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Technical magazine of Information Science & Engineering department

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DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING

VISION

To be a center of excellence in Information Science and Engineering through the interactive teaching learning process, research, and innovation.

MISSION

M1. Creating competitive ambience to enhance the innovative and experiential learning process through state of the art infrastructure.

M2. Grooming young minds through industry-institute interactions to solve societal issues and inculcate affinity towards research and entrepreneurship.

M3. Promoting teamwork and leadership qualities through inter-disciplinary activities in diversified areas of information science and engineering.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Possess theoretical and practical knowledge to identify, scrutinize, formulate and solve challenging problems related to dynamically evolving information science.

PEO2: Inculcate core competency, professionalism and ethics to cater industrial needs and to solve societal problems.

PEO3: Engage in Lifelong learning and stay intact to the transformation in technologies and pursue research.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Exhibit competency and skills in distributed computing, information security, cyber security, data analytics, and machine learning.

PSO2: Able to provide sustainable solution to implement and validate information science projects.

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CUTTING EDGE

1. BIOLOGICAL COMPUTERS

US store a movie in the DNA of a living E.coli bacterium, and then retrieve and replay it, researchers in the US have developed a DNA based Biological computer that works inside living bacterial cells and tells them what to do, according to a report published recently in Nature.

In the recent years, researchers have been trying to make cells into PCs. Cells store data in something generally approximating memory, they act due to the exacting, rules-based articulation of programming because of boosts, and they can complete activities with bewildering speed.The DNA genome gives all the functionality necessary to make a useful state machine, In the the case of this new MIT paper, their highly customized strain of e.coli is made with specifically arranged "target sequences" spaced very carefully throughout the genome; when scientists provide a specific combination of chemical signals, old and boring techniques in genetic engineering lead the cell to release a specific "recombinase," a type of enzyme that can invert the orientation of a pre-programmed stretch of DNA, or remove it entirely. It's the action of these recombinase enzymes, and their interaction with the short target sequences, that allow all-new abilities in cellular computing.

New biological circuit works just like a digital one, it receives an input and makes a logic-based decision, using AND, OR, and NOT operations, but instead of the inputs and outputs being voltage signals, they are the presence or absence of specific chemicals or proteins.

Cells are inherently programmable, so once you can reliably store information in the genome, doing simple in-out operations with that information needs the use of only long-standing techniques in biology. Gene expression is quick, but modern computer processors are quicker. And even with fluorescent reporting, reading the information output of a cell with never be as efficient as electrical

pulses down a wire.

One major advantage of life over modern engineering is power efficiency. Running artificial intelligence algorithms takes many long hours of electricity every year, and extremely long and complex problems could end up being vastly more affordable to solve, using biotech. Supercomputers costs millions of dollars in energy every year, while your bio-computer runs on just a few common, cheapo metabolites. We find living cells at the bottom of the ocean and the top of the atmosphere, the mouths of active volcanoes and in ancient lakes under kilometers of arctic ice.

The process starts with the design of a DNA strand that codes for all the logic the system will need. The researchers then inserted the synthesized DNA into E. coli bacteria as part of a plasmid, which is a ring of DNA that can replicate itself as it floats around in the cell, that served as a template for the biological computer's machinery. The cell's molecular machinery then translated the DNA into RNA, essentially copying the DNA code onto a different molecule, which could then be used by the cell.

Scientist says the envisions bio computers like these being used in diagnostic devices that detect and kill viruses, or in cellular devices programmed to break down environmental toxins, and all that's just for starters, and before they revolutionize the field of computing.

"You could upload a biological circuit into the cells in the body to protect against viruses or prevent cancer from developing," he says, "that is, the biocomputer would be part of your own cells. If the body is attacked by cancerous or viral materials, cells could be programmed to shut down or synthesize a drug or summon the immune system into action, instead of allowing the disease to spread.

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- Ms Madhura Hegde
Asst Professor, Dept of ISE

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2. EYEPHONE

Eye phone is a hands free interfacing system that is used for activating mobile phone by eye. Here the functions of the phone can be drive easily. The phone functions activated by blinking of the eye. The navigation key functions are done by the movement of eye. The principle behind in eye phone technology is Eye tracking systems. The device senses the movement of the eye using the pupil movement. Normal devices are used front camera to sense the eye movement. But in modern phones uses sensors used to track eye movements.

