TECHGEEKS

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SV COLLEGE OF ENGINERRING

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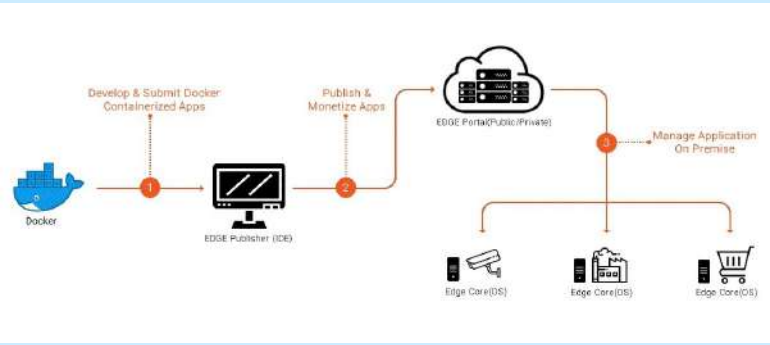
INSIDE THIS ISSUE:

Pixeom

Pixeom a prototype device with the aim of offering alternative cloud services (Personal Cloud Device). The Pixeom Personal Exchange Network allows users to easily create, access, and share their Content from anywhere while connecting with a global community, through the use of a Pixeom X device.



Pixeom is not only the first to put multiple cloud services in a box, but also the first to connect them together globally, forming a growing network of users and content, eliminating the need to sell personal data or charge subscription fees in order to stay online via a datacenter. With all the news about Snapchat, Target, Dropbox, and the NSA floating around, people are starting to see the real consequences of trusting their data with someone else. Datacenters have become treasure troves of personal information that are regularly targeted by hackers, or turned over on a whim to anyone with a badge that who asks for it.

A prototype device with the aim of offering alternative cloud services that don't require you to hand over the keys to your private data in exchange for a convenient digital service. If the Pixeom name sounds familiar, that may be because you remember it as a Raspberry Pi-based personal cloud platform. Indeed, that's the service the company first launched back in 2014. It quickly pivoted to an enterprise model, though. The original Pixeom device allowed users to set up their own personal cloud storage and other applications at home. While there is surely a market for these devices, especially among privacy-conscious tech enthusiasts, it's not massive, especially as users became more comfortable with storing their data in the cloud. One of the major drivers was that it was actually very difficult to get VC funding in an industry where the market trends were all skewing towards the cloud.

Pixeom also based its technology on OpenStack, the massive open-source project that helps enterprises manage their own data centers, which isn't exactly known as a service that can easily be run on a single machine, let alone a low-powered one. Today, Pixeom uses containers to ship and manage its software on the edge. On the software side, Pixeom is relatively cloud agnostic. One nifty feature of the platform is that it is API-compatible with Google Cloud Platform, AWS and Azure and offers an extensive subset of those platforms' core storage and compute services, including a set of machine learning tools.

Submitted by
G.PRANAVI
18KH1A0528
CSE

Implementation of CP

This system can be used to store the details of the inventory, update the inventory based on the sale details, produce receipts for sales, generate sales and inventory reports periodically etc. This is one integrated system that contains both the user component (used by salespersons, sales managers inventory managers etc) and the admin component (used by the administrators for performing admin level functions such as adding new items to the inventory, changing the price of an item etc). This system runs on multiple terminals, offers a GUI interface to its users and connects to a common database.

Problem Statement:-

The existing working system of the stock management is the manual working system where all the work from managing the goods, all the information about them, the transactions and the maintenance of the organization are done manually. So following are some disadvantages of the old system:

1. Time consuming

2. Less accurate

3. Less efficient

4. Lot of paper work

5. Slow data processing

Objective of the System

The objective of the stock management system is to provide better optimization and cost reducing for the users of this system. The main objective of inventory management is to maintain inventory at appropriate level to avoid excessive or shortage of inventory because both the cases are undesirable for business. Thus, management is faced with the following conflicting objectives:

1. To keep inventory at sufficiently high level to perform production and sales activities smoothly.

2. To minimize investment in inventory at minimum level to maximize profitability.

Other objectives of inventory management are explained as under:-

1. To ensure that the supply of raw material & finished goods will remain continuous so that production process is not halted and demands of customers are duly met.

