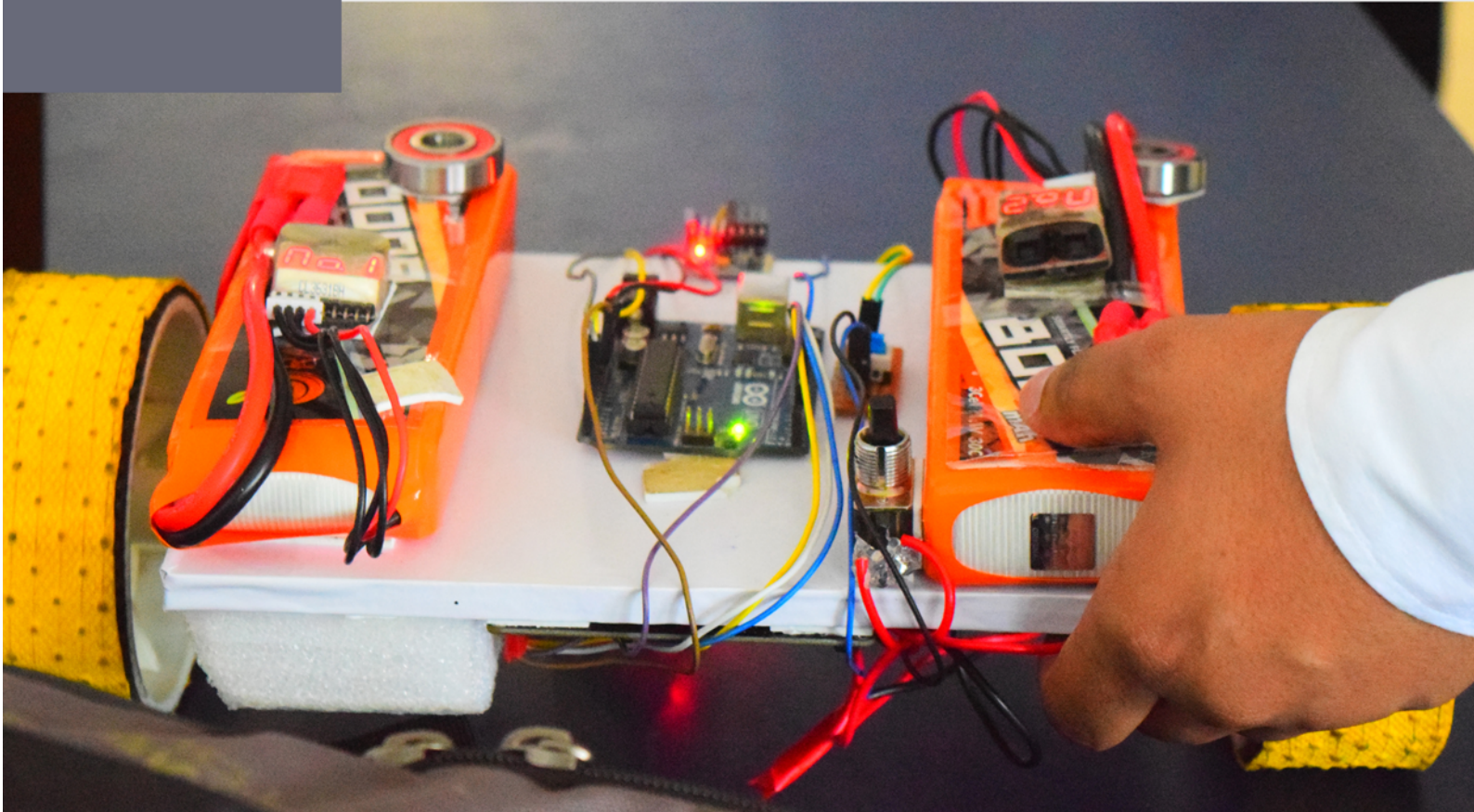
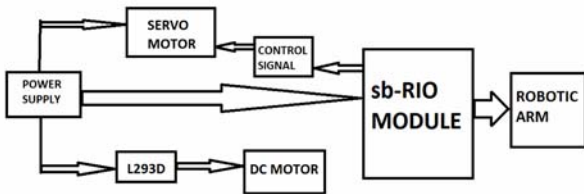




BEST PROJECTS 2017



Objective	Methodology	Conclusion	Future Work
<ul style="list-style-type: none"> The Objective is to design a pick and place robotic arm using the LabVIEW . To Executes different task repeatedly with high Precision. To reduce the human interference nearly 50% 	<ul style="list-style-type: none"> The movement of robotic arm is due to five servo motors and one DC-motor. Three degree of freedom allows efficient movement of the arm. The motors are controlled by using the various ports of sb-RIO and interfacing the LabVIEW with the RIO module. 	<ul style="list-style-type: none"> The robotic arm was found to be user friendly. This implementation paradigm based on personal computer and standard operating systems constitutes a new trend in automation 	<ul style="list-style-type: none"> These arms can be used in aerospace, automotive and electronics industries. In medical science: soft tissue manipulation, needle insertion, suturing and cauterization.



PC BASED EMERGENCY AMBULANCE SYSTEM

Project id: 9016

SUBHASH CHANDRA KUMAR : EIE# 201316457 and NEHA VERMA : EIE#201311603


INTRODUCTION	LABVIEW INTERFACING	RESPIRATION RATE MEASUREMENT	BODY TEMPERATURE MEASUREMENT
<p>This project presents our work on the design and development of a PC based remote patient monitoring system which allows the patient to be monitored remotely from any location.</p> <p>MOTIVATION We're Seeing an interesting convergence of technology, medicine, social issues, and human progress. -John Nasta Digital Health philosopher</p> <p>HEART RATE MEASUREMENT</p> <p>Heart rate is determined by the of peaks in waveform in 60 seconds Measured the heart rate by calculating the distance between R peaks.</p>	<p>The Vernier sensor attaches to NI ELVIS II through the Analog Proto Board Connector.</p> <p>The Figure shows how to connect the Analog Proto Board Connector to the NI ELVIS II Series Prototyping Board.</p> <p>SensorDAQ</p> <p>NI ELVIS II</p> <p>HEART BEAT MEASUREMENT</p> <p>ADVANTAGES</p> <ul style="list-style-type: none"> Very high performance Low cost of development More reliable and flexible Less time consuming 	<p>Respiratory activity is reflected in many cardiovascular signals, such as the heart rate and the arterial pressure, mainly due to intrathoracic pressure changes and autonomic nervous modulation.</p> <ul style="list-style-type: none"> Displacement Method Thermistor Method Surface Temperature Sensor 	<p>LM35 Temperature Sensor</p> <p>Thermistor</p> <p>BLOCK DIAGRAM OF PROJECT</p>

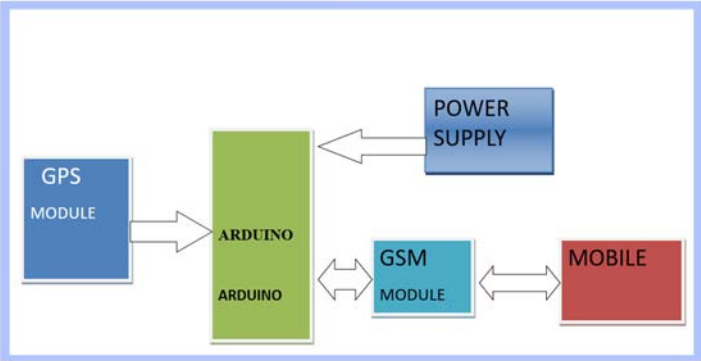
Location Tracking and Monitoring for patients suffering from memory diseases

Project id: 9018

Soumya Ranjan Nayak#201314939

Somesh Kumar Nayak#201213729

Objective	Working	Result	Conclusion
<p>□ The aim is to design a location tracking system which will help the patient who are suffering from different memory loss diseases.</p> <p>□ In addition to that we can also implement our project as a solution to various problem in mean of safety.</p> <p>Additional application</p> <p>1. Women safety: This device can be fitted in a purse, belt or fitted to the girl's sandals and the panic button attached to the belt. The lady in danger can activate the system by pressing emergency button</p> <p>2. Vehicle tracker The GPS-GSM module interface with arduino device can be fixed inside a vehicle so that the device can provide the location to the respective user .</p>	<p>The GPS unit is connected to the GSM unit through a arduino (uno). The SIM card holder, battery are connected to the module step 1:</p> <p>case1: Whenever the patient is lost , there is a clue to press button on that kit and once the button is pressed the latitude and longitude is send to the user as SMS.</p> <p>Case2: When a call is made to the device, the location of the patient holding the device is sent to the user as a SMS (Short Message Service) alert.</p> <p>Step2: When the massage is received by the user then the SMS containing the latitude and longitude can be browse through goggle map. Hence the tracking can be customized by the care taker.</p>		<ol style="list-style-type: none"> In this project, we have successfully designed a tracking system which comprises of arduino microcontroller with GPS-GSM module to provide proper guidance to the memory loss patients. It also provides safety to the women as they can inform police, family member etc. in case of any danger.



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Guarding the Ground with IAV SWAYAMBHU

Project id: 9026

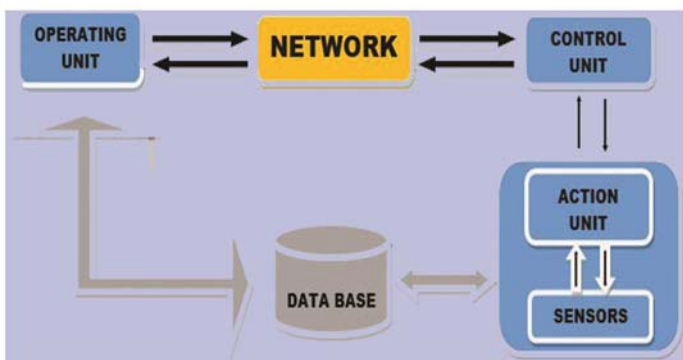
Shubhendu Dash

Roll#EIE201310536

Suman Sekhar Gouda

Roll#EIE201310512

Objective	Methodology	Conclusion	Future Work
<ol style="list-style-type: none"> Everyone knows that being a soldier is a dangerous job. What if we could send robots to do these jobs instead off human? Design a prototype which could be used both in Military as well as Civil purpose. 	<ol style="list-style-type: none"> Hardware Design Sensor module integration Internal circuit board design Software Design Hardware to software linking User to prototype communication 	<p>Cost effective</p> <p>Reduced Terror Threats</p> <p>Reduced Man power loss</p> <p>All Terrain Mobility</p> <p>24*7 Security Serveillance</p>	<p>Implementation of Autonomous coding</p> <p>LabVIEW based GUI Development</p> <p>GPS tracking system</p>



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Design and Implementation of Low Cost Medicine Reminder

