Vasavi College Of Engineering

TECHGYAN

Department Of Computer Science & Engineering

EDITORIAL

SAP' your way to success...

The year started with the news papers and television channels flooded with words like 'recession',' cost-cutting' and 'lay offs'. As we stand at the threshold of our future to face the real world, we are actually uncertain of the step we need to take. Different deliberations are making the situation unclear and confusing.

The late 2000's recession was a result of a series of events that took place across the world like blowing up of real estate bubble in United States and indiscriminate lending by the banks in real estate ventures which made the mortgage-backed securities difficult to assess. As shares and housing prices declined many large and well established investment and commercial banks in the United States and Europe suffered huge losses and even faced bankruptcy, resulting in massive public financial assistance. A global recession has resulted in a sharp drop in international trade, rising unemployment and slumping commodity prices. As a result of this, the economic situation of industries in all sectors worsened.

The IT industry also bore the brunt of recession in terms of decrease in funds for projects, decrease in the number of projects and mass layoffs of employees in almost every organization. Experts forecast that it generally takes 6 months to two years to overcome recession. We have already unwaveringly sustained majority of this crisis, now its time for us to look forward to a new beginning, as it is rightly said when the clouds cover the sun there is always a silver lining of hope.

There is an unprecedented competition in the market-place today. The need to understand consumer desires the norm for existence and survival in business. Today a need has arisen for the managers to be enterprising and be ready to meet global challenges with a proactive vision. One of the solutions for the challenges we face in the market place, has been offered in the form of SAP (Standard Assessment Procedure). Even during this worsening economic slowdown there is a bright future for the engineers equipped with SAP. The SAP jobs are best paid in the industry. The business statistics give credence to the growing feeling that SAP and much of the enterprise software market it represents, are relatively recession-proof. SAP ERP (Enterprise Resource Planning) is a way to integrate the data and processes of an organization into one single system. ERP usually accomplish integration, by creating one single database that employs multiple software modules providing different areas of an organization with various business functions. Thus many organizations are moving forward to embrace SAP solutions. SAP thereby opens up an area for huge employment opportunity and therefore honing your knowledge with SAP training will acts as an added advantage.

The technology trends presented in this magazine proves the tremendous professional zeal of CSE students of Vasavi, who are in real fire fighting mood against the recession. The editorial team salutes their ignited minds and wishes them all the best for a rocketing career rise. Hope the collection interests you and acts as a tool to refresh and update you. We wish all the readers success in their respective careers.

All the best... Happy Reading!!

Team **TECHGYAN**

In one word, this ideal is that you are divine.—Swami Vivekananda

ANDROID

Its Anatomy and Features

By Uma Shankar, 4/4 CSE

Google Android created a storm in the mobile operating system arena even before any mobile manufacturer started shipping mobile phones based on Android. The first question that creeps into our thought is what is android all about and how is it different from the rest?
Well, it goes like this,

Android is the first truly open source comprehensive platform for mobile phones, in simple words is a software stack for mobile devices that includes an operating system, user interface and key applications. Though the key players of mobile operating systems like Symbian, Microsoft windows CE, Apple are already established in this field, Google has tried to make its presence felt by giving many firsts with Android to developers.
In all, the Android is a complete set of software that is needed to run mobile phone without having any proprietary impediment from the manufacturer. Android will provide an open mobile software platform that enables creation of applications that would run and give same user experience on any Android based phone. This hasn't been the case till now because developers had to refer to the manufacturer's phones specifications before developing the mobile applications for it. So with Android, if the developer has an idea of app for mobiles he won't have to go into mobile phone's specifications but rather develop the app and have it deployed on Android-based handset irrespective of its manufacturer.

How the applications are developed for Android?

The Android SDK provides the tools and APIs necessary to begin developing applications on the Android platform using the Java programming language.

Android Features:

Application framework enabling reuse and replacement of components.

Dalvik virtual machine optimized for mobile devices.

Integrated browser based on the open source WebKit engine.

Optimized graphics powered by a custom 2D graphics library; 3D graphics based on the OpenGL ES 1.0 specification (hardware acceleration optional)

SQLite for structured data storage.

Media support for common audio, video, and still image formats (MPEG4, H.264, MP3, AAC, AMR, JPG, PNG, GIF)

GSM Telephony (hardware dependent)

Bluetooth, EDGE, 3G, and WiFi (hardware dependent)

Camera, GPS, compass, and accelerometer (hardware dependent)

Rich development environment including a device emulator, tools for debugging, memory and performance profiling, and a plugin for the Eclipse IDE.

