CVR COLLEGE OF ENGINEERING

(An Autonomous institution)

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DEPARTMENT OF INFORMATION TECHNOLOGY

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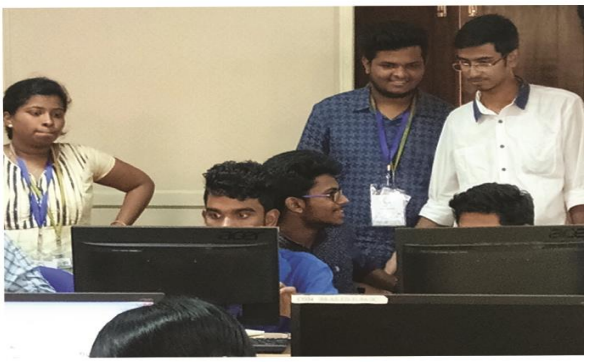

Workshop on Hands on IoT by P.Kishaan-HBOT Hyd

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COVER PAGE DESIGNED BY BHARATH CHINTHAKULA
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ARTIFICIAL INTELLIGENCE

Artificial intelligence (AI) is an area of computer science that emphasizes the creation of intelligent machines that work and reacts like humans. Research associated with artificial intelligence is highly technical and specialized. The core problems of artificial intelligence include programming computers for certain traits such as:

- Knowledge
- Reasoning
- Problem solving
- Perception
- Learning
- Planning
- Ability to manipulate and move objects

The original 7 aspects of AI:

- Simulating higher functions of the human brain.
- Programming a computer to use a general language.
- Arranging hypothetical neurons in a manner so that they can form concepts.
- A way to determine and measure complexity.
- Self-improvement.
- Abstraction
- Randomness and creativity

Many problems in AI can be solved in theory by intelligently searching through many possible solutions. Reasoning can be reduced to performing a search. For example, logical proof can be viewed as searching for a path that leads from premises to conclusions, where each step is the application of an inference rule. Planning algorithms search through trees of goals and sub goals, attempting to find a path to a target goal, a process called means-ends analysis. Robotics algorithms for moving limbs and grasping objects use local searches in configuration space. Many learning algorithms use search algorithms based on optimization.

Evolutionary computation uses a form of optimization search. For example, they may begin with a population of organisms (the guesses) and then allow them to mutate and recombine, selecting only the fittest to survive each generation. Forms of evolutionary computation include swarm intelligence algorithms and evolutionary algorithms (such as genetic algorithms, gene expression programming, and genetic programming).

Approaches used in Artificial Intelligence are:

- Cybernetics and brain solution
- Symbolic
- Sub- symbolic
- Statistical
- Integrating the approaches

AI is at the center of a new enterprise to build computational models of intelligence. The main assumption is that intelligence (human) can be represented in terms of symbol structures and symbolic operations which can be programmed in a digital computer. There is much debate as to whether such an appropriately programmed computer would be a mind, or would merely simulate one, but AI researchers need not wait for the conclusion to that debate, or for the hypothetical computer that could model all of human intelligence. Aspects of intelligent behavior, such as solving problems, making inferences, learning, and understanding language, have already been coded as computer programs, and within very limited domains, such as identifying diseases of soybean plants, AI programs can outperform human experts. Now the great challenge of AI is to find ways of representing the commonsense knowledge and experience that enable people to carry out everyday activities such as holding a wide-ranging conversation, or finding their way along a busy street. Conventional digital computers may be capable of running such programs, or we may need to develop new machines that can support the complexity of human thought. Artificial intelligence systems have been useful tools in solving complex problems that are seen to be beyond the level of human thinking. Although the characteristics of these systems are drawn from human intelligence, they exhibit more intelligence than the human beings themselves. This is just the beginning in computer revolution and more improvements are likely to be seen in the near future.

K.Shashanka

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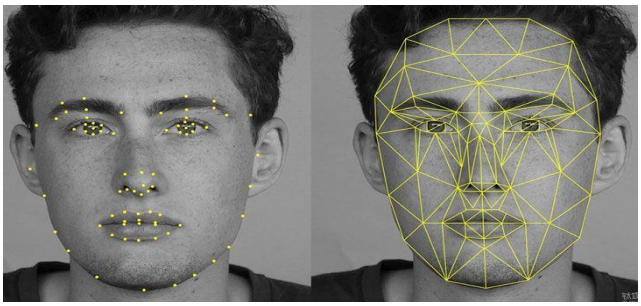
FACE REGONISATION SYSTEM



Introduction

Face Recognition is the ability of an application or device to detect and recognize a Human Face, which can be used for numerous applications. Basically, face recognition technology users to gain access by simply scanning the face. This can be used under various applications such as Facebook's automated facial tags or as a security barrier -- something that Apple did with their iPhone X.