Students: Amitesh Prasad and Ashish Kumar

This is not just a medicine reminder box but also an e-nurse

Graphical Abstract	Novelty	Schematic	Confidential documents
<p>Skip Doses → As a result</p> <p>Very costly and more complexity</p> <p>ALTERNATIVES IDEAS</p> <p>Solution: A low cost Medicine Reminder Box</p> <p>Block representation of Medicine Reminder boxes</p> <p>Highlights:</p> <ul style="list-style-type: none"> ☐ Made in India; Made for India ☐ Own hardware/software ☐ Assembly language program ☐ COM port interfacing through VB ☐ Own protocol ☐ No Lab view ☐ No NI card ☐ No Arduino ☐ No foreign software /hardware ☐ Initiated to file a patent 	<p>Hardware</p> <ul style="list-style-type: none"> ✓ Low cost devices are used such as Microcontroller, drivers, switches ✓ Automation of several work in hospital ✓ Efficient Data Management ✓ Easy Data Retrieval ✓ Automatically Reminder of Schedules ✓ It provides features which are not supported by traditional system ✓ User friendly Graphical User Interface ✓ Algorithms are configurable depending on the requirement <p>Software</p> <ul style="list-style-type: none"> ✓ A User friendly software ✓ Compatible with any of the systems ✓ The software gets connected to the hardware automatically and displays the schedule of medicines. ✓ In this project we are using indigenous software using visual basics instead of using any foreign software for ex lab view which costs 		
Software Description of Med Reminder			
<p>Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7</p> <p>Figure descriptions:</p> <ul style="list-style-type: none"> Fig. 1: Overview of "e-nurse.exe" software Fig. 2: Set the meals details Fig. 3: Enter the mobile number Fig. 4: Click on the first tray Fig. 5: Click on the second tray Fig. 6: Click on the third tray Fig. 7: Click on the fourth tray 			
Final Deliverables			
<p>Features</p> <ul style="list-style-type: none"> ☐ Low cost, Easy to operate ☐ Spacious and capable to store medicines for months ☐ No need to set the time and medicine details every week or month ☐ Easy to operate, GSM module ☐ LCD indicating medicine name and block where it is kept, Battery backup ☐ Serve water, Can work efficiently for years ☐ Tray closes both manually and automatically <p>Entrepreneurship possibilities:</p> <ul style="list-style-type: none"> ☐ People of all age group can use it ☐ Low manufacturing setup cost ☐ Low maintenance cost 			

Project Day 2017



NATIONAL INSTITUTE OF SCIENCE & TECHNOLOGY
Palur Hills, Berhampur, ODISHA-761008

Ideation of InGaN/GaN MQW based Insulated Gate Light Emitting Diode for bias dependent optical device applications

Project id: 9036

Name: Padmanabh Pundrikaksha Pancham

Roll: 201318116

Objective	Why $In_{1-x}Ga_xN/GaN$ is Used ?	A Novel Approach	Why 3 rd Terminal ?
<p>To obtain a bias adjustable colour management in novel quantum well based gated LED structure to address complete visible light spectrum especially including white light.</p> <p>Some of the applications are:</p>	<p>GaN and InGaN direct band gaps that cover a wide range of wavelengths from infrared to visible and UV regions.</p> <p>This opens the way for monolithic white LEDs by combining several Quantum Wells of various thicknesses, i.e. "colors", inside the GaN p-n junction.</p>	<p>In the proposed device structure an extra gate terminal is incorporated which is a totally new and a novel idea.</p> <p>Proposed Device Structure</p> <p>Conclusion</p> <ul style="list-style-type: none"> ☐ The bias responses for the device structure have been extensively presented and the color of the spectral distribution has been mapped with CIE 1931 standard. ☐ A new application area of color mapping with bias dependent single LED structure has been revealed for the new device. 	<p>By incorporating a gate control (3rd terminal) we have got a 2D bounded region in the CIE chart which will ultimately results in the attainment of different colors which was not possible in the previous device.</p>
<p>White LED Requirement</p> <p>It is of great interest to design an integrated one-chip white LED without the need of a phosphor converter for long-wavelength light.</p>			

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EM - Alert Using Android

By: L. Sobhini Reddy (201319054)

Project ID: 9039

Guided by: Mrs. Arunima Sambhuta Pattanayak

Introduction

Em-Alert Stands for Emergency Alert. This application is used to trigger alerts in case of emergencies. User can trigger automatic alerts as in case of Accidents or Raging as well as manual alerts as in case of any emergency situations.

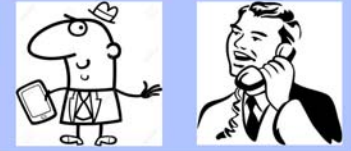
Student Module

- **Manual Alerts**- Raging, Accident, Natural Calamities, Kidnapping, Violence.
- **Automatic Alerts** - Raging alert triggered when we whistle, Accident alert triggered when there is a sudden jerk and alerts are sent.
- Request Employees(Message).



Employee Module

- **Automatic Alerts** – Accident alert triggered when there is a sudden jerk and alerts are sent within 30secs
- Set the Contacts list
- Notify Group of Employees.
- Notify Students of each year.
- Check the student requests.



A Glance of Various Sections

<p>Em Alert</p> <p>Username</p> <p>Password</p> <p>LOGIN</p> <p>REGISTER</p> <p>Emergency Alert</p> <p>Login page</p>	<p>Em Alert CONTACTS</p> <p>Dashboard</p> <p>Accidental Scene</p> <p>REQUEST EMPLOYEES</p> <p>Student Module</p>	<p>Em Alert LOGOUT</p> <p>Dashboard</p> <p>Notify Employee</p> <p>Howdy user,</p> <p>Employee Module</p>	<p>Em Alert</p> <p>Manage Your Contacts here</p> <p>RAGGING CONTACTS</p> <p>VIOLENCE CONTACTS</p> <p>NATURAL CONTACTS</p> <p>KIDNAPPING CONTACTS</p> <p>ACCIDENT CONTACTS</p> <p>Set Contacts</p>
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Web Server

- Apache web server .
- PHP as the scripting language .
- MySQL as the Database service.
- Server is used to keep log of all activities of the user as well as store their data.

Working Mechanism

When the user faces any alarming situations, he launches the app and triggers the alerts, then the GPS locations with predefined message is sent to the prioritized list of contacts.

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Stick Guide For Visually Impaired Person

Project id:9046

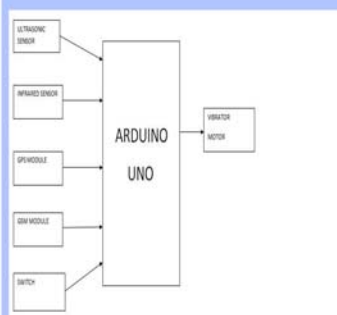
Name & Roll No. of Student: Charusmita Dash(201317241) Aparna Mishra(201311299)

Introduction

- It becomes difficult for a blind person to carry out his day to day activity.
- Blind stick serves as his guide on which he can rely on.
- Problem with traditional stick is the person becomes dependent on others to carry out his activities.
- Our project will help a blind to become independent without relying on others.

Methodology

- We are using a GPS based Blind stick with ultrasonic and infrared sensor for obstacle detection.
- Arduino microcontroller is used for interfacing purpose.
- GPS and GSM module is used to pin point the location of the user.

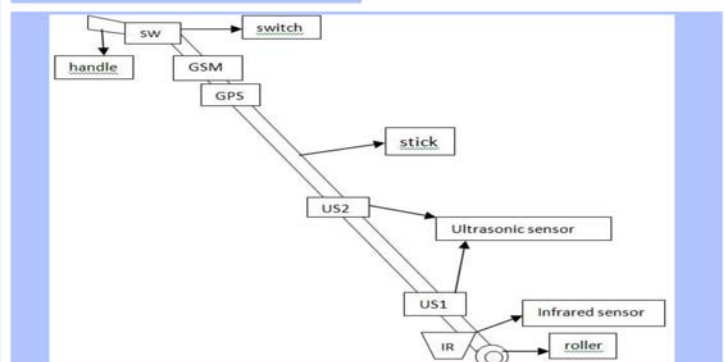


Components

- Arduino microcontroller
- Ultra sonic sensor
- Stick
- Infra red Sensor
- Vibrator
- 5volts,2.5amps Battery

Conclusion

- We are doing this project with an aim that some day it will bring a change in the lifestyle of a blind person.
- It will help them do their tasks on their own without seeking help from other individuals.



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IoT Based Industrial Pollution Monitoring and Control Using Virtual Instrumentation

Project id: 9047

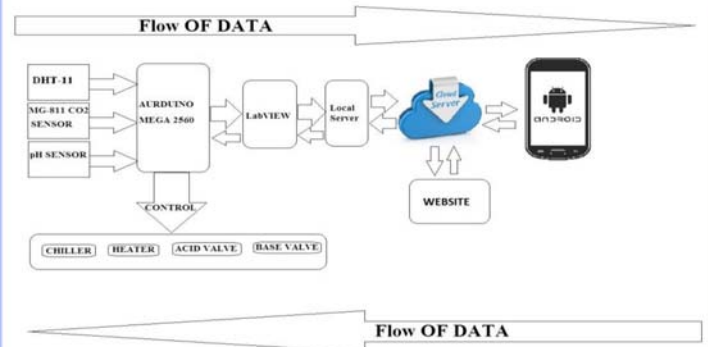
Amiya Ranjan Senapati

Roll-EIE201310814

G Santamanyu

Roll-EIE201310608

Objective	Methodology	Conclusion	Future Work
<ul style="list-style-type: none"> The Objective is to monitor the industrial parameters and control by using LabVIEW . To determine the quality of effluent management and working environment in industries. To determine the key descriptors to be considered in pollution monitoring. 	<ul style="list-style-type: none"> Various industrial parameters is collected through different sensors onsite and fed into the database. The monitoring section of the website and android application shows the various industrial parameters. The Controlling section of the website and android application triggers the controlled devices for pollution control. Surveillance camera is installed for monitoring. 	<ul style="list-style-type: none"> We have identified potential IoT applications in industrial pollution control and monitoring that can be handy in every industry. 	<ul style="list-style-type: none"> Automatic control of industrial parameter by using image processing. A vibrator could be connected to the steering wheel to make the driver vigilant.



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NATIONAL INSTITUTE OF SCIENCE & TECHNOLOGY
Palur Hills, Berhampur, ODISHA-761008

Virtual Drum

Project ID: 9055

Guided by: Mr. Bhawani Shankar Pattnaik

Khushboo-(201311335)

Amruta Panda-(201311016)

Introduction

Virtual Drum is an embedded instrument which is small in size used to generate sound according to the motion of one's hand without any real existence of physical instruments.



Equipments Used

- MPU6050 sensors
 - Gyro-sensor
 - Accelerometer



- Raspberry pi



- Arduino



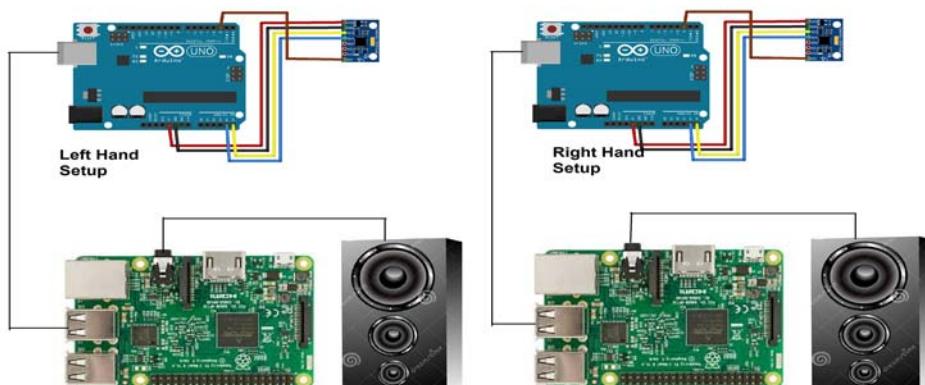
Characteristics

- Portable
- Low power consumption
- Light weight
- Compatible with user
- Affordable
- Smart integration of Hardware and Software.
- Symphonious

Implemented Procedures

- Interfaced sensor (MPU6050) with Arduino board.
- Observed sensor output on serial monitor of Arduino.
- Taken sensor output value of hand movement with respect to X,Y and Z axis by programming on Arduino.
- Programmed on eclipse to run java program on Raspberry Pi.
- Integrated Arduino with Raspberry Pi for both hands.
- Produced sound beats depending upon the hand movement.