2. To minimize carrying cost of inventory.

3. To keep investment in inventory at optimum level.

4. To reduce the losses of theft, obsolescence & wastage etc.

5. To make arrangement for sale of slow moving items.

6. To minimize inventory ordering costs.

PROPOSED SYSTEM:

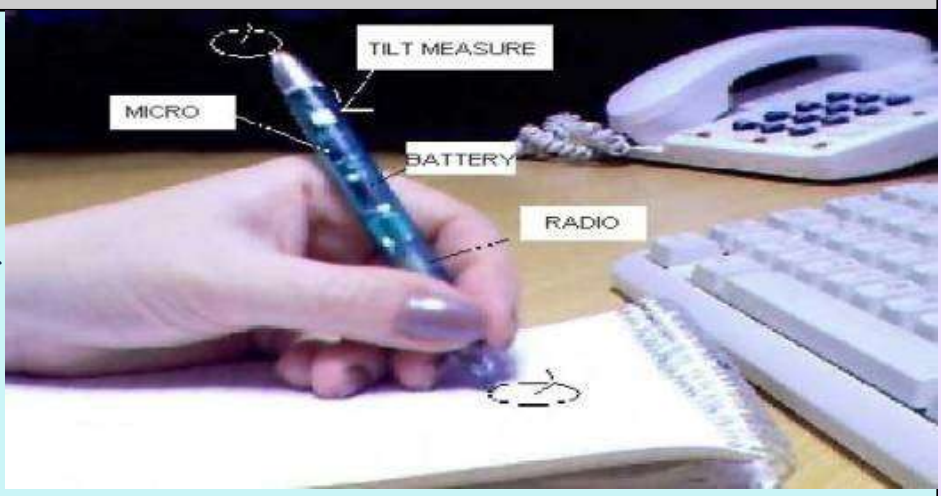
Keeping and the accounts maintenance easier.

generation of emails as soon as the inventory manager or sales person or sales manager is required to send a mail to the administrator , intimating if any problem occurred due to their work.

Submitted by
B.SHANMUKH SUBRAMANI
19KH1A0512
CSE

Smart Quill

SmartQuill is slightly larger than an ordinary fountain pen. Users can enter information into these applications by pushing a button on the pen and writing down what they would like to enter .The SmartQuill does not need a screen to work. The really clever bit of the technology is its ability to read handwriting not only on paper but on any flat surface – horizontal or vertical. There is also a small three -line screen to read the information stored in the pen; users can scroll down the screen by tilting the pen slightly. The user trains the pen to recognize a particular handwriting style - no matter how messy it is, as long as it is consistent, the pen can recognize it. The handwritten notes are stored on hard disk of the pen. The pen is then plugged into an electronic "inkwell" ,text data is transmitted to a desktop computer, printer, or modem or to a mobile telephone to send files electronically. Up to 10 pages of notes can be stored locally on the pen . A tiny light at the tip allows writing in the dark.When the pen is kept idle for some time ,power gets automatically off.



FEATURES

- Display technology used in SmartQuill
- Handwriting recognition and signature verification
- Display scrolls using tilt sensors
- Communication with other devices
- Memory and power

DISPLAY TECHNOLOGY

Technology used in SmartQuill for display is Kopin Corp's Cyber Display technology. Cyber Display is a ¼ inch diagonal LCD that uses circuitry built on a silicon wafer, then removed and mounted to glass. The displays are integrated to miniature monitors using its own backlighting, optics, ICS and packaging.

HANDWRITING RECOGNITION AND SIGNATURE VERIFICATION

Accelerometers measure hand movement in 2 or 3 planes

- On board DSP converts to ASCII characters for pen applications
- Write on paper, flat surface, vertical wall or in air
- Single character recognition on pen
- Record cursive letters and download to PC for decoding
- Password by signature recognition

There are 2 techniques used for this purpose :-

1. Accelerometer technology
2. Handwriting recognition software

Submitted by
K AASRITHA
19KH1A0553
CSE

Rover Mission Using JAVA Technology

Man who is a good explorer by nature is trying to invade his next planet, the Mars, with the help of JAVA enabled rovers. Both JAVA and rovers are wonders created by man.