Face Recognition Process

Just like fingerprints, each face is unique. And although two people might look alike, there are still vast differences between the two faces that make them different, with factors (features) like skin-tone, texture, curves, contours and numerous other features.

Humans have evolved to recognize other human beings through their facial appearance, and in fact, we have a specific part in our brain called 'Fusiform Face Area' responsible for all this. This area calculates the generic pattern of faces and differentiates one from another, just like the placement of eye, the eye color, the nose shape and placement and so on.

In the early stage of facial recognition, researchers used the same behavior and made the

software denote the difference in faces through distinct facial features, which was called as a person's 'faceprint'. However, the issues related to accurate recognition perfectly such as , the faces were needed to be in the same lighting and appearance as they were captured in, face is dynamic and ever-changing, with factors like ageing, pose, illumination and emotions (which the researchers call as the A-PIE problem) getting an accurate detection was impossible.

The newer DeepFace facial recognition technology helps to solve this problem with a groundbreaking solution. The artificial-intelligence based Deep Learning algorithm captures a single 2D image and converts it into 3D, and scans the face by simulating the lighting, ageing and pose and emotions, eliminating the A-PIE problem.

Moreover, the Deep learning algorithm also remembers each time it recognizes or fails to recognize a problem, and it prevents itself from repeating its mistakes, getting better after every attempt. Facebook has been using this AI learning algorithm with its automatic facial tagging feature, and has come close to a surprising 97.35 percent accuracy!

Applications : Apple iPhone X and FaceID

Apple's facial recognition uses a similar basis for its technology, but its overall application is quite unique. The camera along with various sensors of the iPhone X are used to accurately recognize a face, which it calls as the 'True Depth Camera System'. The various sensor are proximity Sensor, Ambient Light Sensor, speaker and the microphone. The sensors behind the FaceID include the Infrared Camera, Flood illuminator, and the Dot projector and the 7-megapixel selfie shooter.

The Steps for Face Recognition are

1. The first thing that gets active is the Flood illuminator. This lights up your face for other sensors to scan.
2. The Infrared camera flashes IR lights on your face detecting its placement, depth and position. Since IR cameras also work in the dark, it isn't affected by low-light conditions.
3. The Dot projector flashes a whopping 30,000 invisible dots on your face which

scans your facial features and creates a unique 3D map of the face.

4. Compares it to the one stored on the iPhone X during the initial setup, and if it matches, you get access to your iPhone X.

   Even if due to some problem you're unable to get through FaceID, you have the regular pin code as a failsafe. But the sensors aren't the only thing that helps you to unlock the device accurately. iPhone X's new A11 Bionic chip also has built-in deep learning algorithm, which is capable of conducting over 600 Billion calculations per second. This adapts and learns features of your face. The AI built in will take care of issues like beard or wearing glasses or even a hat for face recognition.

Android vs Face ID

While Apple's Face ID might more popular, it was Android that had brought in facial recognition on its 4.1.1 Jelly Bean operating system around four years back.

Although it just used the front camera and wasn't really secure or optimized, it was one of the first instances of facial recognition on a smartphone, and the device cost merely around Rs.10,000.

Samsung did try to take facial recognition to the. next level with its Iris recognition tech on the Galaxy S8 and Note 8, but even this has been proved to be easily duped using a mere photograph. However, for now, iPhone X remains technology lead in smartphone based facial recognition.

A Rohith Kumar-15B81A1270(III IT-B)

R Sai Satya Sruthi-15B81A1276(III IT-B)

JIO TECHNOLOGY

Introduction

The JIO as it is popularly known was introduced by Reliance Inforcom commercially launched in September 2016.JIO is an LTE mobile network operator in India, that provides wireless 4G LTE service network and not depending on 2G or 3G services. It is the only VOLTE-only operator in the country which lacks legacy network support of 2G and 3G with coverage across all 22 telecom circles in India.

Working Principle:

VoLTE stands for Voice over Long Term Evaluation and is a new protocol for transmitting voice data over the LTE network. While 2G and 3G networks are circuit-switch based, 4G or LTE networks utilize Packet Switching. If a person makes a call through 2G or a 3G network, a certain amount of network bandwidth is assigned to that call as a pipeline, and that does not terminate till the call ends. Here in the VOLTE network, the voice calls are broken up into packets of information, sent over the full data pipeline and then be constructed at the receivers end.

