Vidya Vikas Education Trust's

Universal College of Engineering

Approved by AICTE, DTE, Maharashtra State Goverment and Affiliated to Mumbai University

Accredited with B+ Grade by NAAC | Recognised as Linguistic (Gujarati) Minority Institution

ELECTRONICS ENGINEERING DEPARTMENTMAGAZINE

COMPILED AND DESIGNED BY:

MS. SAMPADA PIMPALE - MAGAZINE COORDINATOR

ISSUE - 018

JANUARY 2020

Vidya Vikas Education Trust's
Universal College of Engineering
Approved by AICTE, DTE, Maharashtra State Goverment and Affiliated to Mumbai University
Accredited with B+ Grade by NAAC | Recognised as Linguistic (Gujarati) Minority Institution

FIND INSIDE

- NEW IMPROVEMENTS IN VEHICLE SAFETY AND COMFORT IN VIEW AS RADAR SENSORS ENABLE NEXT GENERATION ADAS
- INSTALLED BASE OF SMART STREET LIGHTS TO SURPASS 30MN WORLDWIDE
- SOLAR POWER FROM 'THE DARK SIDE' UNLOCKED BY A NEW FORMULA
- PORTABLE ELECTRONICS: A STRETCHABLE AND FLEXIBLE BIOFUEL CELL THAT RUNS ON SWEAT
- DEPARTMENTAL ACTIVITIES
    - **Two Days Workshop On "DATA SCIENCE with PYTHON & R PROGRAMMING"**
    - **Innovation**
    - **Internship**
    - **Project under e-Yantra Ideas Competition**

Electronics Quotes:

"Engineers like to solve problems. If there are no problems handily available, they will create their own problems."

- **Scott Adams**

"One man's "magic" is another man's engineering. "Supernatural" is a null word."

- **Robert A. Heinlein**

New improvements in vehicle safety and comfort in view as RADAR sensors enable next generation ADAS

If global investors know anything about where money is to be made, the winners in the automotive industry will be those which embrace and master the three megatrendsdisruptingthemarket.

These include:

- TheproliferationofAdvancedDriverAssistanceSystems(ADAS)technologies, electrification, and mobility-as-a-service.
- The importance of these trends is reflected in a comparison of the market capitalizations of Tesla, which makes fewer than 400,000 vehicles a year, and Ford. Tesla bases its strategy on a series of innovations in battery-powered traction, autonomous driving and robotaxi capabilities to support Tesla-branded ride-sharing services.
- Ford makes much of its money from traditional American pick-up trucks that feature high-powered internal combustion engines. Ford, with 2017 production volume of more than six million units, had a market capitalization of just $37bn in late 2019, while Tesla was worth $44bn.
- While adoption of mobility-as-a-service has been driven by business model and software innovation pioneered by the likes of Uber, and increasing electrification depends on production innovations such as Tesla's battery 'gigafactory', the focus of innovation in driver assistance is on hardware and software technology – a combination of sophisticated sensor systems and artificial intelligence.
- All assisted driving systems rely in part on multiple forms of 'perception technology': in fully autonomous vehicles, optical technologies such as LiDAR (light detection and ranging) and visual cameras will work alongside electro-magnetic motion sensors and RF/microwave systems – RADAR and satellite positioning.
- It might seem surprising that RADAR should be playing a part in the most exciting developments in automotive technology. In fact, many 24GHz RADAR sensors are mounted in the bumpers of vehicles on the road today – Analog Devices alone has to date supplied some 300 million units to automotive manufacturers for use in applications such as blind-spot detection, automated lane-changing, and Autonomous Emergency Braking (AEB).
- But demand for ever higher levels of driver assistance, supported by the evolution of functions such as AEB and Adaptive Cruise Control (ACC) in new ADAS implementations, is driving suppliers to develop new RADAR systems which offer higher precision, longer range, faster detection and a more complete picture of the world around the vehicle.