EyePhone tracks the user's eye movement across the phone's display using the camera mounted on the front of the phone. It a novel "hand-free" interfacing system capable of driving mobile applications/ functions using only the user's eyes movement and actions (e.g., wink). EyePhone tracks the user's eye movement across the phone's display using the camera mounted on the front of the phone. Eye phone track the eye and infer its position on the mobile phone display as a user views a particular application; and eye phone detect eye blinks that emulate mouse clicks to activate the target application under view.

We present a prototype implementation of EyePhone. Eye phone is capable of tracking the position of the eye on the display, mapping these positions to an application that is activated by a wink. At no time does the user have to physically touch the phone display. EyePhone is the first system capable of tracking a user's eye and mapping its current position on the display to a function/application on the phone using the phone's front-facing camera. EyePhone allows the user to activate an application by simply "blinking at the app", emulating a mouse click. While other interfaces could be used in a hand-free manner, such as voice recognition, we focus on exploiting the eye as a driver of the HPI. We believe EyePhone technology is an important alternative to, for example, voice activation systems based on voice recognition, since the performance of a voice recognition system tends to degrade in noisy environments.

Eye Detection: By applying a motion analysis technique which operates on consecutive frames, this phase consists on finding the contour of the eyes. The eye pair is identified by the left and right eye contours. It identifies the eye pair with almost no error when running on a desktop computer with fixed camera.

Figure 1: Eye capture using the Nokia N810 front camera running the EyePhone system. The inner white box surrounding the right eye is used to discriminate the nine positions of the eye on the phone's display. The outer box encloses the template matching region.

Eye Tracking: The eye tracking algorithm is based on template matching. The eye template is created by putting the phone at a distance of about 20 cm from the eyes. (a) Top left (b) top center (c) top right (d) middle left (e) middle center (f) middle right (g) bottom left (h) bottom center (i) bottom right template matching. The template matching function calculates a correlation score between the open eye template, created the first time the application is used, and a search window. In order to reduce the computation time of the template matching function and save resources, the search window is limited to a region which is twice the size of a box enclosing the eye. These regions are shown in Figure 1, where the outer box around the left eye encloses the region where the correlation score is calculated. The correlation coefficient we rely on, which is often used in template matching problems, is the normalized correlation coefficient. This coefficient ranges between -1 and 1. From our experiments this coefficient guarantees better performance than the one used. If the normalized correlation coefficient equals 0.4 we conclude that there is an eye in the search window. This threshold has been verified accurate by means of multiple experiments under different conditions (e.g., bright, dark, moving, not moving).

Application:

EyeMenu: An example of an EyePhone application is EyeMenu as shown in below figure. EyeMenu is a way to shortcut the access to some of the phone's functions. The set of applications in the menu can be customized by the user. The idea is the following: the position of a person's eye is mapped to one of the nine buttons. A button is highlighted when EyePhone detects the eye in the position mapped to the button. If a user blinks their eye, the application associated with the button is lunched. Driving the mobile phone user interface with the eyes can be used as a way to facilitate the interaction with mobile phones or in support of people with disabilities.

Conclusion: Developing a HPI technology. The EyePhone relies on eye tracking and blink detection to drive a mobile phone user interface and activate different applications or functions on the phone. Although preliminary, these results indicate that EyePhone is a promising approach to driving Mobile applications in a hand-free manner.

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[4] M. Chau and M. Betke. Real Time Eye Tracking and Blink Detection with USB Cameras. In Boston University Computer Science Technical Report No. 2005-12, 2005.

- Ms Asha B Shetty

Asst Professor, Dept of ISE

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3. INDIAN STARTUPS

It is only in the last decade and half that people in the country have moved from being job seekers to job creators, Doing a startup is tough and every country sees more failures than success. More often than not an entrepreneur needs to be prepared to face failures. A startup that has raised funds can count the investors for the same form of mentoring.

Nowadays, it is hard to raise a startup company because of the competition. Competitions have grown up from job seeker to being a boss, everyone wants to be a boss, so the startup rate is also have been incremented.

On the other hand, its good to start a startup and being a boss. It also required an idea and the capacity to start a new startup. Hard work and smart work together make a person into the best boss and this makes the person start the best startup. Before starting a startup, a person needs to know the idea and also the future about that company or a startup.