LTE vs VoLTE

It is essential to understand that LTE (also referred to as 4G-LTE) is a wholly IP-based communications protocol. Existing carriers have all 2G,3G and 4G setups on their network, allowing data to go through the 4G band while pushing calls through the 2G/3G band. While LTE is the next generation data transmission protocol with higher two-way bandwidth, it is capable of only transmitting data. VoLTE is the way in which a voice call can be converted to digital packets and transmitted over the LTE network. In effect, **VoLTE** is a subset of the **LTE** technology.

On **VoLTE** networks, data is exactly what calls are. When you make a call, your voice is broken up into tiny packets of data. These packets then travel over a packet-switched network from sender to receiver.In a packet switched network, those tiny data packets your voice was broken into, take different paths. For example, while one packet may travel from Delhi to Mumbai and then to the destination, the other may go to Kolkata. All these packets, though, end up at the same destination where they're decoded and your voice is transmitted to the listener.

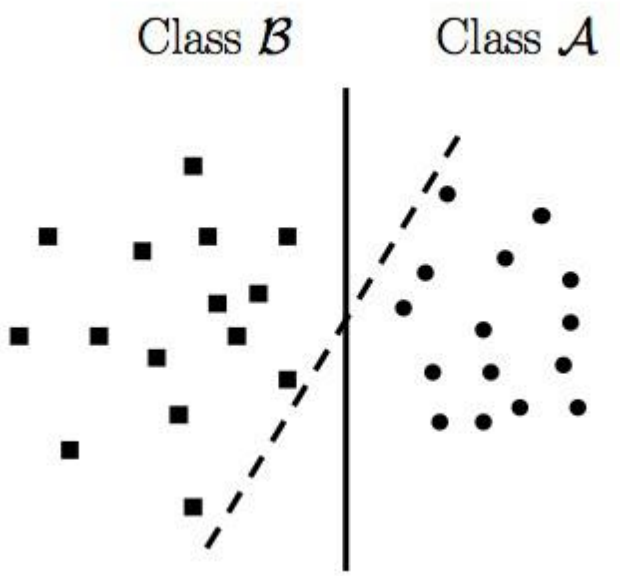
The advantage with jio is their optical fibre network. An opticalfibre is a wire that converts your data signal into light and transfers them at the speed of light. It requires huge money. Reliance Infocom has invested 150,000 crores(22 billion) into this fibre optic network. This is more than two times the combined investment of Airtel, Vodafone and Idea in the 4G segment.

MVN Pooja -15B81A12B1

III Year IT-B

SUPPORT VECTOR MACHINES

"Support Vector Machine (SVM)" is a supervised machine learning algorithm which can be used for classification or regression problems. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (n is number of features you use). The value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyperplane that differentiates the two classes very well. The dotted line in the figure is the hyperplane. Support Vectors are simply the coordinates of individual observation.



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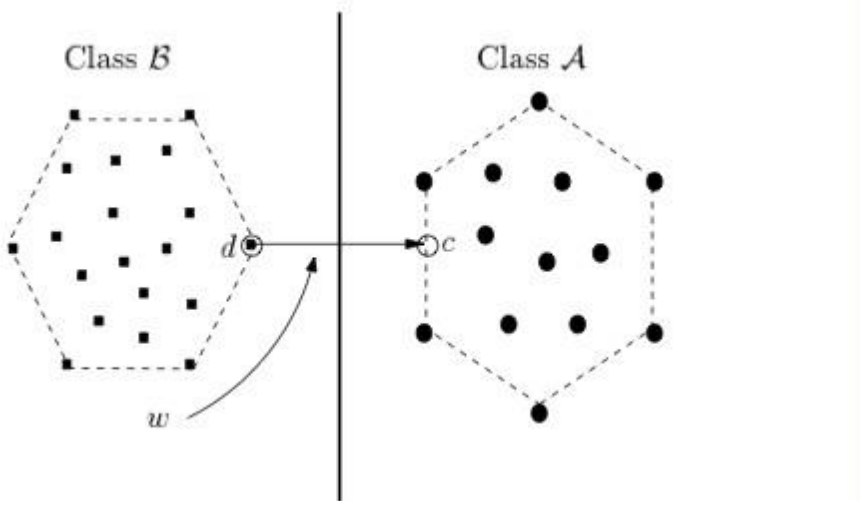
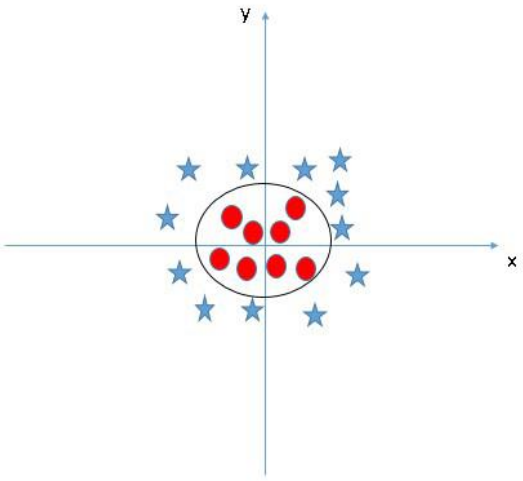
FINDING THE RIGHT HYPERPLANE

