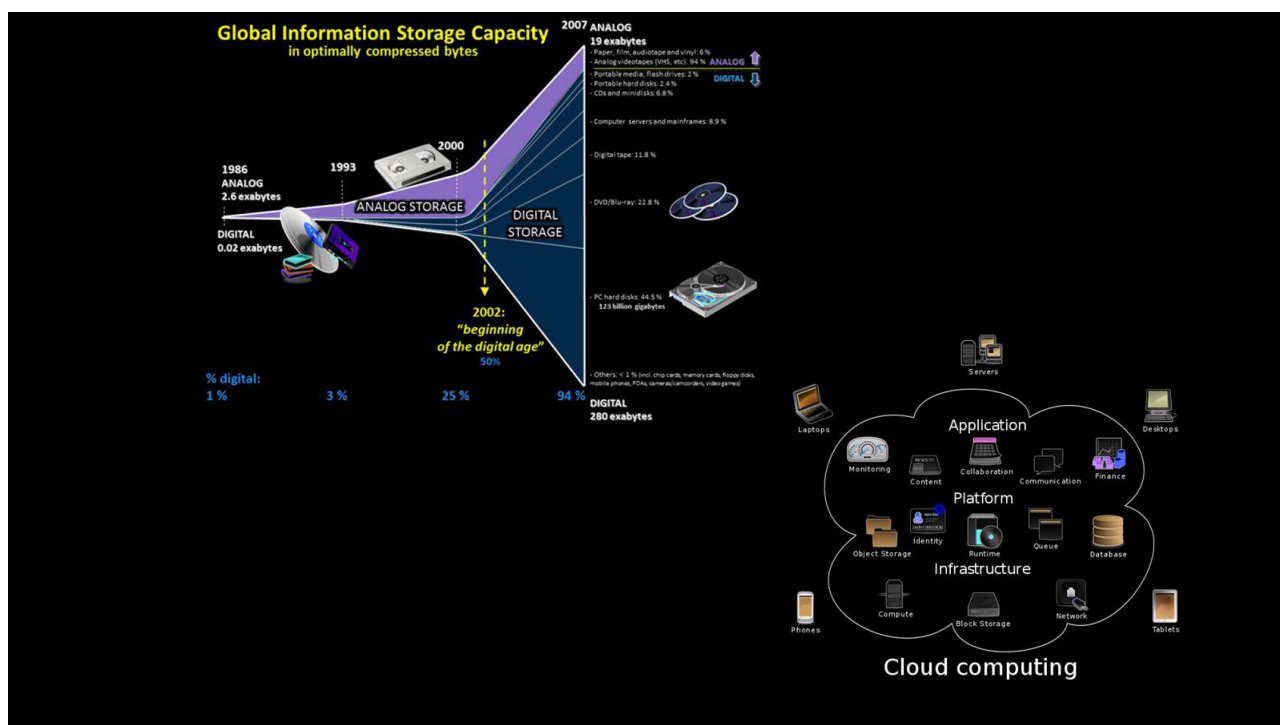
Big Data And Cloud Computing

Big Data

- Deals with the content
- Data is generated due to technological growth & digitization, social media, web-pages, YouTube etc
- To process this structured, semi-structured and un-structured data