Anatomy of Android

The Android operating system includes four major components: the kernel, core libraries, run time and application framework. The Android SDK includes LINUX 2.6 kernel as the operating system for the mobile phone that provides the core system services such as memory management, process management, security, networking, drivers, etc.,

On top of this hard abstraction layer rests a set of C/C++ libraries for features such as media codecs, SQLite, and Webkit. The Webkit is an open source web browser upon which the Android's

integrated web browser is based. The very next layer in the Android software stack is Android's runtime. Google has specifically chosen Dalvik

The application framework layer developers the much talked excellent user experiences with access to APIs that are being used by the core applications. Android SDK uses Java for application development. But, it doesn't incorporate all the packages. This resulted in Android having core packages java.lang, java.io, java.util and it will not include user interface packages like AWT and Swing rather it uses 3D graphics library that is based on OpenGL.

Maps and Location APIs

With Android SDK, Google provides two APIs: Location and Maps through two packages namely,

> com.google.android.maps

> com.google.android.location.

Through these APIs for extracting location information based on the nearby cellular network, one could get the location of the device through the GPS data and also a map is displayed related to user on his Android based phone showing road route to his a required location.

Google Android vs. Google Phone

f you have never heard of Android before, it's an Operating System for mobile phones that is developed by Google. Unlike RIM (BlackBerry), 3

Java virtual machine (VM) for Android as it is well suited for mobile devices in terms of battery and CPU conditions.

Apple (i-Phone), Nokia (Symbian) and other mobile phone companies that develop the mobile OS and the hardware, Google is only developing the OS part while the hardware of mobile device is manufactured by other companies like HTC, Lenovo and Samsung. Thus a "Google Phone" implies that phone runs on Android. Since Android internally runs on Linux, some users have even managed to install the Google Android OS on their Nokia phones and Asus notebooks. Airtel brought the First Google Android powered mobile phone to India, HTC magic. It's an unlocked phone so you can use the device on other GSM networks in India as well. The phone features a unique bar coding application so if you are shopping somewhere, you can quickly scan the barcode of any product in the shelf to get more information about that product using your Google phone.

With Android, Google has forayed into the mobile market. It has just released some android phones but, the time will tell how it is going to compete with when compared to Apple's I-phones, and Nokia N-series and E-series phones.

SUPER COMPUTER SIZE OF YOUR PALM

By Sravan, 4/4 CSE

Supercomputers may not necessarily be as big as a room. They could be no bigger than your mobile phone. A lot of things happen at the pace of an evolution, but a lot of things also happen just like the flip of a coin. Engineers from the University of Edinburgh have reportedly done that 'flip of a coin'. They have made the announcement of their breakthrough finding after examining the behaviour of wires 1,000 times thinner than a human hair.

In order to create a powerful computer the size of a mobile phone, it is necessary to develop much smaller microchips which use thinner wire. But there were some inherent problems while heading towards that direction.

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But Edinburgh engineers have now devised a tool to help combat problems which can arise from wiring microchips much smaller than the ones we are used to today. This will help in the development of hand-held PCs and mobile phones as powerful as super-computers; the findings will also help in the advancement of medical science.

ARENA ALGORITHM FOR FACE RECOGNITION

By P.Pavani & K.Sowmya, 4/4 CSE

Face recognition is a part of a wide area of pattern recognition technology. That process includes mainly three-task acquisition, normalisation and recognition. The algorithm that is used in order to achieve that is called ARENA. It uses Principal Component Analysis (PCA) as pre-processing, dimensionality reduction and feature extraction, of the input images and neural network makes the algorithm perform better. This algorithm degrades by two factors: one is global image variations caused by pose and illuminations changes, and the other is local image variations caused by facial expressions, aging, wearing glasses and so on.

To reduce such adverse effects, two key technologies have been developed:

1) Perturbation Space Method: The face recognition using a 3-D facial model improves the recognition performance greatly even if a pose or illumination changes.

2) Adaptive Regional Blend Matching: The enrolled image and the query image are divided into N segments and a score S[i] is calculated for each pair of segments by the perturbation method.

ARENA Algorithm

It is a memory-based technique for view-based frontal face recognition that can outperform more sophisticated algorithms that use Principal Components Analysis and neural networks. The aim of the system is to find the exact match of an image from the given datasets, so the distance from the query image to each of the datasets stored images is computed and the best much is

returned. The key point of the algorithm for its good performance is the Lp*. Lp* is defined as ARENA algorithm is implemented in order to use its results as input to the neural network.