The distance between the hyperplane and the nearest data point from either set is known as the margin. The goal is to choose a hyperplane with the greatest possible margin between the hyperplane and any point within the training set, giving a greater chance of new data being classified correctly as shown in the diagram.But in most of the cases, the data is not as easy to classify as the examples given.



In SVM, it is easy to have a linear hyperplane between these two classes. But, another burning question which arises is, should we need to add this feature manually to have a hyper-plane. No, SVM has a technique called the kernel trick. These are functions which takes low dimensional input space and transform it to a higher dimensional space i.e. it converts not separable problem to separable problem, these functions are called kernels. It is mostly useful in non-linear separation problem. Hyper -plane is not always linear, One such example for a hyperplane which looks like a circle.



The implementation of the SVM is not as hard as it looks as there are libraries which have already implemented. To implement most of the machine learning algorithms the library used in python is sklearn. The most basic implementation of SVM in python is as shown below.

```
#Import Library
from sklearn import svm
#Assumed you have, X (predictor) and Y (target) for training data set and x_test(predictor) of test_d
ataset
# Create SVM classification object
model = svm.svc(kernel='linear', c=1, gamma=1)
# there is various option associated with it, like changing kernel, gamma and C value. Will discuss m
ore # about it in next section.Train the model using the training sets and check score
model.fit(X, y)
model.score(X, y)
#Predict Output
predicted= model.predict(x_test)
```

Advantages of SVM

• Finds the optimal separation hyper-plane.

• They can learn very elaborate concepts.

• Deals with high dimensional data.

• Usually works very well.

Disadvantages of SVM

• Requires both positive and negative examples.

• Have to select a good kernel function.

• Requires a lot of memory and CPU time.

• Less effective with noisier datasets.

Applications

• It is very useful for classifying text and hypertexts as their application can significantly reduce the need for labeled training instances both in standard inductive and transductive settings.

• Hand-written characters can be recognized.

• Image classification.

• Biological sciences.

• They have been used to classify proteins with up to 90% compounds identified core.

A V Krishna Mohan-16B81A1234

II Year IT-A

TRANSPARENT SMARTPHONE

These days many of us own a smart phone which is thin, rectangular and featured with a big screen. But how would it feel if they are transparent and provide more features than those which are used today???

Amazing….right???

Yes, a fully transparent Smartphones are developed by Taiwanese company “Polytron Technologies”, giving us hope for fancy smartphones far different from common models seen these days.

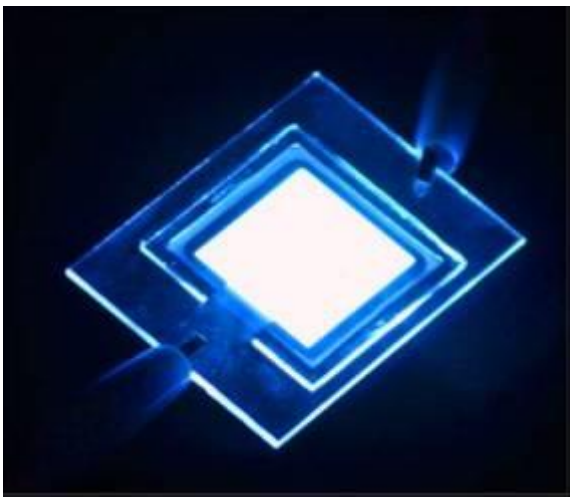
INTRODUCTION

Transparent smart phones allow us to see through the phone and what’s being displayed on the glass screen. This technology has been around in the past two to three decades. But only since 2012 it’s being incorporated by the corporate companies like Samsung, Planar systems etc. These smart phones will enhance our views of the world with digital images overlaid on the real ones. Transparent smart phones are being designed using the OLED and LCD technologies.

OLED Technology

Organic light-emitting diode (OLED) has an emissive electroluminescent layer made of organic compound which emits light in response to electric current. This layer is placed in between two electrodes made of organic semiconductors, atleast one of the electrode being transparent. This has an emissive and conductive layer where the electric impulse travels from conductive layer to the emissive layer.This is the most commonly employed technology in transparent devices and digital displays.