Cloud Computing

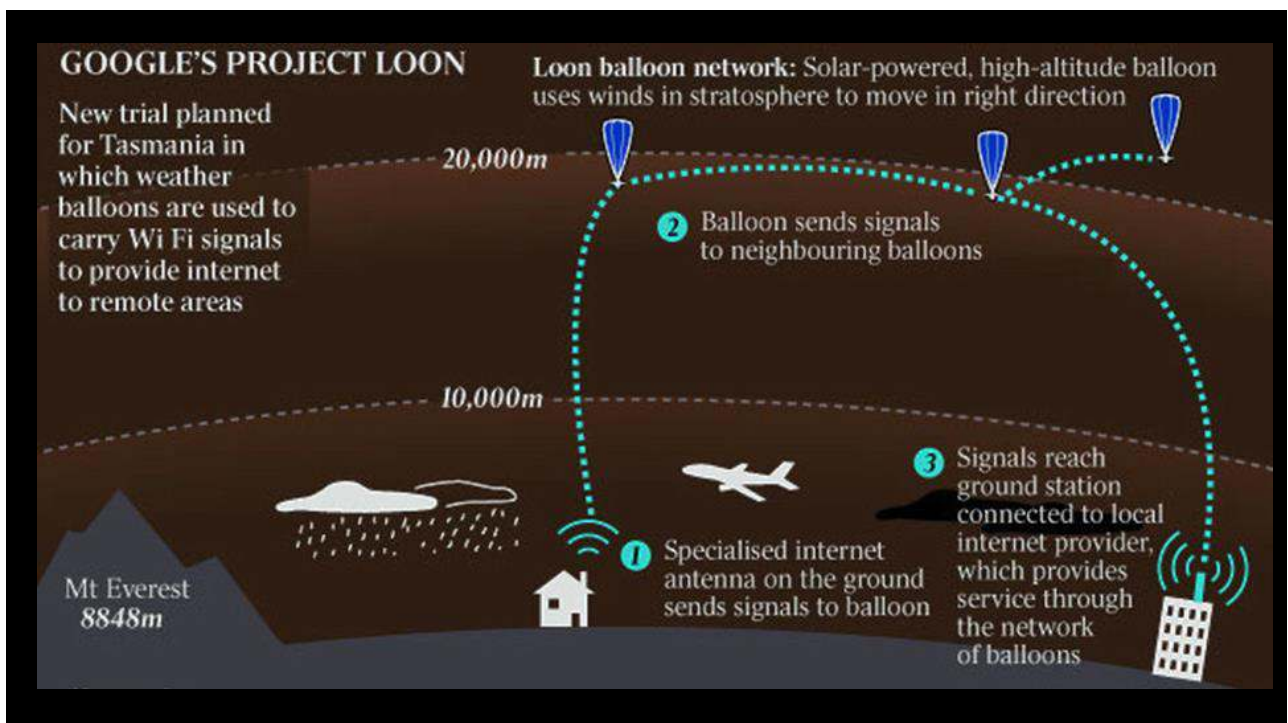
- Deals with the infrastructure
- Provides IT resources as a service
- Elastic and flexible in nature
- Used in BIG data analytics due to its application sharing and cost effective properties



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Project Loon

- Provide low-cost Internet access to rural and remote areas in India
- High altitude floating telecom tower balloons at 20 km height
- Each balloon has wireless broadband internet coverage - 40 km
- Powered though solar panels
- Transceivers connect to cell phone networks in remote areas such as mountains and deserts
- Plan to position where there's no coverage or network capacity is less
- Frequency band proposed to be used by Google could interfere with cellular transmissions



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Mukhota

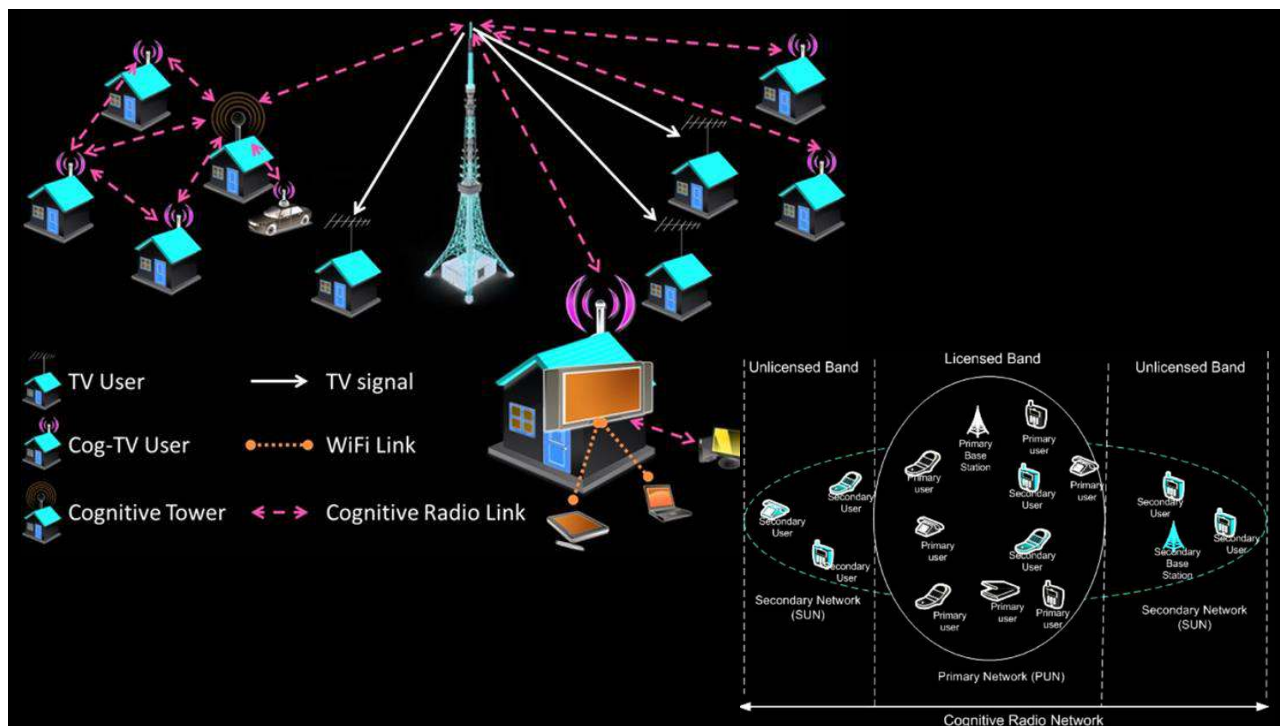
- Device that will tell fisherman that they have reached into foreign territory
- GPS enabled and coded
- Alarms the fisherman not to cross border