Therefore we have to train and test the neural network for which we take the distances of each image from its self and the rest of the images. For testing the neural network we use the distances of one selected image, from the test set, from the images in the training dataset.

In order to produce the input for training we use the program arntrn.m and for testing the program arntst.m. In both cases the user is asked to insert values for the three most important parameters, p, the size of the databases (test and train) and the resolution. After that the program is reading the images from the specific directories, train or test. The command Imread reads an image from a graphics file and returns a matrix with the gray value of each pixel.

Then command Imresize is used to reduce the image to the scale as entered by the user. Imresize reduces the resolution to rez by rez by using, 'nearest', nearest neighbour interpolation. Now the distance L between the images is calculated. First we calculate the difference between two images by substituting the two matrixes we generated from Imread, and we produce a matrix x by x, where x is the resolution value. We have to double the range of the matrix values from [0 256] to [-256 256].

Then we take the absolute value of the matrix elements and we take it to the power of p. after that we sum the columns of the matrix and we get a 1 by X vector of which the sum is the distance Lp. The outputs we get are of the form n by n for arntrn and 1 by n for arntst, where n is the number of images that we use.

Thus, Face recognition technology has come a long way in the last twenty years and also the next generation face recognition systems are going to have widespread application in smart environments, where computers and machines are more like helpful assistants. The ARENA algorithm being good at performance and accuracy is therefore one of the best algorithms for this purpose.

BRAIN COMPUTER INTER-FACE

By K.Sai Divya & D.Radhika Rao,

4/4 CSE

Imagine transmitting signals directly to someone's brain that would allow them to see, hear or feel specific sensory inputs. A Brain-computer interface, sometimes called a direct neural interface or a brain-machine interface, is a direct communication pathway between a brain and an external device. An HCI which is built on the guiding principle (GP): "think and make it happen without any physical effort" is called a brain-computer interface (BCI).

After experimentation three types of BCIs have been developed as following:

1. INVASIVE BCI: Invasive BCIs are implanted directly into the grey matter of the brain during neurosurgery. Using chips implanted against the brain that have hundreds of pins less than the width of a human hair protruding from them and penetrating the cerebral cortex.

2.PARTIALLY-INVASIVE BCI: Partially invasive BCI devices are implanted inside the skull but rest outside the brain rather than within the grey matter.

3. NON-INVASIVE BCI: The easiest and least invasive method is a set of electrodes, this device known as a electroencephalograph (EEG) attached to the scalp. The electrodes can read brain signals. Regardless of the location of the electrodes, the basic mechanism is the same.

The ideal BCI is a two-state machine namely, "neutral state" when nothing happens (the BCI provides a neutral answer), the "active state" when the BCI executes something. These state changes occur at a rate defined by the BCI period and are determined by a Boolean variable B1 (activation) which becomes true when the BCI detects an element of the active EEG set and false otherwise.
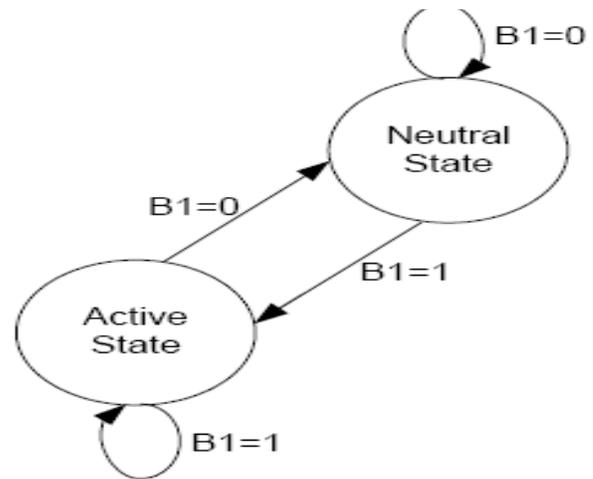

Figure: Ideal BCI

The ideal BCI behave properly when the recognition error rate is near zero.

In a real application, the false positive error (the system switches to the active state while the corresponding EEG trial belongs to the neutral EEG set) and the false negative error (the system switches to the neutral state while the corresponding EEG trial belongs to the active set) are not zero. Depending on the application, these errors are differently penalized.