Java technology today is good for general purpose computing and GUIs, but it was not ready for use with control systems like the software on the Rover. The Golden Gate project seeks to use RTSJ (Real Time Specification for JAVA) to develop a system of control software that can be used on a Rover.

The places where NASA scientists have used Java for this mission is all on the groundside right now. They have created this collaborative command and control system called Maestro, which does this combination of data visualization, collaboration, command and control.

Java RTS enables developers of real-time applications to take full advantage of the Java language ecosystem while maintaining the predictability of current real-time development platforms. Java RTS also brings the world of real-time programming to developers currently using Java technology to create applications that reach into the physical world.

Golden Gate project is being worked on which will create code that would replace the proprietary APIs and real-time operating system code (Wind River) in future missions. Java 3D and Java Advanced Imaging technology are also key to the software JPL (Jet Propulsion Laboratory) is using to render and interpret real time images captured by the Rover.

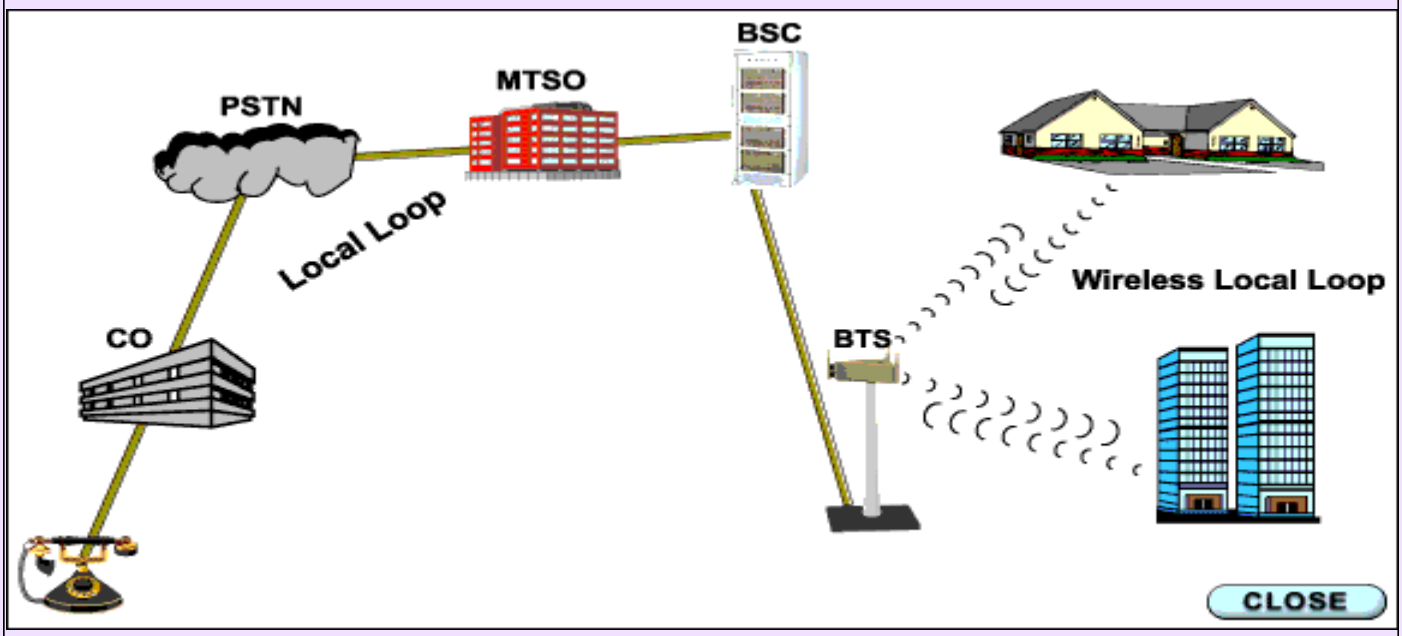
JAVA, due to its unique features like, platform independency, rich set of API libraries such as 3-D modeling APIs, Advanced Imaging APIs and its Mission Data System to control physical systems fuelled the Mars exploring rover mission.