Cognitive Radio

- Form of wireless communication
- Transceiver detects which communication channels are in use and which are not, and move into vacant channels
- Optimize use of available radio-frequency (RF) spectrum
- Terror outfits have modified & created application “**Calculator**”, can be attached to the off -air network created specifically for them
- Network generates its own signal by proprietary ad hoc networking protocols and automatically coordinates with other units
- Enables users to send and get text messages
- Share their GPS locations on offline maps

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Computer vision syndrome or Digital Vision Syndrome

- Temporary condition
- Focusing the eyes on a computer display for protracted, uninterrupted periods of time
- Headaches, blurred vision, and neck pain, redness in the eyes, fatigue, eye strain, dry eyes, irritated eyes, double vision, vertigo/dizziness, polyopia, and difficulty refocusing the eyes
- "20 20 20 rule": every 20 mins focus the eyes on an object 20 feet (6 meters) away for 20 seconds.
- Or close eyes for 20 seconds, at least every half hour.

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Hashtag Activism

- Act of fighting for or supporting a cause that people are advocating through social media like Facebook, Twitter, Google+ etc.
- It does not require any action from the person other than sharing or "liking" a post or "retweeting" tweets on Twitter.
- Use of hashtags (#) that are often used to spread the word about a cause over Twitter.
- Hashtag activism is also known as social activism

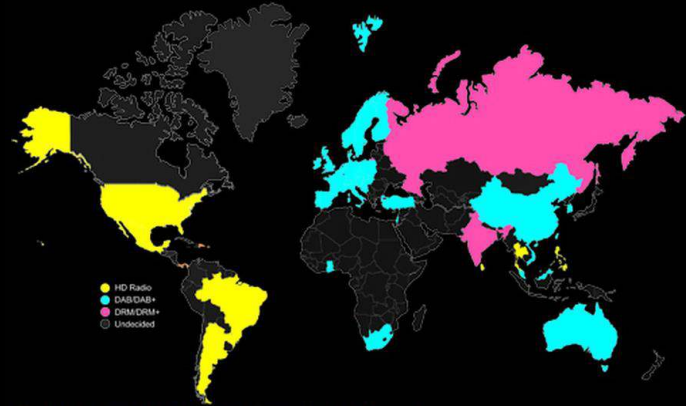
Project Shield

- Technology by Google to protect news sites and portals
- Protection of news sites and portals related to human rights from attacks that threaten free expression and access to information

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Digital Radio Mondiale (DRM)

- Use for cross-border broadcasting initiative
- Twin capabilities of analog and digital transmission
- Perfect for broadcast modes
- Longer range than FM
- Much costlier than FM



The status of digital radio technologies is shown in this map

Google Glass

- Developed by Google Inc.
- Physical device resembling spectacles mounted with touchpad, camera and display
- Has built in memory, sensors, wi-fi and Bluetooth.
- Mapping, recording photos and videos with ability to stream live video.
- Blamed for its unethical use, breaching of privacy and intrusion of others personal business without their knowledge.

