Volume 01-Issue 01-NOV-2015

TECHERA

Association of Computer Engineers

Department of Computer Science & Engineering

Madanapalle Institute of Technology & Science

(UGC – Autonomous)

www.mits.ac.in

In this Issue

Vision:

To excel in technical education and research in area of Computer Science & Engineering and to provide expert, proficient and knowledgeable individuals with high enthusiasm to meet the societal challenges.

Mission:

M1: To provide an open environment to the students and faculty that promotes professional and personal growth.

M2: To impart strong theoretical and practical background across the computer science discipline with an emphasis on software development and research.

M3: To inculcate the skills necessary to continue their education after graduation, as well as for the societal needs.

PEOs:

The B. Tech CSE graduates will be able to:

***PEO1**: Gain Successful Professional career in IT industry as an efficient software engineer.*

***PEO2**: Succeed in Master/Research programmes to gain knowledge on emerging technologies in Computer Science & Engineering.*

***PEO3**: Grow as a responsible computing professional in their own area of interest with intellectual skills and ethics through lifelong learning approach to meet societal needs.*

Program Outcomes:

A graduate of Computer Science and Engineering Programme will have ability to:

PO1: *Apply knowledge of computing, mathematical foundations, algorithmic principles as applicable to solve engineering problems.*

PO2: *Identify a problem, analyze, formulate and use the appropriate computing and engineering requirements for obtaining its solution.*

PO3: *Address the challenges of complex and computation intensive problems, design, implement and evaluate a computer-based system to meet societal needs, within realistic constraints such as economic, environmental, political, sustainability, health and safety.*

PO4: *Demonstrate useful techniques, skills to analyze and investigate complex problems through research and effectively utilize appropriate software tools to solve it.*

PO5: *Create modern applications and apply appropriate techniques with the use of available resources and software tools for analyzing and solving various Computer Science and Engineering problem.*

PO6: *Possess sustainable, inclusive technology for societal and environmental contexts.*

PO7: *Identify with the impact of professional engineering solutions in environmental contexts and the need for sustainable development.*

PO8: *Apply Knowledge to professional and ethical responsibilities.*

PO9: *Function effectively as an individual or in multi-disciplinary teams with the capacity to be a leader.*

PO10: *Create technical reports, professional presentations and communicate effectively on complex engineering activities, with a range of audience.*

PO11: *Demonstrate project management and financial skills with professional ethics and to apply knowledge on contemporary issues in various software engineering problems.*

PO12: *Engage in continuing professional development and recognizing the need for life-long learning.*

Techera Articles

Pressure Sensitive Touch Pad

M. Tejaswi, 13691A05A4,III.B.Tech(CSE)

In recent times, a new technology came into lime light that can responds to multiple input touch and pressure. In past, resistance technology and capacitance technology are the two technologies that are used for detecting one touch and multiple touches at a time respectively.

People are hyper-absorbed by using humble computer mouses and touch phones which can detect only touch but not pressure. To replace this, a pressure sensitive touch pad is used which can responds to pressure.

Design of pressure sensitive touch pad:

In order to design a touch pad a thin plastic sheets has to be embossed with lean lines of conductive metal and in turn enclosed with the even wrap semi-conductive, pressure sensitive ink.

The wrapped equipped sheets should be placed adjacently as the pressure sensitive ink facing inside and thin sheets orient .So that the conduction metal lines finally forms a grid. Then these sheets are caught together with the most high tech of fabric-double sided tape.

Pressure on the pad is calculated by using the power of electric current at different locations. When a touch is made at interaction of two conductive lines, the electronic line passes a strong current in the device. A installed microchip, converts the pressure data from an analog signal to digital format and then compresses the data to send a computer through USB connection or MIDI port. A software on the computer then calculates the position of points of contact with the pad and the level of pressure at each point because so few of the wires needs to be motorized, well-built version of the pad can accomplish parallel compassion without much raise in complication or cost.

Some prototypes have sensed finger's as well as stylus input's for PCs and tablets. Which can also accepts and record's forces from 5 grams to 5 kilogram with a minimal margin of error, which will be able to detect anything from a light tap and also from a stylus to a strike on digital drum.

As the pressure sensitive ink is used in the prototype, which makes the pads into opaque black. Pressure sensitive links are not much good for touch screen interface like smart devices.

Critical thinking question:

1. How pressure is been monitored on software

Conclusion:

The pressure sensitive touch pad is a new revolution in computer science which also makes sense the 3D feel of experience.