Source:http://www.newelectronics.co.uk/electronics-magazine/supplements/outlook/outlook-2020

Installed base of smart street lights to surpass 30mn worldwide

New research from the IoT analyst firm Berg Insight, says that the installed base of smart street lights will reach 31.2 million in 2023.
Currently, the installed base of smart street lights totals 10.4 million worldwide so the report is suggesting growth at a compound annual growth rate (CAGR) of 24.5 percent through to 2023..

Europe is the leading smartE street lighting market accounting for nearly 40 percent of the installed base. Characterized by a higher degree of utility ownership of street lighting assets, the North American market has seen a more scattered uptake of smart street lighting but is nevertheless home to several of the world's largest deployments. North America accounted for around 30 percent of the global installed base in 2018. The Rest of World accounted for 31 percent of the global installed base in 2018 and the Chinese market constitutes a large part of these installations.

The world's leading smart street lighting vendor is UK-based Telensa which accounted for 14.4 percent of the global installed base of connected endpoints in Q3-2019. Included in the top three are also Signify and Sensus, of which the latter became a top player within the market in 2017 through its acquisition of SELC. Together, these three vendors account for a third of the global installed base of individually controlled smart street lights.

US-based Itron is also a leading player in the networking segment, having acquired Silver Spring Networks in 2018. Other important smart street lighting vendors include Rongwen Energy Technolog from China; CIMCON Lighting, Acuity Brands, Current, LED Roadway Lighting and DimOnOff from North America; Lucy Zodion and SSE from the UK; ReverberiEnetec from Italy; Flashnet from Romania and Telematics Wireless from Israel.

"While various proprietary RF mesh or star networks today account for the majority of smart street lighting installations, the adoption of LPWA technologies such as NB-IoT and LoRa is now growing fast, particularly in the European and Asian markets", said Levi Ostling, IoT Analyst, Berg Insight.

He added that in line with this development, the smart street lighting market is currently undergoing significant transformation and is now entering a new era of competition where the success of vendors will be determined by their ability to establish themselves as competitive providers of communications and management platforms for smart city devices.

Source:http://www.newelectronics.co.uk/electronics-technology-news/installed-base-of-smart-street-lights-to-surpass-30mn-worldwide

Solar power from 'the dark side' unlocked by a new formula

Engineers calculate the ultimate potential of next-generation solar panels

Most of today's solar panels capture sunlight and convert it to electricity only from the side facing the sky. If the dark underside of a solar panel could also convert sunlight reflected off the ground, even more electricity might be generated.

Double-sided solar cells are already enabling panels to sit vertically on land or rooftops and even horizontally as the canopy of a gas station, but it hasn't been known exactly how much electricity these panels could ultimately generate or the money they could save.

A new thermodynamic formula reveals that the bifacial cells making up double-sided panels generate on average 15% to 20% more sunlight to electricity than the monofacial cells of today's one-sided solar panels, taking into consideration different terrain such as grass, sand, concrete and dirt.

The formula, developed by two Purdue University physicists, can be used for calculating in minutes the most electricity that bifacial solar cells could generate in a variety of environments, as defined by a thermodynamic limit.

"The formula involves just a simple triangle, but distilling the extremely complicated physics problem to this elegantly simple formulation required years of modeling and research. This triangle will help companies make better decisions on investments in next-generation solar cells and figure out how to design them to be more efficient," said Muhammad "Ashraf" Alam, Purdue's Jai N. Gupta Professor of Electrical and Computer Engineering.

In a paper published in the *Proceedings of the National Academy of Sciences*, Alam and coauthor Ryyan Khan, now an assistant professor at East West University in Bangladesh, also show how the formula can be used to calculate the thermodynamic limits of all solar cells developed in the last 50 years. These results can be generalized to technology likely to be developed over the next 20 to 30 years.

The hope is that these calculations would help solar farms to take full advantage of bifacial cells earlier in their use.

"It took almost 50 years for monofacial cells to show up in the field in a cost-effective way," Alam said. "The technology has been remarkably successful, but we know now that we can't significantly increase their efficiency anymore or reduce the cost. Our formula will guide and accelerate the development of bifacial technology on a faster time scale."