Prototype of OLED’s



Uses

1. **Augmented Reality**: This technology has the best use in case of augmented reality. Transparent devices have much more resolution and displays much more realistic augmented video than which takes the video and adds the supplements and then displays back on to our screens.

2. **In text translation:** Generally when the user points the camera to a sign board in one language and it automatically gets translated into the language of the user choice.But in the case of transparent devices there is no need to use the camera.

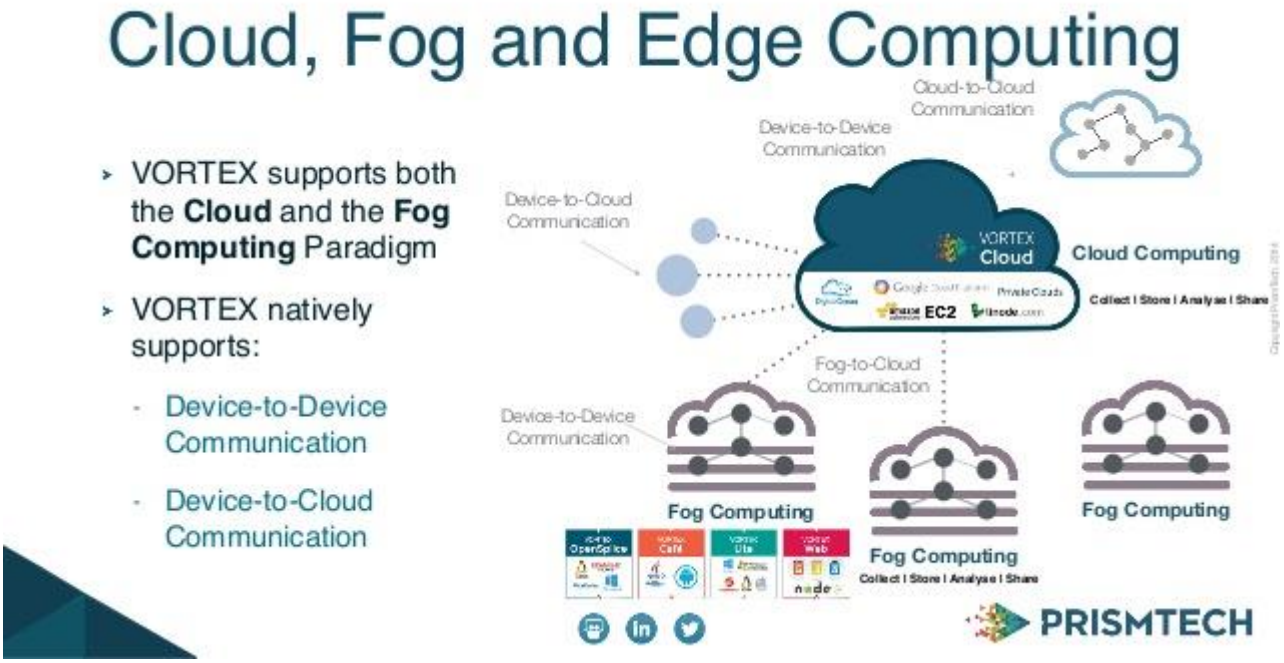
3. **In street view:** The technology is similar to that of Google street view.

4. **In shopping windows:** Here the user can see the item and the corresponding details of it at the same time.