The government is the single largest enabler for an entrepreneurial ecosystem. Government's role in ease of doing business and helping starting companies to ensure success.

The government role has been so far limited to giving out grants and loans.
It is also the duty of a government to support and give loans based on its startup and their company.

- Prathiksha Palai
4SF18IS068

4. GOOGLE FILE SYSTEM

GFS is enhanced for Google's core data storage and usage needs (primarily the search engine), which can generate enormous amounts of data that must be retained; Google File System grew out of an earlier Google effort, "BigFiles", developed by "Larry Page" and "Sergey Brin" in the early days of Google, while it was still located in Stanford. Files are divided into fixed-size chunks of 64 megabytes, similar to clusters or sectors in regular file systems, which are only extremely rarely overwritten, or shrunk; files are usually appended to or read. It is also designed and optimized to run on Google's computing clusters, dense nodes which consist of cheap "commodity" computers, which means precautions must be taken against the high failure rate of individual nodes and the subsequent data loss. Other design decisions select for high data throughputs, even when it comes at the cost of latency.
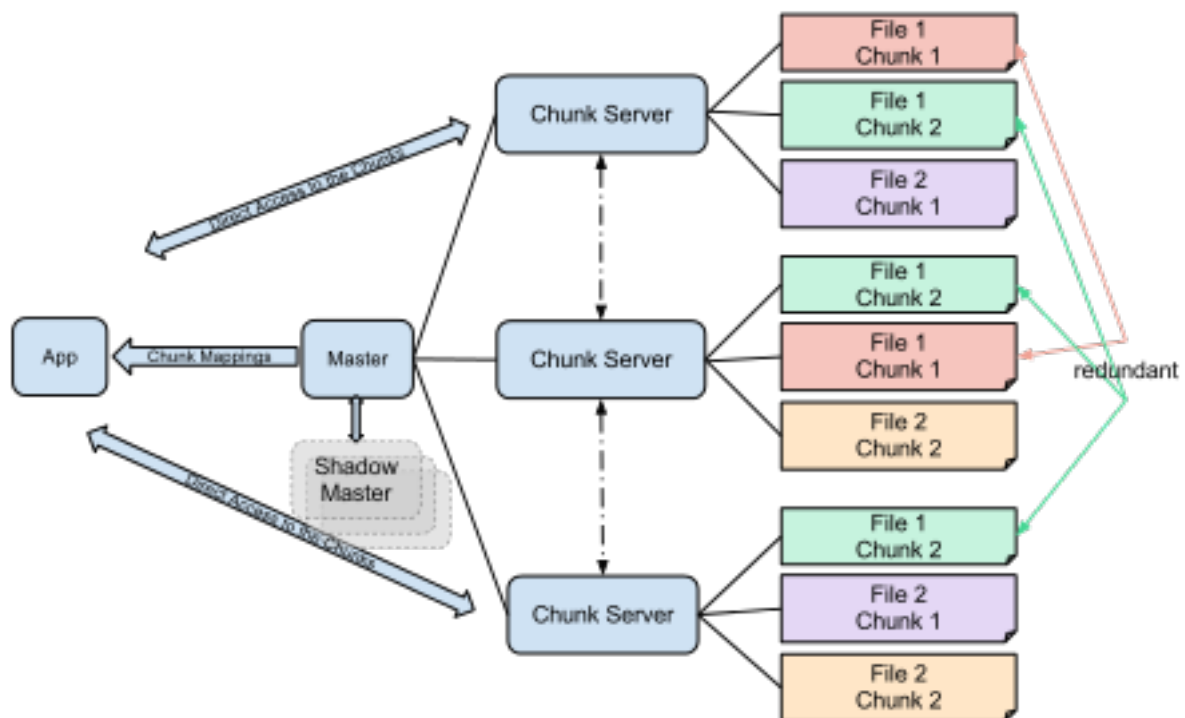
A GFS cluster consists of multiple nodes. These nodes are divided into two types: one Master node and multiple Chunkservers. Each file is divided into fixed-size chunks. Chunkservers store these chunks. Each chunk is assigned a globally unique 64-bit label by the master node at the time of creation, and logical mappings of files to constituent chunks are maintained. Each chunk is replicated several times throughout the network. At default, it is replicated three times, but this is configurable. Files which are in high demand may have a higher replication factor, while files for which the application client uses strict storage optimizations may be replicated less than three times - in order to cope with quick garbage cleaning policies.