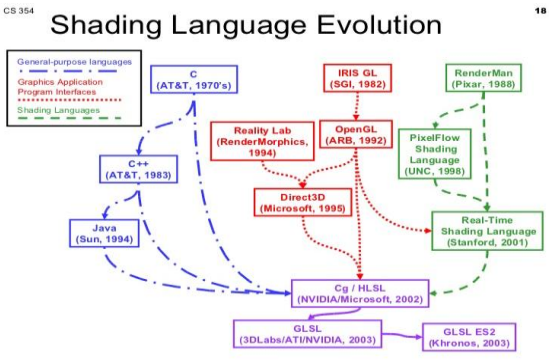
Shading Language

Y. Vijaya Lakshmi , 13691A05B1, III.B.Tech (CSE)

A **shading language** is graphics programming language adapted to programming shader effects (characterizing surfaces, volumes, and objects). Such language forms usually consist of special data types, like "color" and "normal". Due to the variety of target markets for 3D computer graphics, different shading languages have been developed.

Shading languages used in offline rendering produce maximum image quality. Material properties are totally abstracted, little programming skill and no hardware knowledge is required. These kinds of shaders are often developed by artists to get the right "look", just as texture mapping, lighting and other facets of their work.

Processing such shaders is time-consuming. The computational power required can be expensive because of their ability to produce photorealistic results. On large computer clusters, most of the time the production is rendering.



RenderMan Shading Language

The RENDERMAN Shading Language (often referenced as RSL or SL, for short), which is defined in the renderman Interface Specificationis the most common shading language for production-quality rendering. It is also one of the first shading languages ever implemented.

This language defines six major shader types named as below:

The work of Light source shader is to compute the color of the light emitted from a point on the light source towards a point on the target surface.

Surface shaders model the optical properties of an illuminated object. They output the final color and position of the point by considering the incoming light and the object's physical properties.

Displacement shaders are used to manipulate surface geometry independent of color.

- Deformation shaders is to transform the entire space of a geometry. Only one Render Man implementation, the AIR renderer, implemented this shader type, supporting only a single linear transformation applied to the space (this was more like a Transformation shader, if such a type existed).

- *Volume shaders manipulate the color of a light as it passes through a volume. These create effects such as fog.*
- *A color transformation to final pixel values is done by image shaders. This is much like an image filter, but somehow the imager shader operates on data prior to quantization. Such data has a greater dynamic range and color resolution than can be displayed on typical output devices.*

Houdini VEX Shading Language

Houdini VEX (Vector Expressions) shading language which is often abbreviated to "VEX" is modeled after RenderMan. However, its integration into a complete 3D package means that the information can be accesed by shader writer insides the shader, a feature that is not usually available in a rendering context. The language differences between RSL and VEX are mainly syntactic, in addition to differences regarding the names of several shadeop names.

Gelato Shading Language

Gelato's shading language, like Houdini's VEX, is closely modeled after RenderMan. The differences between Gelato Shading Language and RSL are mainly syntactical — that is here Gelato uses semicolons instead of commas to separate arguments in function definitions and a few shaders have different names and parameters.

Open Shading Language

Open Shading Language (OSL) was developed by Sony Pictures Image works for use in its Arnold Renderer. It is also used by Blender's Cycles render engine. The OSL's surface and volume shaders define how surfaces or volumes scatter light in a way that allows for importance sampling; thus, it is well suited for physically-based renderers that support ray tracing and global illuminati

Real-time rendering

Shading languages for real-time rendering are now widely used. They provide both higher hardware abstraction and a more flexible programming model than previous paradigms which hardcoded transformation and shading equations. This gives the programmer greater control and flexibility over the rendering process and delivers richer content at lower overhead.

Quite surprisingly, shaders that are designed to be executed directly on the GPU at the proper point in the pipeline for maximum performance, also scored successes in general processing because of their stream programming model.

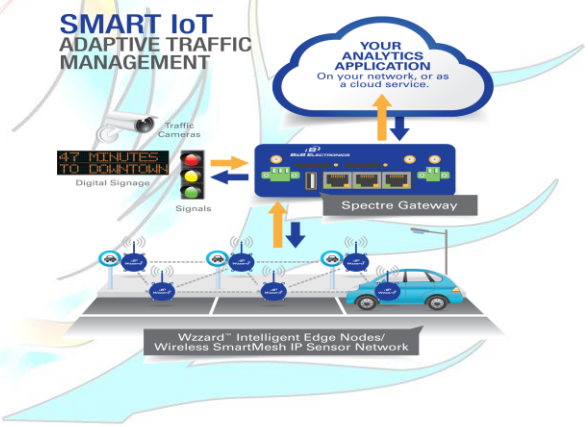
Although some applications provide shading sublanguages, this kind of shading is usually bound to a graphics API.