Architecture



Conclusion

This project mainly focuses on making of a portable drum with low power consumption, user friendly as well as low cost that will be reliable for the drummer without the actual existence of drum setup where we are mainly concerned with the application of software over hardware.

Reference

- 2.7V 4-Channel/8-Channel 12-Bit A/D Converters with SP Serial Interface.
- International Journal of Engineering Research and Applications (IJERA) ISSN

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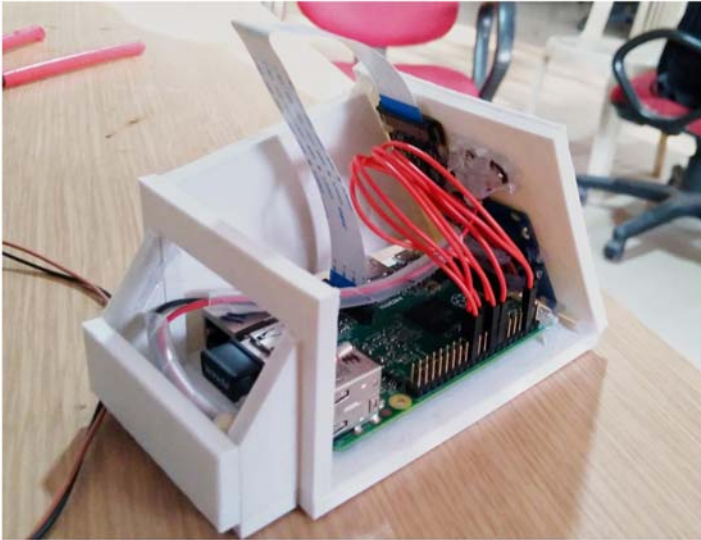



NATIONAL INSTITUTE OF SCIENCE & TECHNOLOGY
Palur Hills, Berhampur, ODISHA-761008

AI Powered Bot for Smart Home

Project ID: 9056

Sidharth Patnaik (#201340288)
Akashdeep Samantra (#201312306)
Guided by: Mr. Bhawani Shankar Patnaik

Introduction	Software Used	Hardware Used	Innovative Element
<p>This is an AI powered Bot, built on the top of Raspberry Pi 2. It understands the natural language, extracts meaning and produces responses like wise. This bot is conected with smart home to facilitate the AI to control home. This bot also enhances home security too.</p>		<ul style="list-style-type: none"> • Raspberry pi 2 • Pi Camera v2 (Night Vision) • Stereo Microphone • WiFi module, Sound card. • Monochromatic LCD Display 	<ul style="list-style-type: none"> • For the first time ever, a bot can understand as well as reply in HINDI • It can remember what you say just like a normal human • Remind you to take medicines.
Primary Functions	AI Module		Working Principle
<ul style="list-style-type: none"> • Takes input and output through voice • Answers your what is and who is ques. • Provides latest news headlines. • Provides Weather information • Identifies the user by face recognition. • Set alarms, reminders, Todo List, etc. • Reminds you to take medicines. • Can remember what you say. • Entertains you when you are bored. (By playing games, telling jokes, etc.) • Monitors power consumption. • Can control home automation. • Identifies enviornment or text. • Provides network home surveillance • Diet monitoring system to keep you healthy and help for balanced diet. • Syncs with Google Events and email. • Responds to profile predicates. • Authenticates user by speaker authentication for home security. 			<ul style="list-style-type: none"> • Gets activated by word 'NATASHA' • Listens to what you say, converts to text. Then it finds the meaning. • Takes a photo and identifies you. • From the meaning extracted, It triggers intents accordingly and then gives output in the form of Voice.
			Automation Module
			 <ul style="list-style-type: none"> • Two Lights • Two Fans • Raspberry Pi2 • Wall Socket • 5 Relays • SMPS • Voltage Converter • WiFi Module.

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EEG-BASED DRIVER ASSISTANT

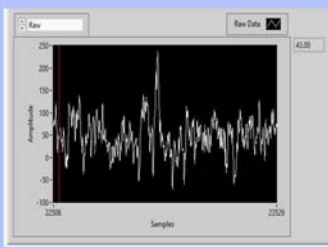
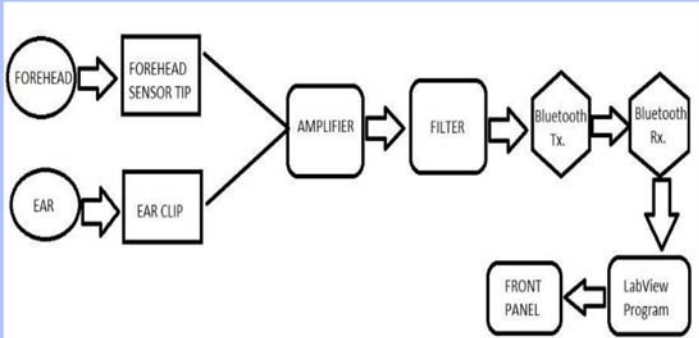
Project id: 9060

Prajnyajit Mohanty

Roll-EIE201310672

Pallem Siddharth

Roll-EIE201310122

Objective	Methodology	Conclusion	Future Work
<ul style="list-style-type: none"> •According to the report of NSF above 51% of drivers drive their vehicle in a drowsy or sleepy state and about 17% had actually fallen asleep . • The neuron pattern changes according to the human thought and mental states. • The objective is to detect drowsiness/sleepy state, drunken state while driving. 	<ul style="list-style-type: none"> • Eye blink due to the contraction of eye muscles is detected using single forehead electrode. • Alcohol state is detected by typically observation of brain wave. • Cross verification of alcohol state is done using a MQ3 alcohol sensor. 	<ul style="list-style-type: none"> • Due to its reliability, precise measurement and better accuracy it can be implemented in real life. Hence this technique will surely yield much greater benefits of saving thousands of human lives on roads every year. 	<ul style="list-style-type: none"> • Alcohol Detection system with Vehicle Controlling. • A vibrator could be connected to the steering wheel to make the driver vigilant. 

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Pencil Sorting Using LabVIEW

Project id: 9062

Manoj Kumar Swain, Roll no: 201310421

Rushali Sahu, Roll no: 201311456

Objective	Working	Block Diagram	Application
<ul style="list-style-type: none"> ➤ To sort the required pencils from a bunch of colored ones. ➤ Image processing. ➤ IMAQ vision analysis. ➤ Actuation through pneumatics control. ➤ The pencil of two different color are fired out by the nozzle to the respective boxes. 	<ul style="list-style-type: none"> ➤ The conveyor is being driven by a single phase induction motor rated 1HP. ➤ Once the conveyor starts rotating the pencils are aligned properly on the feed port so that the pencils can move to the conveyor belt. ➤ A camera is placed which detects the color of the pencil and sends it to LabVIEW. ➤ Nozzles are placed which throw the pencil once it is detected by the camera. ➤ DAQ (Data acquisition) card along with the relay board is used to control the solenoid valves. 		<ul style="list-style-type: none"> ➤ Pencil manufacturing industry ➤ Toy Industry ➤ Ball manufacturing industry ➤ Object defect detection industry ➤ Lead manufacture industry

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Nonvolatile ZnO Based Resistive Switching Memory for Transparent and Medical Electronics

S. Sachin Kumar

Roll No. 201310887

Project id: 9076

Objective	Fabrication Process	Electrical Analysis	Temperature Profile
<ul style="list-style-type: none"> • For the device To be transparent, the memory device also have to be Transparent. • Main objective: Fabricate and characterize the transparent memory device 'RRAM' 		<p>By analyzing the I-V characteristics we can calculate the barrier height.</p> <p>The non - ideal barrier height is analyzed using image charge.</p> <p>Barrier height and maximum barrier height distance changes with change in bias.</p>	<p>Filaments rupture due to the high temp. produced inside the device due to bias.</p>
<h3>RRAM Basics</h3> <p>Generally the RRAM devices are not transparent</p> <p>Types: Unipolar and Bipolar</p> <ul style="list-style-type: none"> • Transparent Oxides: TiO₂, NiO, ZrO, Nb₂O₅, GZO, ZnO • Transparent Electrodes: AZO (Al Doped ZnO), ITO • Flexible Electrode: PET 	<h3>Optical Analysis</h3> <p>Band gap Of ZnO: 3.4 eV</p> <p>Optical analysis is very important for a transparent device to know the transparency and also for calculating the optical band gap.</p> <p>• Tauc's plot gives the band gap.</p>	<h3>Switching Mechanism</h3> <p>Resistance of the device is changes in order to change the state.</p> <p>During SET, filaments are formed for forming low resistance path and during RESET, filaments rupture.</p>	<h3>Conclusion</h3> <ul style="list-style-type: none"> ➤ Annealing at 200°C and 300°C have no effect on the band gap but annealing 400°C the band gap of the device is increased. ➤ Although the barrier lowering seems to be lowering by very low value it greatly affects the leakage current through the device which depends exponentially on barrier height or SBH.

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Image Inpainting Application in a Cloud




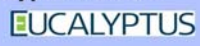
Project ID: 9113

Praveen Kumar

Roll#CSE201316358

Nurus Sabah

Roll#CSE201311508

Objective	Tools Used	Conclusion	Future Work
<ol style="list-style-type: none"> Object Removal from an Image Image Restoration SaaS Web Application 	<ul style="list-style-type: none"> PyCharm  Django  Python 3.4  Eucalyptus Cloud  	<ol style="list-style-type: none"> Successful Removal of Objects and image restoration. Qualitative Analysis using PSNR. Successfully hosted web Application as SaaS Infrastructure. 	<ol style="list-style-type: none"> Implementation of Deep Learning. Implementation Of GPU for faster calculation.

- ### Features
- Interactive Web Environment
 - User Controlled Inpainting Parameters
 - Easy Control
 - Scalable bandwidth of web Application
 - 24x7 available and Free of Cost.