NASA's twin Mars rovers, Spirit and Opportunity, are exploring opposite sides of the Red Planet to search for evidence of past or present water and to map its geological and climate history. On Jan. 3, 2004, the Spirit rover landed in Gusev Crater on Mars, kicking off a mission planned to last 90-days. Two years later, Spirit and fellow robotic explorer Opportunity, which landed Jan. 24, 2004, are still going strong. Each Martian morning, the rovers receive a full day of instructions. They operate autonomously all day, and transmit the resulting images and data back to earth at the end of the day. The operations staff lives on "Mars time", each day is approximately 24 hours, 40 minutes. Planning is done during the Martian night, and there are strict deadlines for the uplink of new rover instructions.

Submitted by
K TIRUPATHI REDDY
19KH1A0544
CSE

Wireless Local Loop

Wireless access first started to become a possibility in the 1950s and 1960s as simple radio technology reduced in price. For some remote communities in isolated parts of the country, the most effective manner of providing communication was to provide a radio, kept in a central part of the community. By the end of the 1970s, communities linked by radio often had dedicated radio links to each house, the links connected into the switch such that they were used in the same manner as normal twisted-pair links. The widespread deployment of the cellular base station into switching sites helped with cost reduction. Similar access using point -to-point microwave links still continues to be widely used today.



Advantages:

In comparison to the alternative of deploying copper lines, WLL technology offers a number of key advantages:

Faster deployment:

WLL systems can be deployed in weeks or months as compared to the months or years need for the deployment of aboveground or underground copper wire. Even with higher costs per subscriber that may be associated with the WLL terminal and base station equipment, the faster rate of deployment can permit a higher return on investment.

Lower deployment costs:

The deployment of WLL technology involves considerably less heavy construction than does the laying of copper lines. The lower construction costs may be more than offset by the additional equipment costs associated with WLL technology, but, in urban areas especially, t he process of routing cable to individual households is also much more time consuming than deploying wireless base stations, which are shared by many subscribers. Wireline networks also take more time to deploy than WLL networks because they require government right of way authorization to dig trenches through public streets.

Lower network maintenance, management, and operating costs:

Especially in areas where the deployment of copper lines has the potential to be haphazardly performed, wireless equipment can be less failure prone than copper wire and can be less vulnerable to sabotage, theft, or damage due to the elements or other parties. In some WLL systems, network management, including fault-finding and system reconfiguration, can be conducted from a centralized location to fully administer the WLL network between the telephone network interface and the subscriber terminal. The overall result is reduced lifetime network costs.

Lower network extension costs:

Wireless local loop technology intrinsically offers flexibility to meet uncertain levels of penetration and subscriber growth rates. Once the WLL infrastructure is in place, each incremental subscriber can be installed at very little cost.
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Submitted by
S.RUHINA SAMREEN
18KH1A0590
CSE

Deep Neural Network

Deep learning: One of the machine learning technique that learns features directly from data.

Why deep learning: When the amounth of data is increased, machine learning techniques are insufficient in terms of performance and deep learning gives better performance like accuracy.

What is amounth of big: It is hard to answer but intuitively 1 million sample is enough to say "big amounth of data"

Usage fields of deep learning: Speech recognition, image classification, natural language procession (nlp) or recommendation systems

What is difference of deep learning from machine learning:

Machine learning covers deep learning.

Features are given machine learning manually.

On the other hand, deep learning learns features directly from data.

Deep Learning is a part of the broader field machine learning and is based on data representation learning. It is based on the interpretation of artificial neural network. Deep Learning algorithm uses many layers of processing. Each layer uses the output of previous layer as an input to itself. The algorithm used can be supervised algorithm or unsupervised algorithm. Deep Learning is mainly developed to handle complex mappings of input and output. It is another hot topic for M.Tech thesis and project along with machine learning.

Deep Neural Network

Deep Neural Network is a type of Artificial Neural Network with multiple layers which are hidden between the input layer and the output layer. This concept is known as feature hierarchy and it tends to increase the complexity and abstraction of data. This gives network the ability to handle very large, high-dimensional data sets having millions of parameters.

The procedure of deep neural networks is as follows:

Consider some examples from a sample dataset.

Calculate error for this network.

Improve weight of the network to reduce the error.

Repeat the procedure.