- Ms Jayapadmini Kanchan
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5. 3D-DOCTOR

3D-DOCTOR is an advanced, 3D imaging software developed by Able Software Corp.It is an advanced 3D modelling, image processing and measurement software for MRI, CT, PET, microscopy, scientific, and industrial imaging applications.

3D-DOCTOR Software is used to extract information from image files to create 3D model. It was developed using object-oriented technology and provides efficient tools to process and analyze 3D images, object boundaries, 3D models and other associated data items in an easy-to-use environment. It does 3D image segmentation, 3D surface modeling, rendering, volume rendering, 3D image processing, disconsolation, registration, automatic alignment, measurements, and many other functions.

3D-DOCTOR supports both grayscale and color images stored in DICOM, TIFF, Interfile, GIF, JPEG, PNG, BMP, PGM, RAW or other image file formats. 3D-DOCTOR creates 3D surface models and volume rendering from 2D cross-section images in real time on your PC. Leading hospitals, medical schools and research organizations around the world are currently using 3D-DOCTOR
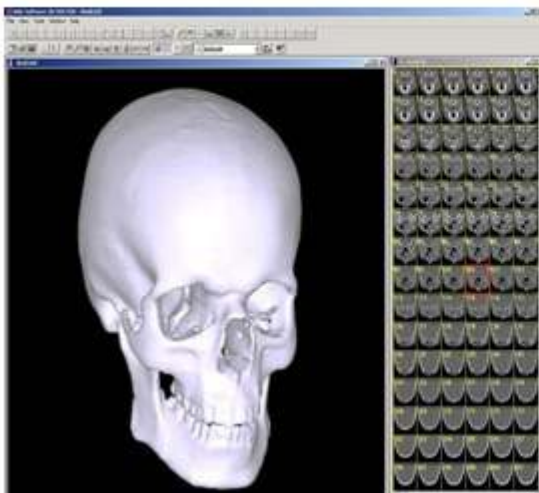
3D-DOCTOR supports a variety of image formats in both 2D and 3D. These formats include DICOM, TIFF, JPEG, BMP, Interfile, GIF, PNG and RAW. Other non-standard image formats are also supported, but only with known dimensions (number of columns, rows and planes), bit depth per pixel, little endian or big endian, and the size of file header. This technology is currently being used by leading hospitals, medical schools and research organizations around the world.

- Joanna Tresa Correa
4SF18IS036

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6. TOUCHLESS TOUCHSCREEN

The touch less touch screen sounds like it would be nice and easy, however after closer examination it looks like it could be quite a workout. This unique screen is made by TouchKo, White Electronics Designs, and Groupe 3D. The screen resembles the Nintendo Wii without the Wii Controller. With the touch less touch screen your hand doesn't have to come in contact with the screen at all, it works by detecting your hand movements in front of it.

Everybody loves a touch screen and when you get a gadget with touch screen the experience is really exhilarating. When the I-phone was introduced, everyone felt the same. But gradually, the exhilaration started fading. While using the phone with the fingertip or with the stylus the screen started getting lots of finger prints and scratches. When we use a screen protector; still dirty marks over such beautiful glossy screen is a strict no-no. Same thing happens with I-pad touch. Most of the time, we have to wipe the screen to get a better unobtrusive view of the screen.

The system is capable of detecting movements in 3-dimensions without ever having to put your fingers on the screen. Their patented touch less interface doesn't require that you wear any special sensors on your hand either. You just point at the screen (from as far as 5 feet away), and you can manipulate objects in 3D. Sensors are mounted around the screen that is being used, by interacting in the line-of-sight of these sensors the motion is detected and interpreted into on-screen movements. What is to stop unintentional gestures being used as input is not entirely clear, but it looks promising nonetheless.

Today's thoughts are again around user interface. Efforts are being put to better the technology day-in and day-out. The touch less touch screen user interface can be used effectively in computers, cell phones, webcams and laptops. May be few years down the line, our body can be transformed into a virtual mouse, virtual keyboard.