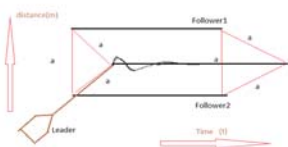
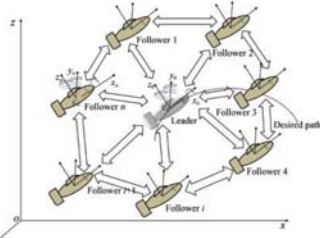
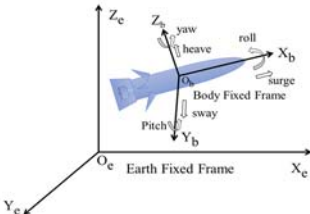
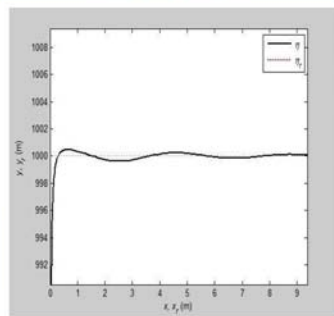
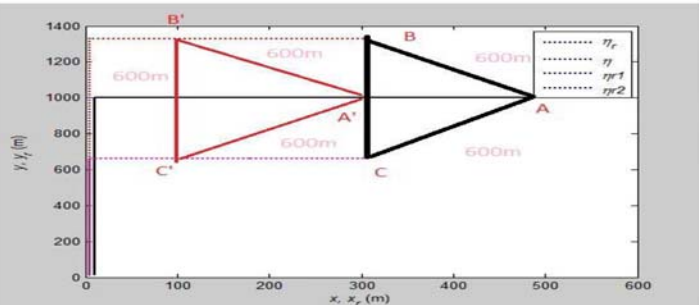


Formation control of multiple Autonomous Underwater Vehicles using PID controller

Project ID: - 9117

Suraj Kumar Roll # EEE201346247

Karan Amrendra # EE201316246 Guide: Dr. Basant Kumar Sahu

Introduction	Objective and Problem Formulation	AUV Modelling	Simulation Results
<p>Autonomous Underwater Vehicles (AUVs) are unmanned mobile robots that travel underwater.</p>  <p>Applications:</p> <ul style="list-style-type: none"> Deep sea inspections Civilians and military Detect undersea mines Detections of gas and oil pipelines 	<p>Objective: To design a leader-follower formation control law using PID controller technique.</p> <p>Problem formulation:</p>  	<p>AUV Modelling</p>  $M(v)\dot{v} + C(v)v + D(v)v + g(\eta) = \tau$ $\dot{\eta} = J(\eta)v$	<p>Simulation Results</p> <p>Single AUV</p>  <p>Formation control of AUVs</p> 

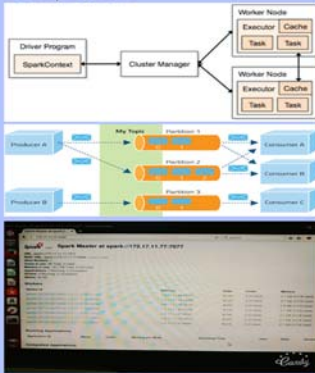
Distributed Stream Processing and Machine learning

Project id: 9124, Under Dr M. Reza

Sarit Patnaik Roll 2013102058, Sekhar Banarjee Roll 201310201

Problem statement

- Stream processing is getting more and more important as processing of real time data is becoming necessary. We have used spark clusters as computation platform.
- We have successfully integrated Kafka clusters with it which works as a message broker.
- For programming purpose python api has been used.
- We have made five tools for twitter sentiment analysis, Text summarization, Next word prediction, image classification and Data compression.



Tool Description

Image Classification

For image classification traditional deep neural nets performs really well but suffers from curse of dimensionality. We have used convolutional deep neural net, and the accuracy we got is over 97%. We also have used dropout to every layer to prevent it from overfitting.



Twitter Data Analysis

We collected the live data from twitter and using naïve Bayes classifier we classified the data as either offensive or non offensive. We used Kafka as a buffer.



Tool Description

Next Word Prediction

We have used RNN to capture the contextual dependencies of the words and base in that we will predict the next word on the sentence and have perplexity of around 6%.

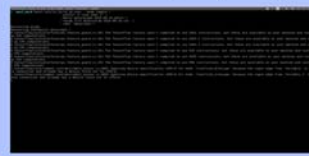
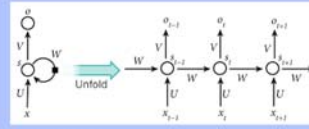


Image Compression

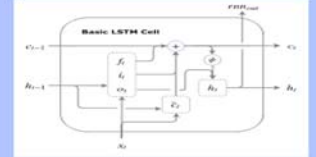
We used hybrid model of CNN and LSTM



Tool Description

Summarization

We addressed the vanishing and exploding GD problem of RNN and used LSTM to remember long term dependencies.



References

- Richard Socher, Alex Perelygin, Jean Y Wu, Jason Chuang, Christopher D Manning, Andrew Y Ng, and Christopher Potts. Recursive deep models for semantic compositionality over a sentiment treebank. In EMNLP, 2013. www.hongkiat.com/blog/free-cloud-os/ (Date : 1/11/16)

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DESIGN AND MODELING OF AN AIRFOIL TO IMPROVE ITS PERFORMANCE

Project id: 9126

Jitendra Kumar Mohanty

201310392

Nikhil Kumar Patel

201310225

PROBLEM STATEMENTS

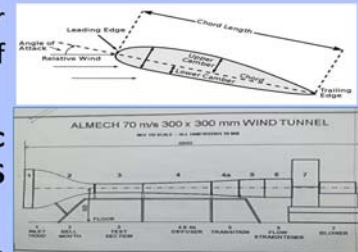
- Examine the velocity and pressure distribution of NACA-0012 Airfoil using wind tunnel experiment setup.
- Determine the Drag and Lift coefficient of the Airfoil NACA-0012 and study their variation with angle of incidence.
- Modelling of Symmetric Airfoil NACA-0012 in ANSYS (FLUENT).
- Design the optimize shape of the airfoil using ANSYS so that drag force is minimised and lift force is maximized.

Wind Tunnel Experiment

A wind tunnel is a tool used in aerodynamic research to study the effects of air moving past solid objects.

Why test in wind tunnel?

- To understand the Aerodynamics of an Aircraft.
- Submarine in Water.
- Automobile in Road.



The incompressible continuity and N-S equations

$$\frac{\partial v_x}{\partial x_1} = 0$$

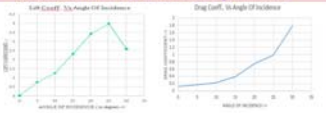
$$\rho \frac{\partial v_x}{\partial t} + \rho \frac{\partial v_x \partial v_x}{\partial x_1} = -\frac{\partial p}{\partial x_1} + \mu \frac{\partial^2 v_x}{\partial x_1^2}$$

Wind Tunnel Experiment Data

Angle of incidence (deg)	Q1 (mm H2O)	Q2 (mm H2O)	Q3 (mm H2O)	Velocity (m/s)	Lift (N)	Drag (N)	Lift/Drag ratio (L/D)	Drag (N)	Lift/Drag ratio (L/D)
0	18.00	15.20	2.80	30	0.00	0.14	0.00	0.13	0.00
5	18.00	15.00	3.00	30	0.90	0.20	0.75	0.17	4.50
10	18.00	15.00	3.00	30	1.50	0.27	1.25	0.23	5.54
15	18.00	15.00	3.00	30	2.77	0.47	2.31	0.39	5.89
20	18.00	15.00	3.00	30	4.10	0.90	3.42	0.75	4.56
25	18.00	14.80	3.20	30	5.09	1.25	3.98	0.98	4.07
30	18.00	15.20	2.80	30	2.89	2.00	2.54	1.79	1.45

Results and Discussions

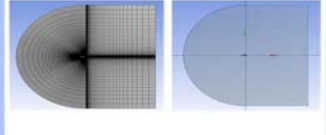
Results From Wind-tunnel experiment



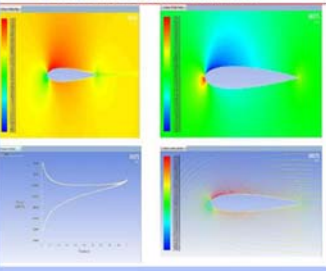
Numerical Experiments in Ansys



Geometry and Mesh View



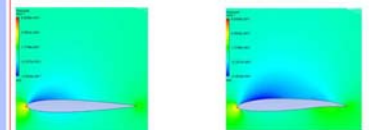
POST-PROCESSOR RESULTS



Optimization of Airfoil

- Optimization is defined as the technique through which we can change the shape of airfoil so that the drag force should be minimized and lift force should be maximized.
- We use ansys adjoint solver as a optimization technique.
- In Ansys adjoint solver we define three components i.e lift force, drag force and lift drag ratio.
- First of all we calculated the lift_drag ratio for original shape is 12.15.
- Then we change the mesh around the airfoil by using mesh – morphing tool and then we again solved and then we get the lift_drag ratio as 13.95.
- The figures of optimized shape is following.

Original shape L-D ratio-12.15



Reference
Harris, C. D., Two-dimensional aerodynamic characteristics of the NACA 0012 airfoil in the Langley 8 foot transonic pressure tunnel, NASA-TM-81927, Technical Report, NASA Langley Research Center, USA, Apr 01, 1981

McCroskey, W. J., A Critical Assessment of Wind Tunnel Results for the NACA 0012 Airfoil, NASA-TM-100019, Technical Report, NASA Langley Research Center, USA, Oct 01, 1987

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SEISMIC RESPONSE OF SOFT-STOREY BUILDINGS

Project id:9179

Sri Venkata Ramya Visali Paidigantam Roll No. CE201315926

ABSTRACT

Open ground storey is a typical feature in the modern multi-storey buildings in urban India.

Such features are highly undesirable in buildings built in seismically active areas; This has been verified in numerous experiences of strong shaking during the past earthquakes.

OBJECTIVE

To study the performance and behavior of the Soft-Storey buildings using non-linear dynamic time history analysis.

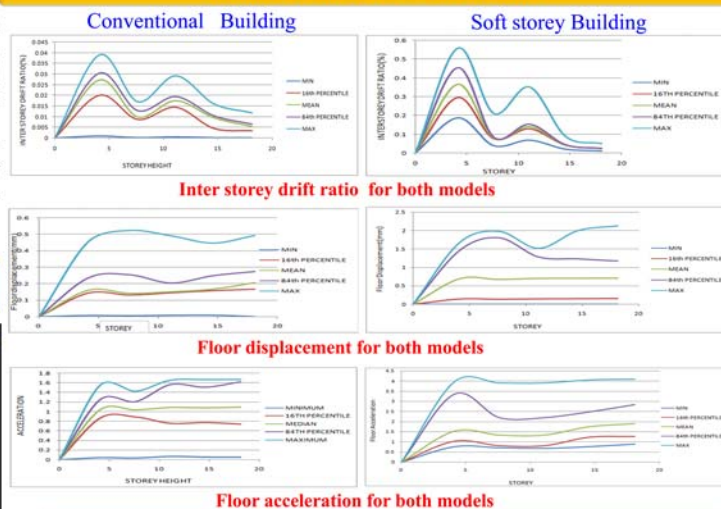
Comparison of seismic performance of soft-storey building with conventional building without soft-storey (Open ground storey)

DESCRIPTION

5 storied moment resisting frame with 4.1 m as storey height in ground storey and 3.5 m as storey height for rest of storey.

Main beams of 250mm*500 mm and Column is of 300mm*300mm in cross-section.

COMPARISON OF GRAPHS



INTRODUCTION

A Soft Storey is the one in which the lateral stiffness is less than 70 % of that in the storey above or less than 80 % of the average lateral stiffness of the three storeys above.



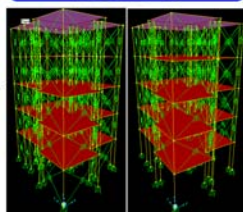
METHODOLOGY

Modeling of the representative buildings in SAP 2000 Software.

Selection and scaling of ground motion as per PEER NGA database for response spectra of India as per IS1893:2002.

Non-linear dynamic time history analysis of models.

BUILDING MODELS



Conventional Building Soft-storey Building

ANALYSIS OF RESULTS

Sl. NO.	MODELS	FUNDAMENTAL TIME PERIOD(S)	MAX. ACCELERATION(g)	MAX. DISPLACEMENT(mm)	MAX. ISD(%)
1	5 Storied conventional building with infill walls	0.84611	1.665	0.59282	0.0359
2	5 Storied OGS building with infill walls	1.34611	4.09536	2.13246	0.5589

CONCLUSION

In open ground storey building with infill walls, seismic responses gets highly increased leading to greater risk of damage.

Soft storey building should always be designed taking into consideration the seismic risk.

FUTURE SCOPE

Studying the response of the soft-storey with Shear wall in various location for minimising the seismic risk.

Studying the response of soft-storey buildings with seismic isolation devices.

REFERENCES

Saraswati Setia, Vineet Sharma, Seismic Response of R.C.C Building with Soft Storey, International Journal of Applied Engineering Research ISSN0973-4562 vol.7 No II(2012).