The paper might have gotten the math settled just in time: experts estimate that by 2030, bifacial solar cells will account for nearly half of the market share for solar panels worldwide.

Alam's approach is called the "Shockley-Queisser triangle," since it builds upon predictions made by researchers William Shockley and Hans-Joachim Queisser on the maximum theoretical efficiency of a monofacial solar cell. This maximum point, or the thermodynamic limit, can be identified on a downward sloping line graph that forms a triangle shape.

The formula shows that the efficiency gain of bifacial solar cells increases with light reflected from a surface. Significantly more power would be converted from light reflected off of concrete, for example, compared to a surface with vegetation.

The researchers use the formula to recommend better bifacial designs for panels on farmland and the windows of buildings in densely-populated cities. Transparent, double-sided panels allow solar power to be generated on farmland without casting shadows that would block crop production. Meanwhile, creating bifacial windows for buildings would help cities to use more renewable energy.

The paper also recommends ways to maximize the potential of bifacial cells by manipulating the number of boundaries between semiconductor materials, called junctions, that facilitate the flow of electricity. Bifacial cells with single junctions provide the largest efficiency gain relative to monofacial cells.

"The relative gain is small, but the absolute gain is significant. You lose the initial relative benefit as you increase the number of junctions, but the absolute gain continues to rise," Khan said.

The formula, detailed in the paper, has been thoroughly validated and is ready for companies to use as they decide how to design bifacial cells.

Portable electronics: A stretchable and flexible biofuel cell that runs on sweat

The potential uses for wearable electronic devices continue to increase, especially for medical and athletic monitoring. Such devices require the development of a reliable and efficient energy source that can easily be integrated into the human body. Using "biofuels" present in human organic liquids has long been a promising avenue.

Scientists from the Department de chimiemoléculaire (CNRS/Université Grenoble Alpes), who specialize in bio-electro-chemistry, decided to collaborate with an American team from the University of San Diego in California, who are experts in nanomachines, biosensors, and nanobioelectronics. Together they developed a flexible conductive material consisting of carbon nanotubes, crosslinked polymers, and enzymes joined by stretchable connectors that are directly printed onto the material through screen-printing.

The biofuel cell, which follows deformations in the skin, produces electrical energy through the reduction of oxygen and the oxidation of the lactate present in perspiration. Once applied to the arm, it uses a voltage booster to continuously power an LED. It is relatively simple and inexpensive to produce, with the primary cost being the production of the enzymes that transform the compounds found in sweat. The researchers are now seeking to amplify the voltage provided by the biofuel cell in order to power larger portable devices.

*Source:*CNRS

Department Activities

TWO DAYS WORKSHOP ON
"DATA SCIENCE with PYTHON & R PROGRAMMING"

Date: 19/12/2019 & 20/12/2019

About the Workshop

Data Science is a concept of unify statistics, data analysis, machine learning and their related methods in order to understand and analyze actual phenomena with data.
The R language is widely used among statisticians and data miners for developing statistical software and data analysis.

Speakers

1. SonalBorase
2. KaveriSawant
3. SandeepDubey

Topics Covered

Day 1: Data Science with Python:SonalBorase

Basic Discussion on Subject:

- What's the python and its scope in Present and Future
- Why we need to go for python
- Internal Concept and Practical Implementation
- Use Python Interpreter and Compiler
- Basic Operations and Data Types.
- Go details in List, Tuple & Dictionary Usage
- Code Block and Indentation
- Conditions and Iteration
- Built own function and use built in def
- Manage and develop own modules
- Manage Exception Handling
- File Handling and Operations.
- Network Program and Socket Implementation

Day 2: Data Science with R: KaveriSawant

- Installation of R and R studio
- Regression and correlation of data
- Extraction of data files from excel
- To find the mean median of the data.