We propose a less ideal BCI by introducing a transition state so that the BCI cannot switch from the neutral to the active state immediately. The BCI remains in the transition state as long as a second Boolean variable B2 (confirmation) is false. B2 is true if the L (latency parameter) previous EEG trials are equally recognized the current EEG trial. ideal BCI
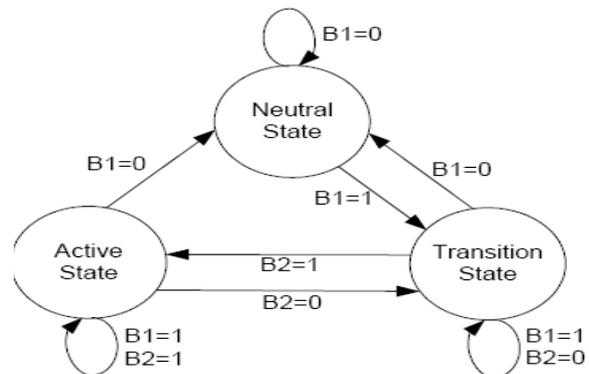

Figure: Less

**Complete peace equally reigns between two mental waves .
—Swami Vivekananda**

HOW BCI WORKS

The common structure of a Brain Computer Interface is the following

1) Signal Acquisition: the EEG signals are obtained from the brain through invasive or non-invasive methods (for example, electrodes). After, the signal is amplified and sampled.

2) Signal Pre-Processing: once the signals are acquired, it is necessary to clean them.

3) Signal Classification: once the signals are cleaned, they will be processed and classified to find out which kind of mental task the subject is performing.

4) Computer Interaction: once the signals are classified, they will be used by an appropriate algorithm for the development of a certain application.

In the case of a sensory input BCI, the function happens in reverse. A computer converts a signal, such as one from a video camera, into the voltages necessary to trigger neurons. The signals are sent to an implant in the proper area of the brain, and if everything works correctly, the neurons fire and the subject receive a visual image corresponding to what the camera sees.

Achievement of greater speed and accuracy depends on improvements in Signal acquisition, overcoming noise and interference in order to avoid averaging and maximize bit rate, jointly optimizing combined man-machine system and taking advantage of feedback, mapping the task to the brain state of the user (or vice versa), Understanding algorithms and models within the context of the neurobiology.

BCI has the following limitations,

1. The brain is incredibly complex. There are chemical processes involved as well, which EEGs can't pick up on.

2. The signal is weak and prone to interference. Something as simple as the blinking eyelids of the subject can generate much stronger signals.

3. The equipment is less than portable

his field though still in its infancy has made significant contributions to the field of HCI. It has

a wide range of applications like bioengineering applications that has helped several disabled people, human subject monitoring like sleep disorders and neurological disorders etc, neuroscience research, improved man –machine interaction, military applications, gaming etc.

CLOUD COMPUTING

By Harikrishna, 4/4 CSE

"An emerging computer paradigm where data and services reside in massively scalable data centres in the cloud and can be accessed from any connected devices over the internet"

Cloud Computing has become one of the buzz words of the industry. It is because of its ability to promise increase the velocity with which applications are deployed, increase innovation, and lower costs, reliability and fault-tolerance massive scalability and all while increasing business agility. The on-demand, self-service, pay-by-use nature of cloud computing is also an extension of established trends.

The core concept of cloud computing is, quite simply, that the vast computing resources that we need will reside somewhere out there in the cloud of computers and we'll connect to them and use them as and when needed.

What distinguishes cloud computing from previous models is, it's using information technology as a service over the network. We define it as services that are encapsulated, have an API, and are available over the network. This definition encompasses using both compute and storage resources as services.

In its simplest form, cloud computing consists of shared computing resources that are virtualized and accessed as a service, through an API. The cloud enables users in an organization to run applications by deploying them to the cloud, a virtual datacenter. Cloud service providers tend to offer services that can be grouped into three architectural layers: software as a service, platform as a service, and infrastructure as a service.

Superstition is our great enemy, but bigotry is worse. .— Swami Vivekananda
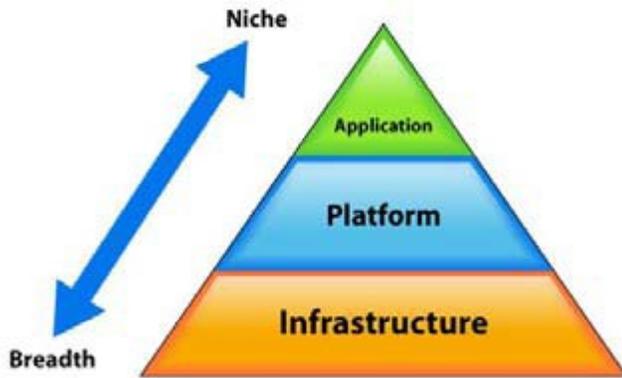
Software as a service (SaaS) features a complete application offered as a service on demand. Single instances of the software runs on the cloud and service multiple client organizations. Most widely known example of SaaS is salesforce.com and Google Docs, Gmail.