Krishna Mohan

II Year IT-A

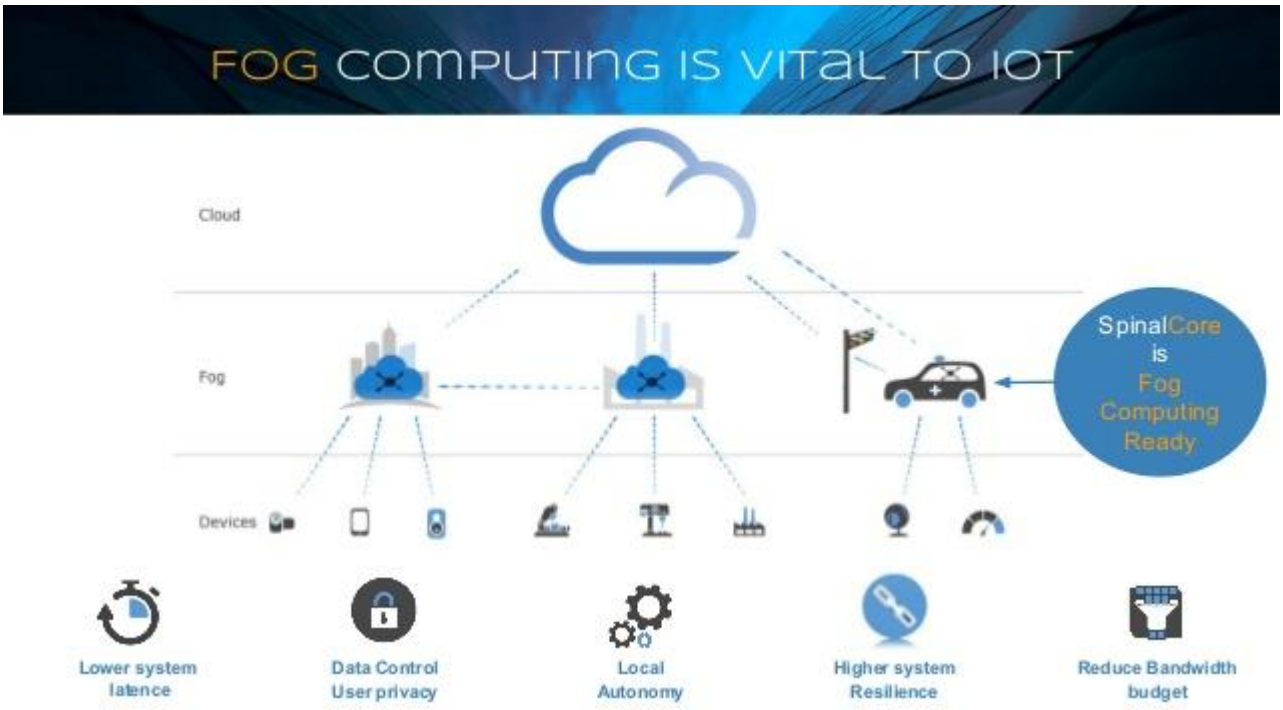
The term Fog Computing is also referred as “edge computing”, Which is essentially means that rather than hosting and working from a centralized cloud, fog systems operate on network ends.



That concentration means that data can be processed locally in smart devices rather than being sent to the cloud for processing .It's one approach to dealing with the Internet Of Things(IoT).

Characteristics of FOG

1. Low latency and location awareness
2. Wide-spread geographical distribution
3. Mobility
4. Very large number of nodes
5. Strong presence of streaming
6. Real time applications
7. Heterogeneity



The above characteristics make the Fog the appropriate platform for a number of critical **Internet of Things(IoT)** services and applications. namely, Connected vehicle, Smart Grid, Smart Cities and in general, Wireless sensors and Actuators Networks (WSANs).

Fog, Cloud and IoT together

The IoT promises to bring the advantages of cloud computing to an earthly level, permeating every level home,vehicle , and workplace with smart , Internet connected devices. But as dependence on our newly connected devices increases along with the benefits and uses of a maturing technology, The reliability of the gateways that make the IoT a functional reality must increase and make uptime a near guarantee.Fog computing can meet requirements for reliable low latency responses by processing at the edge and can deal with high traffic volume by using smart filtering and selective transmission.

The success of fog computing hinges directly on the resilience of those smart gateways directing countless tasks on an internet teeming with IoT devices.