Raghavendra S. Deshpande, Surekha A. Bhalchandra, (2014), „Seismic Analysis of Reinforced Concrete Building with Soft First Storey” International Journal of Scientific & Engineering Research, Volume 5, pp.49-56.

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QM CALCULATION FOR THE STRUCTURAL AND ELECTRONIC PROPERTIES OF POLY(THIOPHENE)S

Project id: 9192

PIYUSH PRABHAT(201316266) and DEEPAK KUMAR ROY(201316082)

INTRODUCTION

- Polythiophene is a conducting polymer.
- Polythiophenes become conducting when oxidized.
- The study of polythiophenes and related conductive polymers was recognized by Alan J. Heeger, Alan MacDiarmid and Hideki Shirakawa.

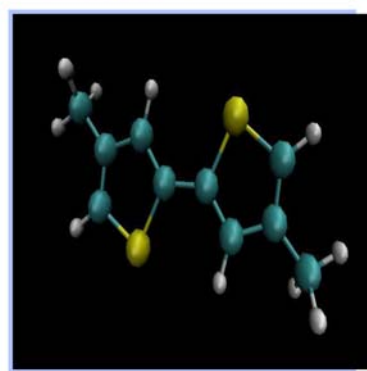
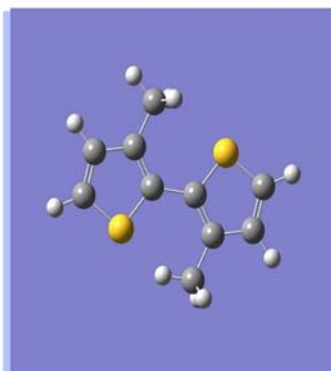
METHODOLOGIES

- All the quantum chemical calculations were carried out by using the TURBOMOLE program suite. The geometry optimizations and frontier molecular orbital properties of all compounds were carried out by employing Density Functional Theory B3LYP/TZVP level of theory.

- The obtained optimized structures were visualized by using Visual Molecular Dynamics programme.

- The quantum chemical calculations were run through Linux command and by using HP server installed at Centre for Multiscale Modelling.

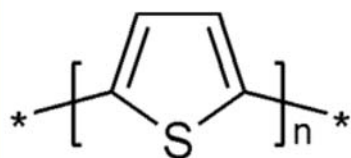
RESULTS AND DISCUSSION



HH	HT	TT	M-HH	M-HT	M-TT
+5.08 eV	+10.07 eV	+4.15eV	+4.17eV	+29.99eV	+4.19eV

SUMMARY

We would like to focus on the effect of substituents on the electronic structure of polythiophenes: such as methyl, ethyl amino or nitro groups. In addition, the phenyl-substituted polythiophenes will also be included in our study.



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PREPARATION & CHARACTERIZATION OF HONEYCOMB SANDWICH BEAMS

SUBHRANSU K PANDA (201310582)

Project Id: 9193, 9194

ADVISOR

SNEHASHISH PATRA(201310465)

AKASH RANJAN(201316879)

Dr. P. S. RAMA SREEKANTH

SIBASISH DASH (201318127)

Introduction

Sandwich structure is a special form of a laminated composite formed by two thin stiff skins (or face) separated by a thick core.

Advantages:

- Better Strength-Weight ratio
- bending resistance
- shock absorption capacity
- Blast Resistance



Fig. Sandwich structured beam

Figure 1: Honeycomb-Sandwich Beam



Figure 2: Applications of Sandwich Beams

Material Preparation

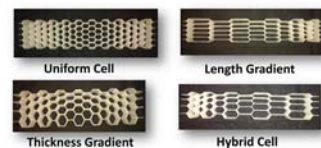
Material used for face sheet preparation:-

- > High density polyethylene (HDPE)
- > Multi-walled carbon nano tube (MWCNT)
- > Graphite nano diamond (GND)
- > Graphite nano platelets (GNP)



Core preparation-

- CREO models of honeycomb cores have been prepared and 3d printed using nylon.
- **Uniform Cell-** 10mm, 12mm, 15mm, 21mm, 27mm, 36mm
- **Length Gradient-** length of longest diagonal is kept in decreasing order from left to right.
- **Thickness Gradient-** structure thickness of the shell is kept in decreasing order from top to bottom.
- **Hybrid cells-** combinably kept the length wise and thickness wise gradient and made these type of hybrid structure



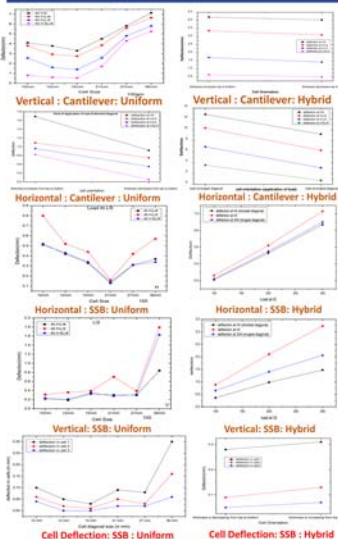
Sandwich preparation-

1. 28 mm wide honeycomb core was machined by surgical knife
2. Roughen the face sheets by 120 grit sandpapers to ensure appropriate adhesive's bonding.
3. Face sheets were then bonded to the top and bottom of the honeycomb core with (Epoxy) adhesive
4. The assembly was cured under pressure of approximated free weights for 24 hours.

Testing Methods

Types of Testing	Cantilever Beam	Simply Supported Beam	Cell Deflection Test
Orientation of Core	<ul style="list-style-type: none"> □ Vertical Orientation □ Horizontal Orientation 	<ul style="list-style-type: none"> □ Vertical Orientation □ Horizontal Orientation 	<ul style="list-style-type: none"> □ Vertical Orientation
Amount of Load Applied	50,100,150 (gm)	100,200,300 (gm)	200,300 (gm)
Point of Application of Load	At Free End	At 1/4, At 1/2, At 3/4	At 1/2 and At 1/0
Dimension of Core	207*20*51.2	207*20*51.2	207*20*51.2
Points At which Deflection Measured	At 1/0, At 1/4, At 1/2, At 3/4	At 1/4, At 1/2, At 3/4	Cell-1, Cell-2, Cell-3 others have zero deflection.

Analysis Results

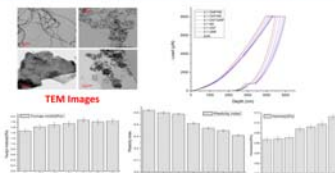


Lap Shear Test

Sample	STRESS (N/mm ²)
0.1%GND	0.334521669
0.1%GND+0.1%MWCNT	0.334521669
0.1%MWCNT	0.942742885
0.2%GND+0.1%MWCNT	0.334521669
0.05%GND+0.1%MWCNT	2.554529109
CORE MATERIAL(NYLON)	2.736995474

This test has been done to find out the lap shear strength of adhesive for different composition of Nano fillers in the skin material and material of core.

Nanoindentation



Conclusion

- > The beam deflection for uniform cells was least for 15mm cells in Vertical Orientation and 21mm cells in Horizontal Orientation.
- > The beam deflection for Length Gradient cells was found less when load was at shortest diagonal both in Vertical and Horizontal Orientation.
- > Beam deflection for Thickness Gradient cells found less when thickness decreases top to bottom both in Vertical and Horizontal Orientation.
- > The beam deflection for Hybrid cells was found less when thickness decreases from top to bottom and load is at longest diagonal both in Vertical and Horizontal Orientation respectively.
- > In case of horizontal and vertical orientation the moment of inertia and cell deflection plays a major role for deflection.
- > Lap shear strength is highest for 0.1% MWCNT & 0.05% GND.

Acknowledgement

•We extend our heartfelt thanks to Mr. Santosh Kumar Sahu, Department of Mechanical Engineering, NIST, Berhampur for his constant support.

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ResQ: A 3D Game

Project id: 9205

Sandeep Kr. Behera

Roll#CSE201310187

Prem Prakash

Roll#CSE201316046

Objective

1. Help a old woman to cross the road.
2. Help a boy trapped in a tree.
3. Help a woman who is attacked by a tiger.
4. Help the people trapped in a flood.

Tools Used

1. For Designing :
 - a) Adobe Photoshop
 - b) Adobe Mixamo
 - c) Adobe Fuse
 - d) Autodesk Maya
 - e) Autodesk 3ds Max
2. For Developing
 - a) Unity3D
 - b) c# Programming

Conclusion

1. Adventure based Social PC Game
2. Large Target Audience
3. Playable in a simple PC
4. Interesting Missions
5. Increase SOCIAL AWARENESS

Future Work

1. Develop more levels
2. To make it VIRTUAL Reality Supported
3. Multiplayer
4. Support for cross Platform
5. Publish it in market.



Features

1. Interactive Environment
2. AI based Game
3. Real Camera Effect
4. Pre Process Effect for camera
5. Map for mission Location
6. 3D Sound Effects
7. Easy controls

Methodology

1. Help needy.
2. Collect Tips
3. Use Tips to help again



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Aim and Objective	Methodology	cont..	Results
<p>AIM - To do experimental and numerical analysis on mechanical properties obtained by polypropylene and its composites prepared by mixing polypropylene with fly ash and zircon sand as particulates filler reinforcement materials at different weight percentages and comparing the obtained experimental results with results obtained from finite element analysis.</p> <p>Applications -</p> <ul style="list-style-type: none"> In the aircraft structures and aerospace industries Sporting goods suppliers who sell high-performance equipment in the field of golf, tennis, fishing, canoes and archery markets as well as in the swimming pool industry with Composite wall structures. Containers, electrical circuits and other household equipment Bullet-proof vests and other armor parts Brake and clutch linings 	<p>Experimental Procedure -</p> <ol style="list-style-type: none"> Collection of powder and powder preparation Fly ash powder and Zircon Sand Composite Preparation Tests Performed - <ul style="list-style-type: none"> Tensile Test Flexural Test Impact Test 	<p>cont..</p> <p>From the comparison, FEA obtained higher values and the results show that FEA is better than experimental.</p>	<p>Results</p> <p>Conclusions</p> <ul style="list-style-type: none"> Fly ash composites showing better results in tensile and impact test. 5% fly ash composite showing better flexural strength than other specimens. Fly ash composites showing higher surface roughness due to lower density of fly ash than zircon sand. Zircon sand composites absorbed more water in comparison to fly ash composites.