Applications of Deep Learning

Here are some of the applications of Deep Learning:

1. Automatic Speech Recognition
2. Image Recognition
3. Natural Language Processing
4. Toxicology
5. Customer Relationship Management
6. Bioinformatics
7. Mobile Advertising

Advantages of Deep Learning

Deep Learning helps in solving certain complex problems with high speed which were earlier left unsolved. Deep Learning is very useful in real world applications. Following are some of the main advantages of deep learning:

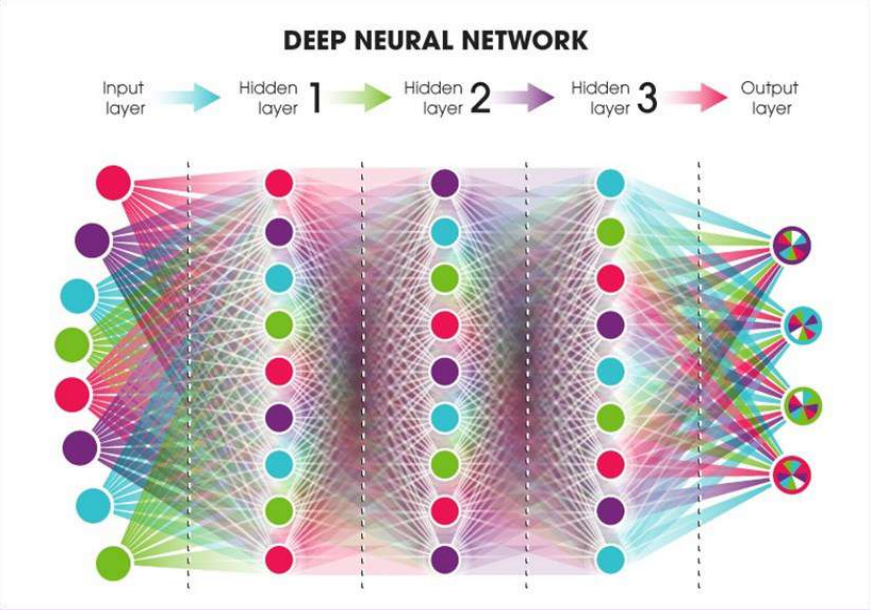
Eliminates unnecessary costs – Deep Learning helps to eliminate unnecessary costs by detecting defects and errors in the system.

Identifies defects which otherwise are difficult to detect – Deep Learning helps in identifying defects which left untraceable in the system.

Can inspect irregular shapes and patterns – Deep Learning can inspect irregular shapes and patterns which is difficult for machine learning to detect.

From this introduction, you must have known that why this topic is called as hot for your M.Tech thesis and projects. This was just the basic introduction to machine learning and deep learning. There is more to explore in these fields.

It is a part of the family of machine learning and deals with the functioning of the artificial neural network. Neural Networks are used to study the functioning of the human brain. It is one of the growing and exciting field. Deep learning has made it possible for the practical implementation of various machine learning applications.



Submitted by
M.BHAVANA
18KH1A0562
CSE

INTERNET OF THINGS (IOT)

It's believed by many that in the future, when human population has swelled to unprecedented levels, water will be so scarce that fighting over it will be the cause of most wars. Wouldn't it be better if we just wasted less? Two Californian firms that have come up with well – a smart home initiative that uses sensors to monitor water usage.IOT water Conversation system hopes to reduce waste.

The firms realised early on that – unlike with power use – very few people have any idea how much water they use. The core of the design is a network of sensors attached to each water outlet, like kitchen and bathroom sinks, toilet, washing machine and the biggest user of all – the shower. Each component is self-powered and doesn't require professional installation, and when each sensor is connected via WiFi, the information is then sent to the customer's smart phone so they have an accurate tally of all their water usage. Users start by entering household information into the app, like number of residents, location of property, and the app works out how much the household should be using per day. This is then illustrated using a digital tank of water, which depletes as water is used revealing a desert behind the water. The hope is that water usage will no longer feel so and users will start to conserve more. The app also creates daily, weekly, monthly and yearly usage charts. The system should help each household save around 12 percent of water, which might not change the world overnight but would be a step in the right direction.