How Google Glass works

Camera

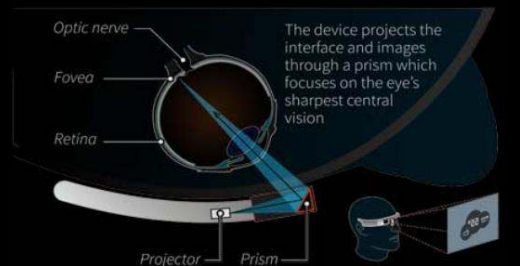
Captures photos or videos of what the wearer sees, and can be instantly shared to contacts.

Display

Transparent panel shows interface overlaid on what the wearer sees.

Board

A panel houses the onboard electronics, such as memory, sensors, communication devices, and batteries.



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IPTV

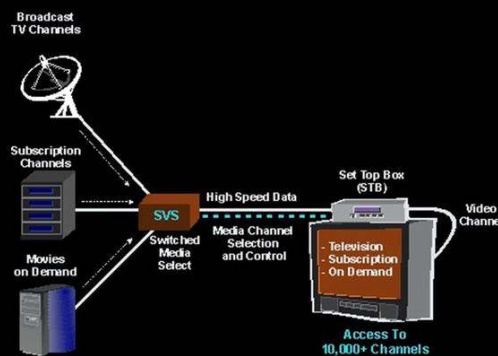
- New generation TV that communicates over Internet protocol in the form of packets rather than signals in normal TV's.
- It has 3 components: Where content is encoded, decoded; Delivery Network; Setup Box
- Two-way interactivity - viewers have more options to personalize, interact and control their viewing experience.
- Based on internet protocol, it is sensitive to packet loss and delays if the IPTV connection is not fast enough.

Map of IPTV countries of the world.



IPTV Connection

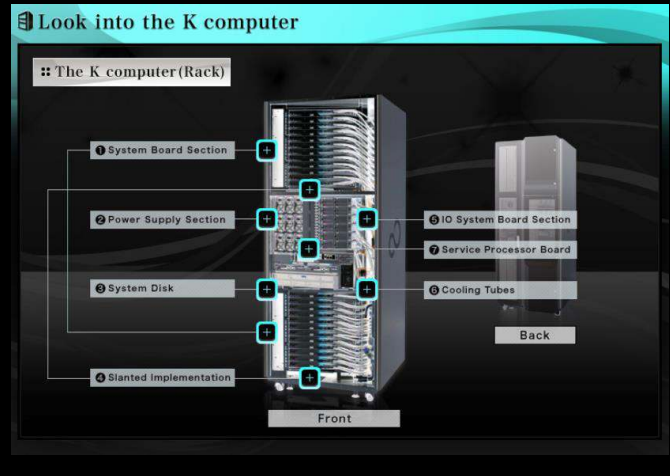
- Switched Video
- Single Stream
- Variable Packet Delays and Losses



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K-Computer

- Japan's fastest supercomputer
- Developed by Japanese MNC Fujitsu
- Active since 2011.
- Distributed memory architecture
- Performance target of 10 petaflops.



Param Yuva II

- Indian Super computer developed by C-DAC in 2013.
- It is an improved version of Other Param Series supercomputers.
- All-round advancement
- Capacity-building and advanced research and development.
- Research in space, bioinformatics, weather forecasting, seismic data analysis, aeronautical engineering, scientific data processing and pharmaceutical development.

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Ambience Intelligence (AmI)

- Setup of electronic devices that observes, records, analyze and respond to the human environment.
- Ability to model user behavior, activity prediction and recognition, decision making and controlling.
- Broaden interaction between human beings and digital information technology by use of ubiquitous computing devices.
- 3 main components: ubiquitous computing, ubiquitous communication, and user adaptive interfaces.
- Used in Smart homes which smartly interact with residents; Health related Application where patients' activity can be monitored; Public transportation System where traffic can be managed efficiently.
- It possess security issue and Privacy challenges.