Design and Implementation of GPRS Controlled Home Automation System on FPGA using Verilog FSM

Project id: 9285

Swastik Ranjan Nanda Roll#ECE201310797 & Subhasree Subhasmita Senapati Roll#CSE201347362

Guided by Mr. Manoj Kumar Senapati

Introduction	Features	Architecture & Results
<p>Home automation or smart home is the residential extension of building automation and involves the control and automation of lighting, heating, ventilation, air conditioning, and security, as well as home appliances such as washing machine, ovens or refrigerators.</p> <p>Modern home automation system uses different technologies like IOT, remote controlled systems, mobile applications, Arduinos & Raspberry Pis etc. Here in this project we have used GPRS module & FPGA using Verilog FSM for the home automation system.</p>	<ul style="list-style-type: none"> We can control different gadgets of our house remotely by simply messaging. As we are using FPGA we can implement more things with automation like we can control more number of gadgets easily and we can also include security system in it. By taking reference to this we can implement automation in different fields using FPGA Through this project we had implemented the UART on FPGA for which we can be able to communicate between two FPGAs and the communication between FPGA and computer is also possible. 	<p>Architecture-</p> <p>Results-</p>
<p>Aim & Components</p>	<p>Conclusion & Future Work</p>	<p>Through this project we had succeed in communication between two FPGAs, interfacing FPGA with computer and interfacing GPRS modem with computer through AT commands. After interfacing the GPRS modem with FPGA we can be able to build the whole home automation system.</p>
<p>Our aim is to develop a GPRS controlled home automation system on FPGA using Verilog FSM. We have used Xilinx 14.7 tool for implementing the project and the components we have used are FPGA, GPRS module, Relay, Mobile Phone. Message will be sent from the mobile and that will be read by the GPRS modem and accordingly the operations will be performed like turning on and off lights, fans etc.</p>		

SAR Logic Design for Successive Approximation ADC for Biomedical Application, project id-9296

Chinmayee Mishra
Akleshore Panda

Priyanka Satapathy
S. Bandita Panda

Priyanka Mishra
A. Dayanand Gupta

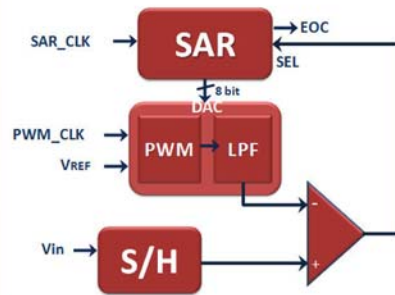
G. Abraham
Aswini Tripathy

Ansuma Panda
Jyotirmayee Tripathy

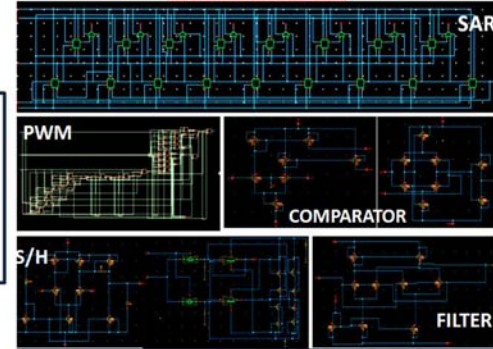
INTRODUCTION

- There is a growing need for Successive Approximation Register ADC(SAR ADC) in biomedical application such as pacemaker, cardiac defibrillators and blood glucose monitor.
- The biomedical devices often operate only with a battery. Therefore, it is desirable to fully utilize the energy without sacrificing the performance of the system. The Analog-to-Digital Converter (ADC) needs to be designed for minimum power consumption from system level to circuit level.
- Successive approximation register is the block which enables the ADC to do the binary search operation. In other words, one bit is determined in each clock cycle using binary search algorithm.
- A low power 8-bit Successive Approximation Register ADC is designed using umc180nm technology using cadence tool in virtuoso and encounter platform. Low power consumption is one of the main design constraints in today ICs. For systems that are powered by small non rechargeable batteries over the entire life time, such as medical implantable devices, low power consumption is important. The designed and obtained results predict that the SAR ADC consumes 452.663uW power. The frequency of operation is 2MHz. The slow rate of 8 bit output is 3.967×10^6 V/s. Supply voltage is 1.8V. Lowest significant bit (LSB) is 3.906mV. One conversion cycle takes 4us. The layout takes an area of 0.0522 mm².

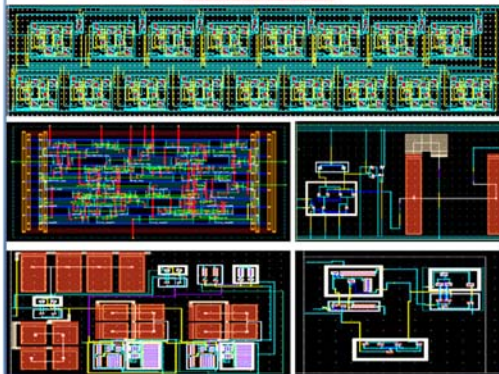
BLOCK DIAGRAM



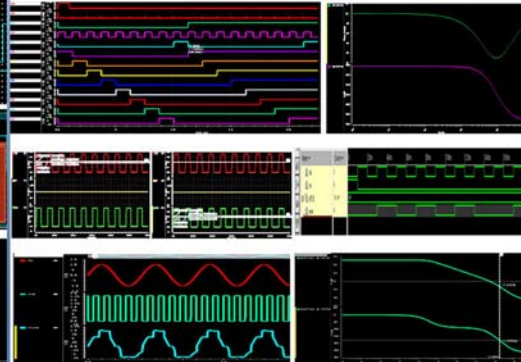
DESIGN SCHEMATIC



DESIGN LAYOUT



DESIGN ANALYSIS



DESIGN RESULTS

PROPERTIES	SPECIFICATIONS
Technology	180nm
Resolution	8 bit
Power consumption	452.663uW
Propagation Delay	1.028ns
DC Supply Voltage	1V
Input Voltage	0-1.8V
Lowest Significant Bit	3.906 mV
Conversion Time	4us
Logic output high voltage	1V
Logic output low voltage	26.533 mV
Leakage current	7pA
Gain	66.78dB
Phase margin	58deg
CMRR	92dB
Slew rate	18V/u
Bandwidth	55.21MHz

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DESIGN OF DDR SDRAM CONTROLLER FOR EMBEDDED SYSTEM

Project id: 9318

SHULAGNA BHATTACHARYA(ECE201311845) & LOKESH SINHA (ECE201316687)

Introduction

- Double data rate (DDR) SDRAM—SDRAM latches command information on the rising edge of the clock and data on the falling edge of the clock.
- A DDR SDRAM controller works as an interface between processor and SDRAM so that it could achieve high speed data transfer.
- The command and address signal flows from processor at normal clock but data fetching and dispatching are done at twice the normal rate.
- The target is to implement a low area and low power consuming automated design so that design could be emphasized and required timing operation could be obtained without disturbing any other constraints.



Description

Top Module

The Top module integrates the functionalities of all the five modules to function as a DDR SDRAM Controller on the top level.

Refresh Management Module

We employ a refresh management module which will send periodic refreshes to the DDR SDRAM Here we employ a 500ms refresh signal.

Address Decoder Module

The address decoder module gets its control signals from the controller, and generates row address column address, chip select and bank select for the DDR SDRAM.

Control Interface Module

The control module controls the flow of signals to the memory by receiving it from other modules.

Command FSM and control generation

It passes signals such as RAS, CAS, Chip Select, Bank Select, no operation, precharge and clk enable which are used to select the desired row, column, chip and bank respectively. It also decides depending upon the read enable and write enable signals from command control module and decide when to enable data path modules and in which direction.

Data path Module

The data path module performs the data latching and dispatching of the data between the Processor and DDR Memory. Data between the user interface and the DDR SDRAM is transferred at both the rising edge and falling edge of the clock input.

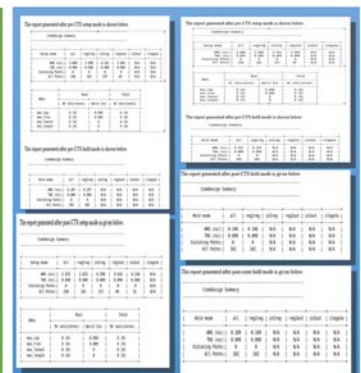
- The five modules are:
- Control Interface
 - Address mapping
 - Refresh management
 - Command FSM and Control generation
 - Data path



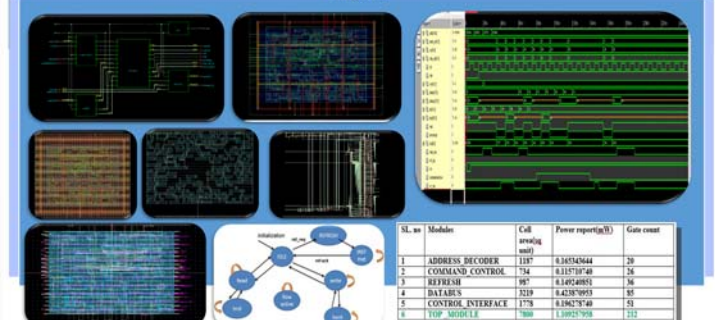
Simulation



Reports



Figure



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Waste & Recycled material on concrete technology

Project id: 9335

Chandan Kumar Mahto (201316730) & Pradyumna Behera (201310281)

INTRODUCTION

- Waste ∞ Population
- The non-decaying waste cause a waste disposal crisis.
- Follow **WASTE HIERARCHY**
- aim is reduce, recycle and reuse



OBJECTIVES

- To study compressive strength of concrete using waste material as partial replacement of fine & coarse aggregate.
- To find the alternative of basic materials which can be used in construction unit.
- To reduce or utilize the waste generated
- Cost reduction & environmental benefits

QUESTION

ARE NATURAL AGGREGATE ENOUGH FOR FUTURE CONSTRUCTION ????? ?

Replacing material
 Fine aggregate ===== Glass powder
 Coarse aggregate ===== coconut shell

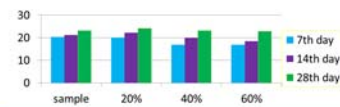


CUBES WITH GLASS

- Common product found in different forms which have limited life.
- It is Non biodegradable
- Need to be reused or recycled to avoid environmental problems
- Glass powder based concrete is a good alternative to overcome the problem of sand

SIZE	PERCENTAGE
2.36 mm – 1.18 mm	30%
1.18 mm – 425 micron	50%
<425 micron	20%

Specimen	7 th day strength in MPa	14 th day strength in MPa	28 th day strength in MPa
Normal cube	20.4	21.2	23.1
20%	20	22.18	24.1
40%	16.9	19.9	23.2
60%	16.9	18.4	22.8

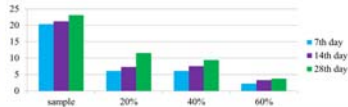


CUBES WITH COCONUT SHELL

- It is an agricultural biodegradable waste.
- India manufactures 15,730 million nuts annually, which is next to Indonesia with 16,498 million.
- Coconut shells dumped improperly to the environment provide breeding places for disease vectors such as rats and mosquitoes
- It is a light-weight material and has low dead loads



Specimen	7 th day strength in MPa	14 th day strength in MPa	28 th day strength in MPa
Normal cube	20.4	21.2	23.1
20%	6.1	7.34	11.6
40%	6.1	7.5	9.4
60%	2.21	3.31	3.7



COMPARISON

Ordinary concrete	Replaced concrete
Normal strength	Improvement in strength
Workability is normal	Workability is improved
Durability is normal	Durability is high
Cost is high	Cost is reduced
concrete posses large volume of aggregate	Aggregate used is less in volume
Product of large scale natural resource exploitation	Product of reduced natural resource exploitation

CONCLUSION

- It is identified that all wastes used here can be disposed by using them as construction materials.
- Cubes with 40% replacement of sand with glass powder gives equivalent strength as of conventional concrete.
- Cubes with 20% replacement of C.A with coconut shell gives maximum strength of 11.2 MPa which could be used for works of less importance.
- Cubes with 10% replacement of both C.A & sand with glass powder & coconut shell gives comparable strength as of conventional cube.
- Vast potential of saving the natural beds of stones, boulders & sand
- It also reduces the cost of construction when used in bulk.



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Optimum location of shear walls in RC buildings

Project id: 9362

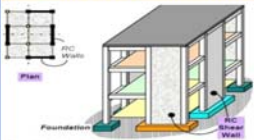
Sudeep kumar Das #CE201310404

Sourav kumar Mohanty #CE201314925

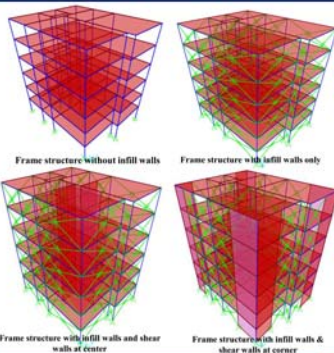
INTRODUCTION

WHAT IS A SHEAR WALL?