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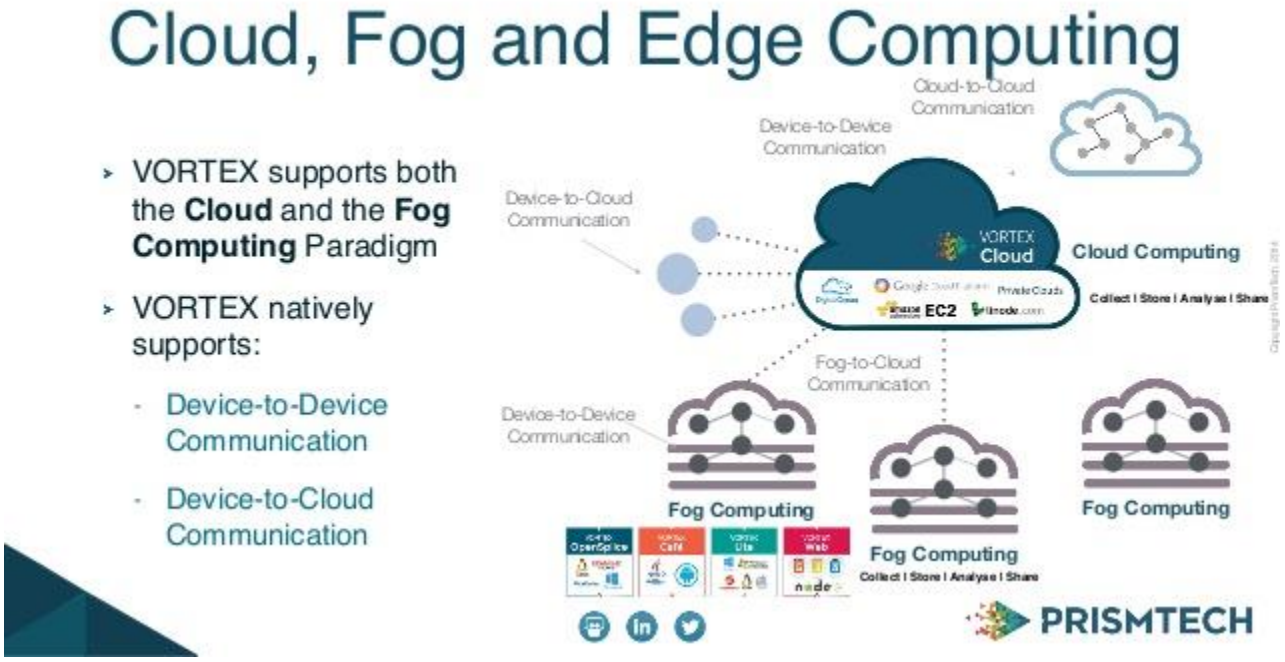

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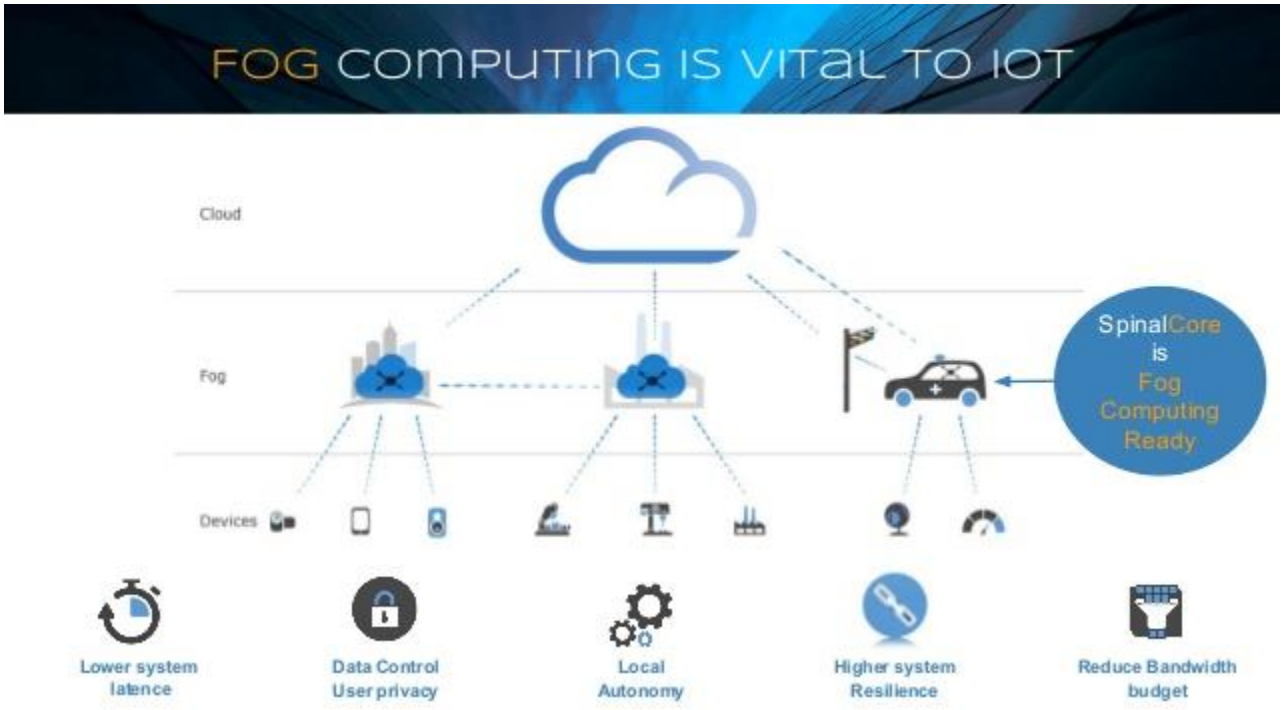