Internet Of Things

A. Bhavitha , 13691A0516, III.B.Tech(CSE)

Over 2500 years ago one of the first human technologies, the art of painting and drawing emerged. Until we figured out on agriculture it only took an outstanding of about 15000 years. Over the years of innovation in agriculture it only took 5000 years to figure out on writing and wheel. Then planning towards to organize our societies into cities and states it took 2500 years. From city to states we figured out the experimental method only in 1900 years and next to industrial development only 325 years. Then industrialism to invent electricity, telephone and radio only 95 years. After all of these innovations we entered into the era of computers from past 65 years, then moving from primitive computers to the modern pc only 38 years and from modern computing to the internet it only took 15 years, from the internet to smartphones, the cloud and mobile computing it only took 12 years. If you observe what's happening here, this corresponds to the law of accelerating returns meaning that the more advanced we become, the faster we become advancing. So technology is an accelerating force future approaches us faster and faster all the time. Here comes internet of things.

IOT is an evolution of mobile home and embedded applications; they are being connected to the internet integrating greater computing capabilities and using data analytics to extract meaningful information. Billions of devices will be connected to the internet and soon hundreds of billions of devices as related devices connect with each other they can become an intelligent systems of systems and when these intelligent devices share data over the cloud and this analysis can transform our business, our lives and our world in countless ways.



Here is an example of the picture, imagine an intelligent device such as smart traffic camera. The camera can monitor the road way traffic for congestion, accidents, and weather conditions and communicates that status to a traffic monitoring system then that combines with data from other cameras creating an intelligent citywide traffic system. Now imagine that intelligent traffic system connected to other services like transportation systems which get data from their own intelligent devices which

create an intelligent system of systems. For suppose if the city's intelligent traffic system detect massive congestion due to an accident that insight can be sent to the city wide transportation system which analyzes the accident impact on other city systems, you can also derive optimal routes around the accident and can send those instructions to the city's digital signaling system to guide drivers about accident to re-route their path. That's just one example having the potential benefits that can happen when an intelligent device share insight with other systems fuming ever-expanding systems of systems. We can see IOT examples in "vision of future" articles by Phillips as – A personalized device help you organize and enjoy your life in many ways like:

- *Absorbing data via camera pen and voice import, it also offers email video conferencing access.*
- *Providing expert cooking advice through hands free communication in kitchen*
- *Maintaining garbage which optimize waste disposal by sorting, compacting and removing.*
- *Using medical box (an IOT device), we can connect with doctor from the home and do all the treatment by ourselves with device help under doctor observation.*

Likewise we can sight infinite number of examples in near future as technology is emerging at the pace of light speed.

A question may arise in your minds that with many companies working on different products and technologies, is it possible to integrate thousands of devices to make a single personalized device like ROBOT which acts as our personal secretary that works with common sense which prepares a daily schedule and provides assistance in every minute work of our daily life.

Yes, it is quite possible as all the companies trying to from an open standard that facilitates integrating devices. Among them are the All Seen Alliance, whose members include LG,Qualcomm ,Panasonic, Microsoft and Sony and the open interconnect consortium which has the support of cisco, intel, GE, Hp and Samsung.

Raspberry Pi Technology

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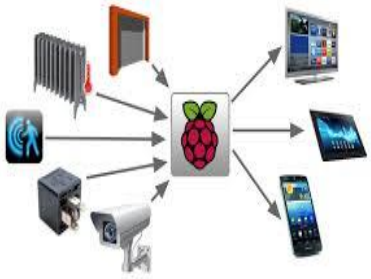
The Raspberry Pi is a credit card sized single board computers which can be connected to many of the devices like television, keyboard. It is a little Personal Computer which is capable of performing many of the operations as a Computer does like playing games, word processing, spread sheets. It also plays a High Definition video.

The main intention of this Raspberry Pi invention is to promote the importance and need of ***basic computers*** *to the kids in schools and teach them about computers through Raspberry Pi. This was developed by the Raspberry Pi Foundation in the United Kingdom.*

As the Raspberry Pi is a micro computer especially designed for children for experimental works and to enhance the knowledge, it is of low cost and portable.

Specifications of Raspberry Pi:

- *Credit card sized.*
- *Secure Digital models A and B or Micro SD Models A+ and B+ sockets for persistent storage and Boot Media.*
- *Broadcom BCM2835 SOC (System on a Chip).*
- *Open GL ES 2.0 , 1080p GPU H.264 encode /*
- *decode*
- *GPIO, I²C, I²S, SPI, UART.*
- *Power Source Connectors.*



Hardware and Software Requirements:

DC Motor, Raspberry Pi Model, TV or PC monitor, Motor Driver IC, LED, Resistors, Capacitors, Diode, Transformers and Voltage Regulator.