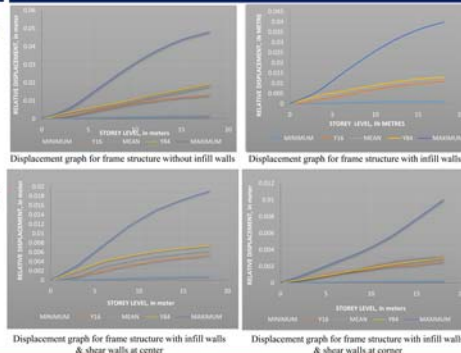
shear wall is a structural system which provides strength & stability to structure from lateral loads like wind load, seismic load.



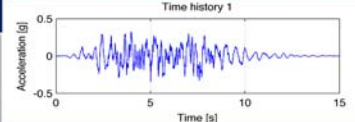
DIFFERENT MODELS OF THE BUILDING



DISPLACEMENT SPECTRA OF ALL MODELS



TIME HISTORY ANALYSIS



CONCLUSION

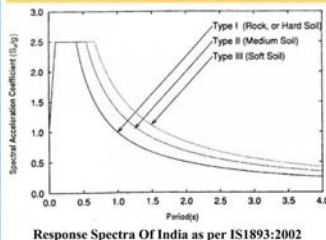
- When shear walls are provided on corner max storey displacement & max storey acceleration of this building are decreased comparing to when shear walls are provided on center portion.
- Building with shear wall at corner position proves to be a better alternative than shear wall at center position for this building model in earthquake prone area.

METHODOLOGY

- Modelling of building models in SAP2000 without shear walls is done and with shear walls in various locations is done.
- Selection and scaling of time history data as per PEER NGA database as per IS 1893:2002 response spectra of India.
- Dynamic Non-linear Time history analysis is carried out using SAP2000.

RESPONSE SPECTRUM

A response spectrum describes the maximum response of a single degree of freedom system to a ground motion.



ANALYSIS RESULTS

NO.	MODELS OF BUILDING	MAX ISD (%)	MAX Displacement (metre)	MAX Acceleration (in g)	MAX Velocity (in m/sec)
1	Frame structure	0.01705	0.0449	8.4041	0.6145
2	Frame structure with infill wall	0.0174	0.0401	5.7930	0.4399
3	infill wall & shear wall at corners	0.01080	0.0115	6.9728	0.257
4	infill wall & shear wall at center	0.011724	0.0197	8.6731	0.0100

FUTURE SCOPE

- Study of coupled shear wall.
- Study of shear walls in soft storey buildings.



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- Paulay T. Equilibrium criteria for reinforced concrete beam-column joints, ACI structural journal, 86, pp-635-643, 1989.
- Tzonos AG, Tegos IA, PenelisGG. Seismic resistance of type 2 exterior beam-column joints reinforced with inclined bars, AC structural journal, 89,3-12,1992

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Data Viewpoints : A Web Based Mathematical Analysis Software

Project id:9387

Bhawmesh Dipu CSE201316665
Debadeepta Rath CSE201311643

Introduction

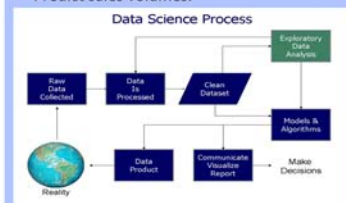
Data visualization is the presentation of data in a pictorial or graphical format. It enables decision makers to see analytics presented visually, so they can grasp difficult concepts or identify new patterns.

The way the human brain processes information, using charts or graphs to visualize large amounts of complex data is easier than poring over spreadsheets or reports.

Data visualization is a quick, easy way to convey concepts in a universal manner

Data visualization can also:

- Identify areas that need attention or improvement.
- Clarify which factors influence customer behavior.
- Help us to understand which products to place where.
- Predict sales volumes.



Data visualization is one of the steps in analyzing data and presenting it to users.

Aim

- The web based visualization tool aims to provide visualization of data in different ways .
- It gives user the flexibility to visualize the data with a web based user interactive page.
- The user has the flexibility to create artificial neural network to train and predict the data

Challenges

- Understanding the data
- Understanding what user want to see
- Understanding the format of visualization and its strengths and limitations

Development

The web based tool is developed using the django web framework using python as a backend language with its different packages used for full filling the different need of user.



Method

- Users need to select the type of graph they want to solve such as line,scatter,function,3D etc.
- Based on the selection, a webpage asking for all the details related to that problem will appear.
- Users can either fill in the details or upload a excel sheet corresponding to their graph .
- Click on the Plot button . The details is transferred to the Dango server.
- The graph is generated . If any error, then it is displayed

Conclusion

- The focus is largely on standard line, bar, and pie charts over other types of data visualizations.
- Academic audiences are the most common target audience
- There appears to be a lack of understanding about how to tailor design choices to ensure that visualizations are communicating a more focused and compelling message
- It is significantly faster to analyze information in graphical format
- Even extensive amounts of complicated data start to make sense when presented graphically.



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Hardware Friendly Machine Learning

Project id:9407

Sheetal Sahu(201317804) Amit Kumar(201310632)

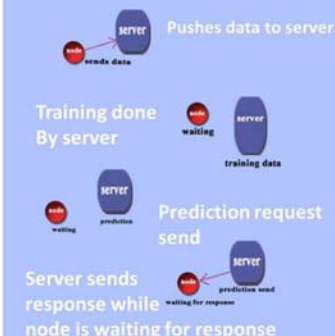
Prevalent Architecture

Embedded boards are:

- Light weight
- low storage
- Low computational power
- Low bandwidth

Demerits

- Lacks Global Training
- nodes wait for server to give response
- Knowledge sharing is not possible
- Does not support real time decision making.



Proposed Architecture



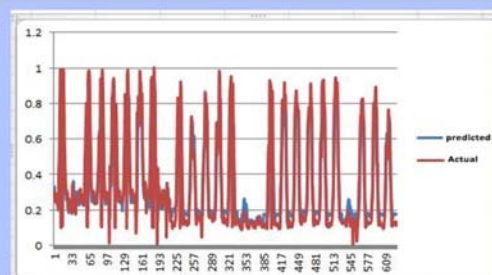
Benefits

- Communication overhead is reduced.
 - Real time decision making
 - Global knowledge
 - Knowledge Sharing
 - Enhances accuracy and reduces error
- ### Applications
- Outlier detection
 - Driverless vehicles
 - Distributed Vehicle training to reduce accidents

Implimentation And Results

Building wise energy consumption of NIST for past 2 years. Each building generates their training file. Global training on these files at the server. The generated model file is sent to respective nodes. Local real time prediction can be performed at node level.

The model with mean squared error of 1.6%



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Braille Reader

Project id: 9408

Rashmi Kumari- 201317121

Snigdha- 201318348

Problem Statement

The project consists of three major parts:

◆ Taking images using raspberry pi camera and segmenting them into some identifiable Braille characters



◆ The identifiable Braille characters is subjected to character recognition algorithm to convert into English alphabets.

◆ The English alphabets is converted to voice using Text to Speech functionality.



Understanding Braille

Braille is a specialized writing system for visually impaired people, where raised dots on embossed paper are used as tactile alphabet.

A Braille character is a rectangular array of six 6 dots, 2 across and 3 down, is considered the basic unit for all Braille symbols. These dots makes up to sixty-four possible combinations of different character set or sequence of characters using 1 to 6 dots.

The Braille Cell

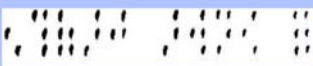
1 ●●4
2 ●●5
3 ●●6

Image Processing

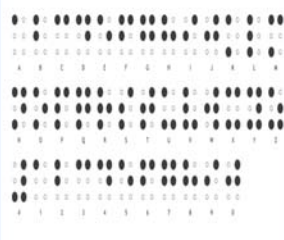
Contrast Stretching & Intensity Enhancement:



Thresholding:



Braille Representation of English Alphabet:



Binary Encoding

We have set the threshold for differentiating between black and white pixel as:

BLACK = (127)

WHITE = (255)

Pixel Value	Binary	Hex	Dec
0	00000000	00	0
1	00000001	01	1
2	00000010	02	2
3	00000011	03	3
4	00000100	04	4
5	00000101	05	5
6	00000110	06	6
7	00000111	07	7
8	00001000	08	8
9	00001001	09	9
10	00001010	0A	10
11	00001011	0B	11
12	00001100	0C	12
13	00001101	0D	13
14	00001110	0E	14
15	00001111	0F	15
16	00010000	10	16
17	00010001	11	17
18	00010010	12	18
19	00010011	13	19
20	00010100	14	20
21	00010101	15	21
22	00010110	16	22
23	00010111	17	23
24	00011000	18	24
25	00011001	19	25
26	00011010	1A	26
27	00011011	1B	27
28	00011100	1C	28
29	00011101	1D	29
30	00011110	1E	30
31	00011111	1F	31
32	00100000	20	32
33	00100001	21	33
34	00100010	22	34
35	00100011	23	35
36	00100100	24	36
37	00100101	25	37
38	00100110	26	38
39	00100111	27	39
40	00101000	28	40
41	00101001	29	41
42	00101010	2A	42
43	00101011	2B	43
44	00101100	2C	44
45	00101101	2D	45
46	00101110	2E	46
47	00101111	2F	47
48	00110000	30	48
49	00110001	31	49
50	00110010	32	50
51	00110011	33	51
52	00110100	34	52
53	00110101	35	53
54	00110110	36	54
55	00110111	37	55
56	00111000	38	56
57	00111001	39	57
58	00111010	3A	58
59	00111011	3B	59
60	00111100	3C	60
61	00111101	3D	61
62	00111110	3E	62
63	00111111	3F	63

Conclusion:

The project will serve as a great help for visually impaired people and their close ones. The device can also be used to digitally interpret and store Braille writing. It will not only benefit the sightless but also to the sighted, who are interested in reading Braille literature and they will be able to share their knowledge and thought.

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TWO MACHINE LEARNING APPROACHES FOR SHORT-TERM WIND SPEED TIME-SERIES PREDICTION

Deepak Ku. Nayak (CSE #201312264) & Biswajeet Mishra (CSE #201310616)

Project ID: 9433

Guided by: Dr. K. Hemant Reddy

INTRODUCTION

- Electricity consumption is ever increasing
- Renewable sources of energy if harnessed efficiently can help meet this requirement
- However, the intermittent characteristics of the sources prove to be a challenge
- Power generation using wind speed is considered in this project
- For scheduling of the maintenance work to optimize power generation and safety, time series prediction of wind speed in PI is essentially important

OBJECTIVES FUNCTIONS

$$PICP = \frac{1}{n_p} \sum_{i=0}^{n_p} c_i$$

$$NMPIW = \frac{1}{n_p} \sum_{i=0}^{n_p} \frac{(U(x_i) - L(x_i))}{y_{max} - y_{min}}$$

Max PICP(w)
Min NMPIW(w)
s.t. $0 \leq PICP(w) \leq 1$
 $NMPIW(w) \geq 0$.