Day 2: SandeepDubey

- Image Processing using OpenCV and python

Organizing Committee form UCoE

Campus Director
Dr.JitendraPatil

Head of Department
Mrs. KaveriSawant

Staff Coordinator
Mrs. SonalBorase

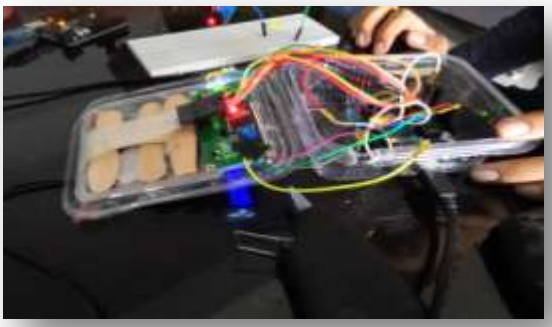
Organizing committee
Mrs. Mildred Pereira
Mr.GauravShete
Ms.SampadaPimpale

Student Coordinators
ParagDhanawade
HardikParmar

Faculty Achievement

Mr.SandeepDubey: The question bank and Lab experiments on **IMAGE PROCESING: AFFINE TRANSFORMATIONS** has been accepted form e-Yantra.

Students Innovation



Students of Innovation cell invented Automatic College Exam Bell using RTC Time Module

Details about the Project:

This Project takes over the task of Ringing of the Bell in Colleges. It replaces the Manual Switching of the Bell in the College. It has an Inbuilt Real Time Clock (DS3231/DS 12c887) which tracks over the Real Time. When this time equals to the Bell Ringing time, then the Relay for the Bell is switched on. The Bell Ringing time can be edited at any Time, so that it can be used at Normal Class Timings as well as Exam Times. The Real Time Clock is displayed on 16x2 LCD display. The Microcontroller Arduino Uno is used to control all the Functions, it get the time through the keypad and store it in its Memory. And when the Real time and Bell time get equal then the Bell is switched on for a predetermined time.

Application:

Digital circuit that is used for the purpose of automatic switching of bell is as per the given schedule without any human intervention. Generally, wherever we may go, it might be a school or an organization if start or stop of any process is to be conveyed to a large number of people, a bell is used over there which signals the start or stop of any process.

Students working on the projects:

1. JatinGohil
2. AkshayLaddha
3. Ganesh Basyal
4. Santosh

Students Internship in RoboVR

About RoboVR

RoboVR is a championship where students / robot makers/tech enthusiasts build 1'- 2' sized robots and compete in 30+ human sports like archery, boxing, cricket, football, golf, swimming, tug of war & more played by robots against other robots. The game rewards teamwork and driving skill more than exotic materials and expensively built robots. The rules are a very simplified version of any human sport rules with additions for the nature of the robots as players. The addition of active devices on robots to shoot, kick or flip is encouraged. These devices make for a faster more exciting game. A robot shall have a jersey with its jersey number & team name written on its T-shirt. This is how the robots shall be recognized like a player is recognized when representing a country for any sport. The Robot Makers and builders owe it to the world to

make these sports exciting & pass it to our next generation. Participants have to build these robots as per the specifications mentioned in the rules on the website. All the sports arenas are reduced to robot size and shall grow with the growing skills of robots along the year to come. We aim that by the year 2050, robots shall be 6' tall, majorly humanoid and shall play sports in the actual human arenas. This shows the curve of possible innovations & experiments that can be conducted on robots and the result of the perfect mechanism achieved can be used further in research of solving real life problems.

Purpose of Internship

The Purpose of Internship at RoboVR was to embrace the Robot Technology and design various Sports playing Robots that provide an idea to the audience about the Benefits of Automation and RPA.

Our students AkshayLaddha&JatinGohil did Internship from RoboVR.

Project under e-Yantra Ideas Competition

The e-Yantra Ideas Competition solicits innovative projects from teams of eLSI colleges:

Project name: COMPACT, PORTABLE, ADVANCE AND AUTOMATIC OIL EXTRACTION MACHINE FOR MULTIPURPOSE APPLICATION USING ARDUINOUNO R3 BOARD WITH 1602 LCD I2C MODULE

Group Members:

1. PiyushBhavsar
2. Mit Mehta
3. Ambrish Singh

Mentor: Deepak Modi