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B.Amulya-15B81A1211

G.Bhavya-15B81A1223

III Year IT-A

India Map

This C program is to print map of India

```
#include <stdio.h>
 int main()
{
   int a = 10, b = 0, c = 10;

   // The encoded string after removing first 31 characters
   // Its individual characters determine how many spaces
   // or exclamation marks to draw consecutively.
   char* str = "TFy!QJu ROo TNn(ROo)SLq SLq ULo+UHs UJq "
           "TNn*RPn/QPbEWS_JSWQAIJO^NBELPeHBFHT}TnALVlBL"
           "OFAkHFOuFETpHCStHAUFAgcEAelclcn^r^r\\tZvYxXyT|S~Pn SPm "
           "SOn TNn ULo0ULo#ULo-WHq!WFs XDt!";

   while (a != 0)
   {
      // read each character of encoded string
```

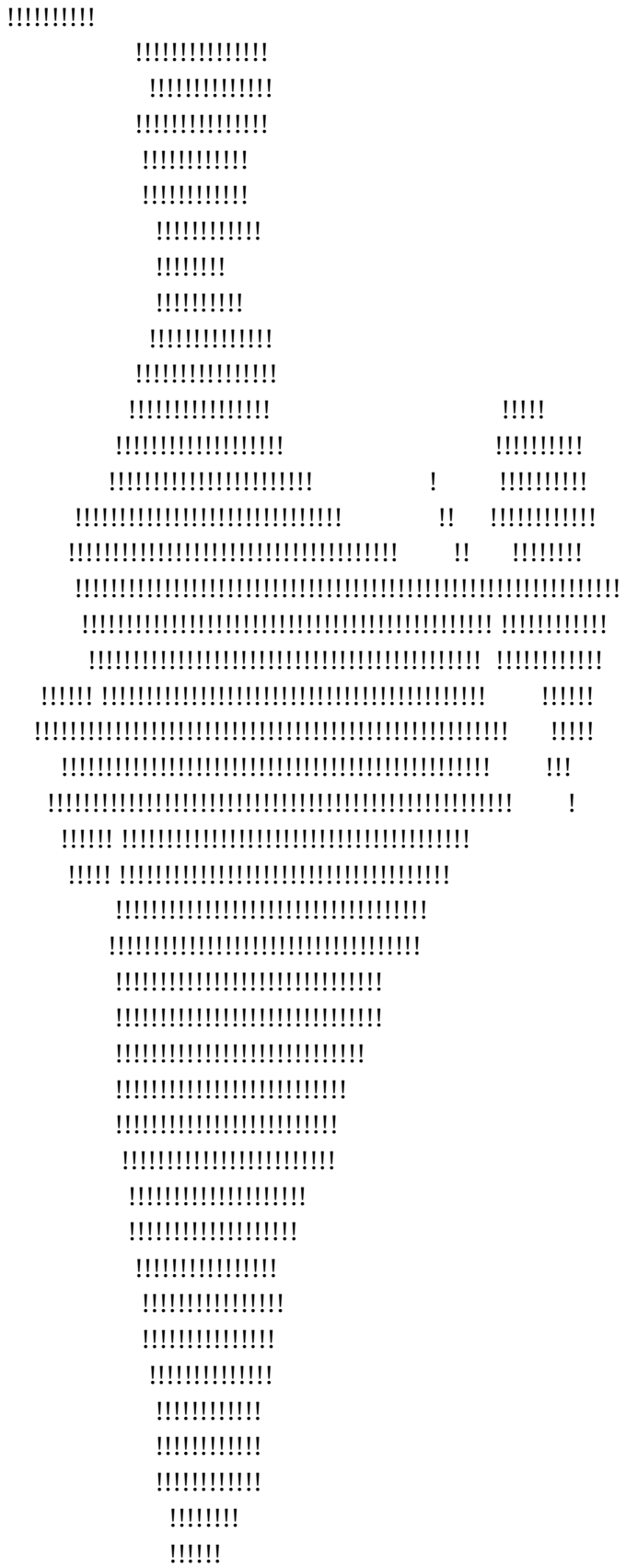
```
        a = str[b++];
        while (a-- > 64)
        {
            if (++c == 90) // 'Z' is 90 in ascii
            {
                // reset c to 10 when the end of line is reached
                c = 10;        // '\n' is 10 in ascii


                // print newline
                putchar('\n'); // or putchar(c);
            }
            else
            {
                // draw the appropriate character
                // depending on whether b is even or odd
                if (b % 2 == 0)
                    putchar('!');
                else
                    putchar(' ');
            }
        }
    }


    return 0;
}
```

This program will display the India map. Output of this program is published in the next page.

!!!!!!



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