Virtual Reality

- Artificial environment created with computer hardware and software
- Presented to the user such that it appears and feels like a real environment.
- Hardware devices like goggles, gloves, and earphones etc. inbuilt with sensors.
- Enables people to deal with information more easily
- Virtual reality exposure therapy (3-dimensional computer simulation) - to treat panic and anxiety disorders.
- Education - enables large groups of students to interact with each other as well as with in a three dimensional environment.

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Digital Snooping

- Spying on personal information or data
- Monitor private and public network for password and data
- Interception of data is done at network layer and can bypass security protocols
- Attacker use software programs to read the data passed over network. It searches for the password fields and intercepts it.
- If the password is encrypted, it uses various algorithms and brute force techniques to decrypt them.
- After password is obtained, the attacker can obtain computer access to steal and manipulate data.
- India has launched its National Snooping Program named Central Monitoring System (CMS)

Cryptography

- Communication over internet can be secure or insecure based on technique used to transmit digital information over the network.
- Technique of communication where the actual message is encrypted into mumble jumbled texts by algorithms. This text is called cipher text.
- Its then send over the network. Even if someone sniffs and intercepts the message, the exact information he won't be able to know.
- Receiver receives the message and decrypts the information into plain text.
- 2 technique to implement cryptography: Symmetric key technique and Public key technique.
- Used in Internet banking, ATM transaction, Online Shopping.
- What is encrypted? Email, WhatsApp, FB messaging etc.

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RoboEarth

- World Wide Web for robots: An open source database that allows robots to share knowledge, and a cloud computing platform that gives robots access to powerful robotic cloud services
- RoboEarth databases and RoboEarth Cloud Engine (Rapyuta).
- RoboEarth Cloud Engine is an open source Platform-as-a-Service (Paas) framework designed for robotics applications. Helps robots to offload heavy computation by giving secure customizable computing environments in the cloud.
- RoboEarth DB: Database that allows to participate in a community of users who share data about environments, actions, and object.

WEBCAST

- Presentation technique where audio and video files are transmitted over internet.
- Synonymous with broadcast but webcast is basically on internet communication in digital formant unlike analog communication in broadcast.
- Webcast streaming there is a source and there are many listeners and viewers.
- Popular for e-learning, webinars, conferences, media etc.
- 2014: Election commission used webcast to monitor the proceedings of sensitive polling booths in far flung and disturbed areas & can notice unauthorized movement. It was available to general public on ECI website.

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Semantic Web

- Web of data
- According to the W3C, "It provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries"
- About common formats for integration and combination of data.
- Also about language for recording how the data relates to real world objects.
- Provide foundation to enable exchange of knowledge and information to coordinate business processes

Ethernet

- Local-area network (LAN) architecture developed by Xerox Corporation
- Uses bus or star topology
- Supports data transfer rates of 10 Mbps
- Performs 'switching' of data traffic traversing through the networks.

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Cybersquatting

- Every company wish to have an internet address or domain name related to its trademark.
- Technique used by fraudulent persons to acquire a domain name that is of popular trademark. For example. Whatsapp.com
- Person who bought this domain name will negotiate with the owner of Whatapp with higher price for profitability at the cost of highly valued trademark.
- On Facebook having a profile of celebrity or important personality with his name and using offensive data to attract his attention.
- Facebook and Twitter has made regulations to handle certain kind of Fraudulent.
- Few countries like USA have laws to regulate Cybersquatting.

Cyber Swachhta Kendra

- For Botnet cleaning and Malware analysis
- Launched by Union Minister of Electronics
- Operated by Indian Computer Emergency Response Team (CERT-In) under provisions of Section 70B of the Information Technology (IT) Act, 2000
- Complies with objectives of National Cyber Security Policy, 2013 – create secure cyber eco-system in India
- Botnet: Network of private computers infected with malicious software without the owners' knowledge.
- Malware: Malicious software designed to disrupt, damage, or gain authorized access to a computer system.
- USB Pratirodh: Desktop security solution to protect from USB storage device threats.
- AppSamvid: Desktop solution to protect systems by allowing installation of genuine applications through white listing.
- M-Kavach: Indigenously developed mobile application to address the security threats in mobiles.