- Mr Ganraj K
Asst Professor, Dept of ISE

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7. APPLE TALK

AppleTalk is Apple's design of a simple, inexpensive and flexible network for connecting computers, peripheral devices, and servers. AppleTalk's flexibility allows it to be used to connect peripherals such as the LaserWriter, or act as a stand-alone local-area network for up to 32 nodes, or form portions of a larger network by using bridges and gateway devices.

Figure 1: Physical Connection

What is AppleTalk? At a purely physical level, AppleTalk is a network with a bus topology that uses a trunk cable between connection modules. Interfacing with the network is handled by the Serial Communications Control chip found in every Mac. Any device (computer, peripheral, etc.) attaches to a connection box via a short cable (called a drop cable), as shown in figure 1. This type of network is known as a multidrop line or a multipoint link. AppleTalk is capable of supporting up to 32 nodes (devices) per network and can transmit data at a rate of 230,400 bits per second. Nodes can be separated by a maximum cable length of 1000 feet.

AppleTalk, as specified by Apple, is wired using relatively inexpensive shielded, twisted-pair cable and Apple's connection boxes. One box is required per device; in the case of the Mac, the box plugs into the serial printer port in the back of the Mac using an attached drop cable. A trunk cable segment from one node on the network plugs into one port on the connection box, and another cable segment leading to the next node in the network plugs into the other port on the box.

One of the advantages of AppleTalk relates to the design of these connection boxes. The boxes are designed so that the continuity of the trunk cable and the network is maintained even if a device is disconnected from the network by unplugging it from the connection box. (Unplugging the trunk from the connection box does disrupt the integrity of the network, however.) The physical layout of an AppleTalk network can therefore be designed by locating the connection boxes where desired without worrying if a device will be initially connected to each one of the boxes. Additional devices can be added to the network at any time simply by plugging them into the boxes.

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References

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- Mrs Suchetha. G
Asst Professor, Dept of ISE

8. START-UP

Start-up is a project initiated by an entrepreneur. An entrepreneur is a person who organizes a venture to benefit from an opportunity, rather than working as an employee. These are the people who seek effectively develop and validate a scalable business model. Start-ups are typically begun by a founder or co-founders who have a way to solve the problem.in India, Bangalore is the top Startup and IT hub of India and one of the best places for startups in the World. We have many start-ups like Headway.ai, OlaCabs Zomato, Paytm, etc. Investors typically want to see that a venture capitalist or angel investor has already put down a reasonable sum of money before they ever give any funding to Indian startups and their founders. So to get the right amount of money for a new startup in India you must have to already the right amount of backing.

One among the top start-ups in India is cure.fit.It is a mobile app that takes a holistic approach towards health and fitness by bringing together all aspects of a healthy lifestyle on a single platform. Its headquarters are located in Bangalore, India. Mukesh Bansal the co-founder of Mytra launched Curefit in May 2016 along with former Chief Business Officer of Flipkart, Ankit
Nagori. Cure.fit (CureFit Healthcare Pvt. Ltd) is a preventive and curative healthcare & fitness company. It delivers physical and mental well being across 4 flagship verticals - cult. fit, eat. fit, mind.fit and care.fit. Currently, cure.fit is serviceable in Bengaluru, Hyderabad, Delhi and Gurugram.

Cult. fit is a chain of group workout fitness centers across Bengaluru, Hyderabad, Delhi and Gurugram It comprises different workout formats such as Zumba, Yoga, Boxing, Strength & Conditioning, Sports Conditioning, HRX by Hrithik Roshan, Prowl by Tiger Shroff, Football and Running Cult also offers do-it-yourself packs on the cure. fit app.
Eat.fit is an online food ordering and delivery platform that delivers daily healthy meals. It also offer weekly and monthly subscriptions
Mind.fit is a chain of mental fitness centers that comprises Yoga and Meditation as its primary offerings. It also provides Do-it-yourself packs, such as Sleep Stories, Yoga Nidra and Pranayama, on the cure. fit app.
Care.fit provides doctor consultations and full-body checkup at its health center with Pharmacy & Diagnostics facility (Ultrasound, ECG, TMT X-ray, Blood & Urine tests). Care.fit offers zero wait time, 24*7 video consultation and free follow up for the users.

There are endless money-making opportunities in today's world. Startups can have a high rate of success in India Education is the reason because the education system in India is great. The top Indian startups are a result of persistence

- SAHANA
4SF17IS072