Platform-as-a-service (PaaS) has at least two perspectives, producer perspective and consumer perspective. One producing PaaS might produce a platform by integrating an OS, middleware, application software, and even a development environment that is then provided to a customer as a service. One using PaaS would see an encapsulated service that is presented to them through an API. Examples of PaaS include the Google Apps Engine.

Infrastructure as a service (IaaS) delivers basic storage and compute capabilities as standardized services over the network with different levels of virtualization technologies. The services are accessible anywhere that provides access to networking infrastructure. The key characteristic that distinguishes cloud computing from standard enterprise computing is that the infrastructure itself is programmable.

A public cloud computing environment is open for use by the general public, which could include individuals, corporations or other types of organizations. A private cloud computing environment exists within the boundaries of an organization, typically for its exclusive usage. But, security and compliance are serious issues with public cloud computing and are among the factors driving the adoption of private clouds.

Hybrid clouds combine both public and private cloud models.

Industry analysts are early proponents of cloud computing and its potential. Several trends are emerging that will enable enterprises to make good use of cloud computing, such as shared,

virtualized and automated IT architectures. VMware, Sun Microsystems, Rack space US, IBM, Amazon, Google, BMC, Microsoft, and Yahoo are some of the major cloud computing service providers

To clearly appreciate the benefits of cloud computing for businesses, it is important to distinguish between the promise of the cloud and necessity of a cloud-enabled application platform. Ultimately, the greatest advantages of cloud computing can only are realized if an organization's applications are able to take advantage of the cloud's inherent flexibility.

ASPECT ORIENTED PROGRAMMING

By K.Raviteja, 4/4CSE

Aspect-oriented programming (AOP) is an approach to programming that allows global properties of a program to determine how it is compiled into an executable program. AOP can be used with object-oriented programming.

Terminology:

A join point is a well-defined point in the program flow.

A point cut is a group of join points.

Advice is code that is executed at a point cut.

Introduction modifies the members of a class and the relationships between classes.

An Aspect is a module for handling crosscutting concerns.

Aspects are defined in terms of point cuts, advice, and introduction.

Aspects are reusable and inheritable.

Each of these terms will be discussed in greater detail.

Currently, the dominant programming paradigm is object-oriented programming that:

Has been presented as a technology that can fundamentally aid software engineering. is reflected in the entire spectrum of current software development methodologies and tools.

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Do not look back upon what has been done. Go ahead! .— Swami Vivekananda

Object orientation is a clever idea, but has certain limitations

A new programming technique called aspect-oriented programming (AOP):

Makes it possible to clearly express those programs that OOP fail to support.

Enables the modularization of crosscutting concerns by supporting a new unit of software modularity –aspects – that provide encap-

sulation for crosscutting concerns.
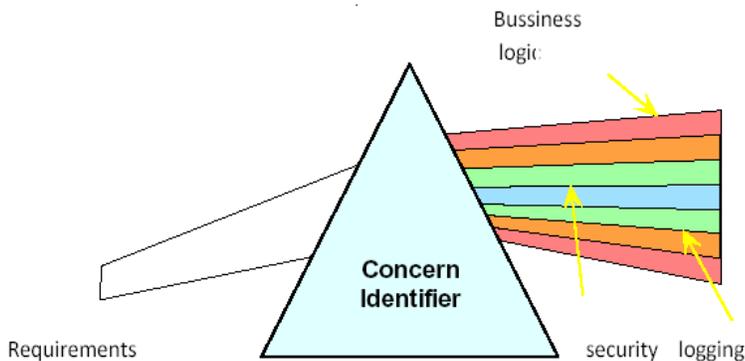
The role of Aspects in software design:

The central problem of Aspect technologies, whatever the approach we consider, is not just about cross cutting or separation of concerns, but it involves deeper research about how to understand a number of software parts as separated artifacts and then integrate some of then into a coherent system.

Advantages: Decomposes the system into primary and crosscutting concerns which map more directly Into requirements, Increases comprehension of the system by reducing tangling and scattering, Join points, point cuts, and advice are used to instrument primary concerns with crosscutting concerns

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Despondency is not religion, whatever else it may be.—
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