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Terahertz Transmission Technology

- Developed by Japan
- Next generation system which can transmit digital data over 10 times faster than 5G mobile networks
- Achieves communication speed of 105 gigabits per second using the frequency range from 290 GHz to 315 GHz
- High-data-rate minimum-latency communications

SAW

- Single actuator wave like robot
- Tiny ingestible 3-D snake like robot
- Can visualize digestive system in real time

New Wi-Fi for superfast connectivity

- Based on infrared rays
- 40 Gbit/sec
- Developed by University of Netherlands
- Comes from light antenna
- Current WiFi - Radio signal of 2.5 to 5 gigahertz

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E-Eye

- Pilot project started by GoI for e-surveillance
- By set of cameras installed in area especially National parks which can monitor and record the movement around it at 360 degree.
- Cameras are fitted with night vision features & can raise alarms when required.
- National Tiger Conservation Authority (NTCA) has approved the installation of these cameras in Corbett National Park.
 - Track animal movement
 - Check human trespassing
 - Control and avoid animal poaching
 - Track habitat destruction, cutting of trees & grazing
 - Better planning and coordination of authorities

Crime and Criminal Tracking Network System (CCTNS)

- Mission Mode Project under National e-Governance Plan of GoI, MHA started in 2009.
- Create comprehensive and integrated system to enhance efficiency and effectiveness of policing by adopting e-Governance and creation of a nationwide networking infrastructure for evolution of IT-enabled-state-of-the-art tracking system.
- Facilitate collection, storage, retrieval, analysis, transfer and sharing of data and information at the police station and between the police station and the State Headquarters.
- Help in online tracking cases and arrest criminals and speedy investigation.

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Digital Addressable System

- Group of hardware devices and related software system for digitization and broadcasting of cable television.
- Integrated system by which signals are sent in encrypted form
- Achieved through Conditional Access System at subscriber end within the limits of authorization made, through the Conditional Access System and the subscriber management system by cable operators.
- Good quality signal and least distortion in broadcasting

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One Nation, One Grid, One Frequency Mission

- Under Power Grid Corporation of India Ltd.
- Power system in India divided into five regional grid systems.
- Later on it was planned from Regional self-sufficiency to National basis
- All five regions were connected and synchronized with same power frequency.
- Synchronization will help in optimal utilization of scarce natural resources by transfer of Power from Resource centric regions to Load centric regions.
- 2013: Southern Region was connected to Central Grid in Synchronous mode with Raichur - Solapur Transmission line

Super Ball Bot

- Kind of robot that has tensegrity structure
- Made of interlocking rods and cables which can twist itself to give itself motion of rolling.
- Developed by NASA for planetary explorations.
- Target considered is Saturn's moon Titan, which boasts an atmosphere which can slow the spacecraft's descent enough so that the robot can be dropped, without airbag or parachute, from 100 kilometers or more above the surface.
- Bounces to a landing on a planet, then deforms itself to roll to locations of scientific interest



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BARBO

- 1st Made in India Industrial Robot
- Called Bravo robot
- Designed at TAL's Pune factory
- Low cost power transmission
- Articulated robots: Fitted with rotary joints

Robophobia

- Fear of Robots and Automation
- Affecting IT industries in India
- IT Tsunami

Seabed Resident Event Profiler (SREP)

- Robotic platform by NIO
- Can be stationed at water depth
- Robot was tested at RV Sindhu Sadhana
- Research on Monsoon, Global Climate & Upwelling
- NIO has headquarters at Goa & regional offices at Kochi, Mumbai and Visakhapatnam

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Cyber Physical Systems Program

- By DST
- Self driven cars (Google & Tesla)
- Autonomous unmanned vehicles
- Aircraft navigation systems
- Rs. 3000 crore
- National Science Foundation of USA started it in 2003

Bharat QR Code

- World's first interoperable payment acceptance solution launched by GoI - less-cash economy
- By National Payments Corporation of India (NPCI), Visa, MasterCard and American Express
- BharatQR code: Static (scan code & enter amount) and dynamic (new QR code will be generated in real time for every transaction)
- QR code (Quick Response code): 2-D (matrix) machine-readable bar code made up of black and white square
- QR code can be read by the camera of a smartphone - store URLs or other information that link directly to text, emails websites phone numbers
- 360 degrees (omni-directional), high speed reading
- Can store up to 7089 digits