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Submitted by
P PRATHYUSHA
19KH1A0575
CSE

LoRa & LoRaWAN Technology

LoRa

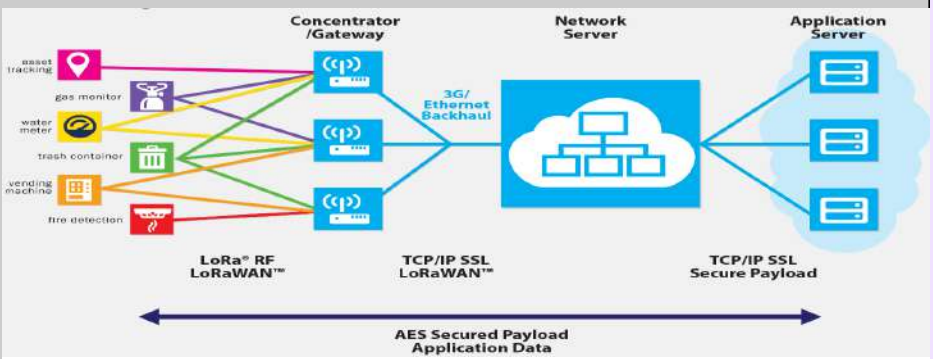
LoRa (short for long range) is a spread spectrum modulation technique derived from chirp spread spectrum (CSS) technology. Semtech's LoRa devices and wireless radio frequency technology (LoRa Technology) is a long range, low power wireless platform that has become the de facto technology for Internet of Things (IoT) networks worldwide. LoRa Technology enables smart IoT applications that solve some of the biggest challenges facing our planet: energy management, natural resource reduction, pollution control, infrastructure efficiency, disaster prevention, and more.

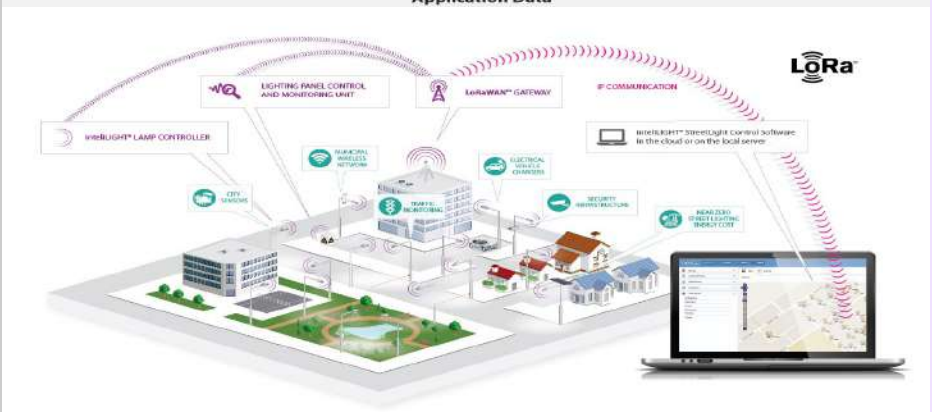
LoRaWAN

The LoRaWAN open specification is a low power, wide area networking (LPWAN) protocol based on LoRa Technology. Designed to wirelessly connect battery operated things to the Internet in regional, national or global networks, the LoRaWAN protocol leverages the unlicensed radio spectrum in the Industrial, Scientific and Medical (ISM) band. The specification defines the device-to-infrastructure of LoRa physical layer parameters and the LoRaWAN protocol, and provides seamless interoperability between devices. While Semtech provides the radio chips featuring LoRa Technology, the LoRa Alliance, a non-profit association and the fastest growing technology alliance, drives the standardization and global harmonization of the LoRaWAN protocol

Key Features of LoRa Technology:

• **Long Range:** A single base station using LoRa Technology enables deep penetration capability for dense urban environments and indoor coverage while also providing the ability to connect to sensors more than 15-30 miles away in rural areas.





• **Low Power:** The LoRaWAN protocol was developed specifically for low-power and enables unprecedented battery lifetime of up to 20 years depending on the application.

• **Geolocation:** This feature enables tracking applications without GPS or additional power consumption.

• **Low Cost:** LoRa Technology reduces up front infrastructure investments and operating costs, as well as end-node sensor costs.

• **Open Standard:** LoRaWAN, a Low-Power Wide Area Networks (LPWAN) specification, ensures interoperability among applications, IoT solution providers and telecom operators to speed adoption.

Submitted by
S MAHAMMED HANEEF
19KH1A0589
CSE