Applications of Raspberry Pi:

The Raspberry Pi boards are used in many applications like Media streamer, Arcade Machine, Tablet computer, home automation, internet radio, coffee and also in Raspberry projects.

Projects using Raspberry Pi:

- *Solar Street Lights using Raspberry Pi*
- *Touch Screen Tablet*
- *Lego Raspberry pi as Enclosure*
- *As FM Transmitter*
- *Home Automation*

Raspberry Pi Online:

Purchasing online is always preferable because at any case it saves money and time. Raspberry Pi can also be purchased online.

Techera Apps

Blinds find the way to their Destination

Developed by
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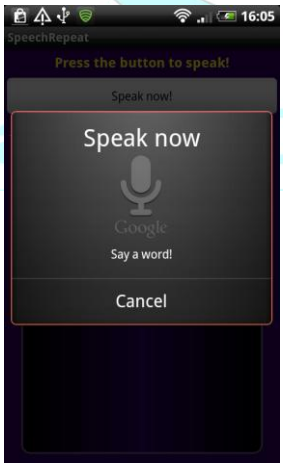
One of the most common problems that all blind and visually impaired people experience is connecting to the world when they are alone. With the advancement of technolgy, an android application equipped with specific features that will help the blind people and visually impaired people in connecting to the world is contacting made easy(CME). Contacting Made Easy is an android application ,which is used to make phone call and messaging without texting the mobile number and message.The app has an exceptional navigation aid that will greatly help people with visual impairmnet navigate the streets.

Through this application they can also know where they are exacly. This application works entirely based on the voice of the user. This application helps the impaired and blind people for easy use of android mobile devices to connect to the world.

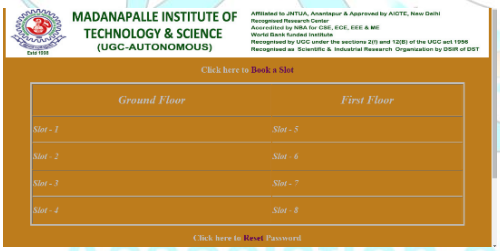


Additional Lab Reservation System

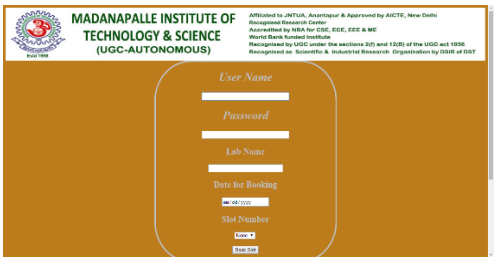
Developed by
G.S. Uday Kumar, 12691A05B3, IV.B.Tech(CSE)

Additional lab reservation is developed to reserve the lab slot/chair in a slot by staff/student respectively. By using this application lab resources can be used effectively during 4:00 PM to 7:00 PM.

Home page of the project which will be of 3 modules for staff, student & admin.



The details of the slots will be provided when navigated to the next page of home.



The user can book the slot/chair according to his convenient in the provided time

Technical Verse

K.Sai Prasanth ,13691A0586,III.B.Tech(CSE)

Technologies are invented

To make the life which is complicated

Easiest to easier

Simplest to simpler

As the demand for new technologies are increasing

The command over machines by man is decreasing

The technologies are boon

At the same time a little bane

New technologies are always of great honor

But should be utilized in a well manner

Technical Challenges

1. Class Time Table Generation

When you make a class time table, you must take into consideration many requirements (number of professors, students, classes and classrooms, size of classroom, laboratory equipment in classroom, and many others). These requirements can be divided into several groups by their importance. Hard requirements (if you break one of these, then the schedule is infeasible):

- *A class can be placed only in a spare classroom.*
- *No professor or student group can have more than one class at a time.*
- *A classroom must have enough seats to accommodate all students.*
- *To place a class in a classroom, the classroom must have laboratory equipment (computers, in our case) if the class requires it.*
- *Some soft requirements (can be broken, but the schedule is still feasible):*
- *Preferred time of class by professors.*
- *Preferred classroom by professors.*
- *Distribution (in time or space) of classes for student groups or professors.*

2. Event Scheduling

Given a set of N events, e.g., events in college festival, each student is asked to choose M events of his/her choice, in order of decreasing preference. If there are K slots available to schedule the events out of which at most P slots can be held in parallel, output a schedule that maximizes the happiness of most students. You are free to choose the definition of "happiness" as long as the definition is reasonable. The algorithm should work for any given N, M, K, P and the preference list of any number of students.

*(Solutions to be mailed to - **ace_cse@mits.ac.in**)*

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