Note:

PICP : Prediction Interval Coverage

Probability

NMPIW : Normalized Mean Prediction Interval Width

APPROACH 1

Multi Layer Perceptron Neural Network- Multi Objective Genetic Algorithm (MLPNN-MOGA)

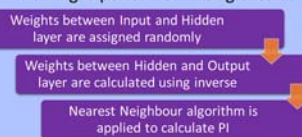
- Consists of one hidden layer
- Training of weights of NN is performed using MOGA



APPROACH 2

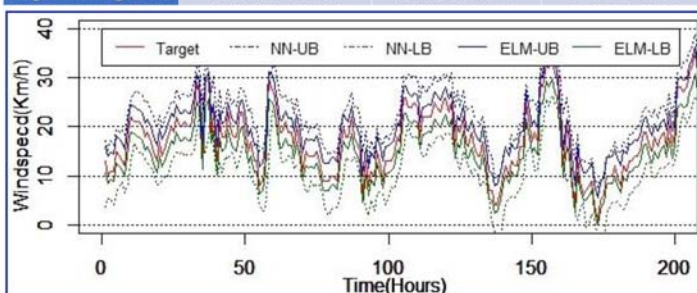
Extreme Learning Machine-Nearest Neighbour (ELM-NN)

- ELM is a single layer feed forward neural network
- Training is performed in single iteration



COMPARISON

	Optimisation Objective	MLPNN-MOGA (Approach 1)	ELM-NN (Approach 2)
Average PICP	Maximisation	0.79	0.91
Average NMPIW	Minimisation	0.19	0.11
Avg. Training Time	Minimisation	300 seconds	100 seconds



DATASET

- Dataset consists of hourly data of wind speed from the Saskatchewan area of Canada.
- Summer dataset (Jul-Aug 2016)
- Winter dataset (Feb-Mar 2016)

CONCLUSION

- Good accuracy and generalization ability for both the applied algorithms
- ELM producing comparatively better results for PICP and NMPIW than MLPNN-MOGA
- ELM is faster than MLPNN-MOGA
- Data-driven and depends highly on the representativeness of the training data set

REFERENCE

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- G.-B. Huang, Q.-Y. Zhu, and C.-K. Siew, "Extreme learning machine: Theory and applications," Neurocomputing, vol. 70, nos. 1-3, pp. 489-501, 2006

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Soft-Switching in DC-DC Converters

Project id: 9479

Subham Kumar Nanda (EE201310708), Anil Kumar Sarangi (EE201310624)

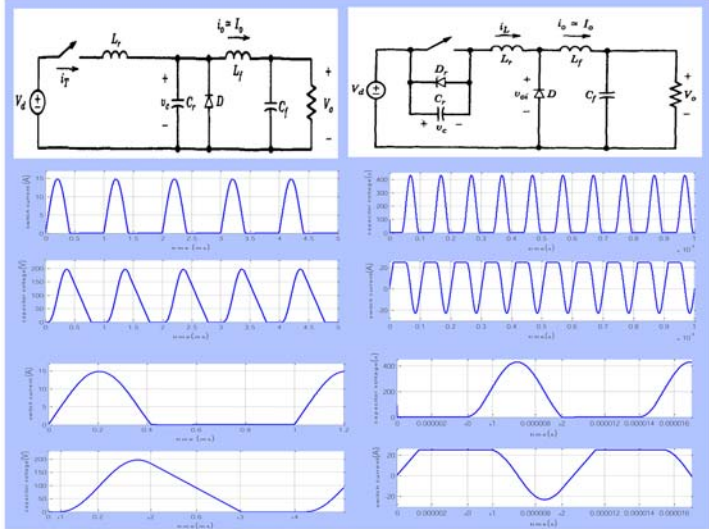
Introduction

Hard switching occurs when there is an overlap between voltage and current when switching the switch on and off. In hard switching converters, the simultaneously high voltage and current associated with the switch during the switching transition, causes power losses in the switch that increase linearly with the switching frequency. At high switching frequency, the switching losses become unacceptable if hard-switching is used, and hence soft-switching is often employed.

Soft-Switching

The goal in soft-switching is that the switching transition of the switch occurs under very favorable conditions, that is, the switch has a zero voltage and/or zero current associated with it. Based on these conditions, the soft-switching circuits can be classified as: ZVS (zero voltage switching) and ZCS (zero current switching). In ZCS topology the switch turns on and turns off at zero current and in ZVS topology the switch turns on and turns off at zero voltage.

ZCS and ZVS dc-dc Converter (step down)



References

- [1] N. Mohan, T. M. Undeland, and W. P. Robbins, *Power Electronics: Converters, Applications and Design*, 3rd Edition, New York: John Wiley & Sons, 2003.
- [2] N.Mohan, *Power electronics a First Course*, New York: John Wiley & Sons, 2003.

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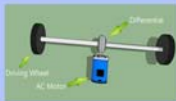
DEVELOPMENT OF SMART ELECTRIC VEHICLE

Abhisek Negi#201310441, Ankit Singh#201310497, Samrat Pushpesh#201316139, Nirmalendu Mahato#201310533, Sukant Kumar Singh#201318596, Bineet Kumar Jha#201310364

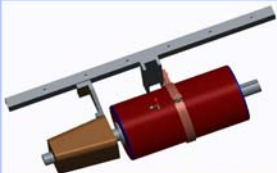
Mechanical

Motor directly coupled with differential which

- eliminates need of gear box.
- increases efficiency.
- Cheap & simple.
- Light weight.



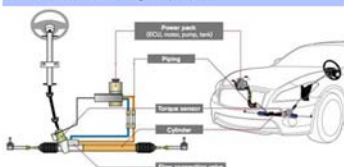
Realignment of motor



We have the calculation of CG of car for battery management.

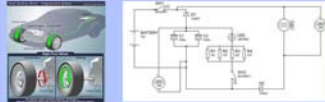
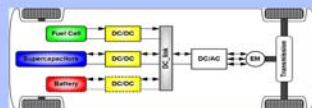


Steering control by assembling a stepper motor to the hydraulic steering system which will adjust itself to withstand its torque and gives a comfortable steering response.



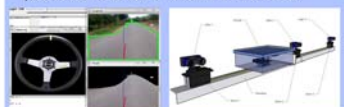
Electrical

- Prototype model for regenerative braking System
- Recovers 20% of full charge of batteries with regenerative braking system
- Different switching states for regenerative braking process
- Super capacitor based fast voltage storage system to use it later on for battery charging
- Recover of electrical energy during driving of car
- Tested out and connected DC MOTOR with controller for more torque and efficiency



Embedded

- Different sensor for sensing the surrounding
- LIDAR sensor for 2d Mapping of the environment
- Image processing detecting the road and finding out the centroid
- PID controller method for controlling the steering wheel and navigating the car to the center of the road
- Implementation of fuzzy logic for emergency brake control and decelerating the car
- Development of android app for inter-vehicle communication, Finding peer, pooling system
- Neural network for making a self driving car
- Testing the network on a robot before trying on a real car
- Merging different sensors and embedded controller with the hardware of the car
- Automatic honking system for alerting pedestrian and other vehicle on the road.



Result

Direct coupling of motor with differential will give greater efficiency which will again use the strength of regenerative braking to drive the car for further more distance and increased efficiency. Enhanced electric drive will provide green and more reliable energy.

Our car is safer for drive and it is in the way to becoming a self-driving car. Automatic honking system will blow horn without driver intervention. Fuzzy logic along with LIDAR sensor makes the intelligence power to the car for an autonomous driving experience. Capability to distinguish different object and calculating its distance will make the car on the road inevitable. Connecting the hardware of the car to the embedded controller will allow the artificial intelligence to control it as required. Inter-vehicle communication will reduce the chance of confusion during drive.



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Robust Frequency Control In An Islanded Microgrid

Project id: 9512

Amit Kumar & Vinod Kumar bearing Roll No: 201316737 & 201316784

Section 1

Abstract

This paper presents a robust frequency control in an islanded AC Microgrid (MG). The Microgrid considered in this paper consists of distributed energy sources (DES). This includes micro turbine (MT), diesel engine generator (DEG), fuel cell (FC), renewable energy sources like wind turbine (WT), photovoltaic panels (PV), and energy storage systems like battery energy storage system (BESS) and flywheel energy storage system (FESS). The load fluctuation, wind power fluctuation and solar irradiation fluctuation often influence the frequency of the MG. So to tackle this problem, a proportional-integral-derivative controller (PID) is designed and optimized by using the stochastic fractal search (SFS) algorithm. The proposed controller is very effective and able to eliminate the frequency deviation in a short time. The time-domain simulation results obtained by SFS based PID controller are compared with the results obtained by SFS based PI controller to show the effectiveness of the proposed controller. From the comparison, it can be observed that proposed controller gives better frequency stability and hence improves the frequency of the MG significantly.

Introduction

With the increasing use of conventional energy sources for producing electricity, CO₂ and other greenhouse gases have drastically increased in the atmosphere which are causing many health issues and has a bad impact on environment. So, in order to avoid these circumstances many alternative energy sources have been discovered. Some of these are renewable energy sources which are connected in microgrids (MGs). The proposed MG consists of WTGs, DEGs, PVs, FCs, BES, and FES systems. Environmental and economic constraints are the main factors of choosing DERs for an islanded MG system. Since the produced power by RESs such as PVs and WTGs depends on the weather condition, the RESs are not preferred to be used for secondary frequency control. The MT and DEG units usually supply electrical energy for demand side to compensate the electrical energy deficiency. However, they have a slow response time and cannot handle MG control for sudden changes in load and power. So for improving the MT or DEG control efforts, coordination with energy storage systems is required to quickly compensate deviations.

Modelling of Microgrid



Fig. 1.62: MG dynamical frequency response model

Since, the produced power by the RESs such as PVs and WTGs depends on the environmental condition; they are not commonly used for frequency regulation, so in this paper, for secondary control problem, MT, DEG, and FC are considered. In secondary frequency control loop, the fluctuations in load, WTG, and PV output powers are compensated by decrease/increase in the DEG, MT, and FC output powers.

Section 2

The total power generated by distributed resources for supplying demand side $P_{Load} = P_{DEG} + P_{MT} + P_{WTG} + P_{PV} + P_{FC} \pm P_{BES} \pm P_{FES}$ Eq. (1)
The power flowing from MT, WTG, DEG, PV and FC are unidirectional so they are added in the above equation but power flowing to/from BES and FES are bidirectional. Hence, both added and subtracted in the above equation.

Table 1: Parameters of Frequency response model

Parameters	Value	Parameters	Value
D (pu/Hz)	0.012	T _{mtg} (s)	2
M (pu/s)	0.2	T _{wtg} (s)	2
T _{deg} (s)	4	T _{pv} (s)	1.5
T _{bess} (s)	0.1	T _{fes} (s)	1.8
T _{fess} (s)	0.1	-----	-----

Structure of Controller

A PID controller continuously calculates an error value as the difference between a desired set point and a measured process variable and applies a correction based on proportional, integral, and derivative terms. The controller attempts to minimize the error over time by adjustment of a control variable, such as the position of a control valve, a damper, or the power supplied to a heating element, to a new value determined by a weighted sum:

$$u(t) = K_p e(t) + K_i \int_0^t e(t) dt + K_d \frac{de(t)}{dt} \quad \text{Eq. (2)}$$

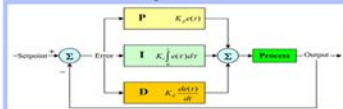


Fig. 3: A block diagram of a PID controller in a feedback loop

Objective Function

In the proposed study 'J' which is an integral time absolute error of the speed deviation is considered as an objective function for the above study. This 'J' may be stated as:

$$J = \int_0^t |e(t)| dt$$

Where, 'e' represents an error signal (Δω), t represents simulation time. The parameters of the damping controller can be obtained by using the above three said algorithms. The optimization problem considered here:

Minimize J

Subjected to:

$$K_p^{min} \leq K_p \leq K_p^{max}$$

$$K_i^{min} \leq K_i \leq K_i^{max}$$

$$K_d^{min} \leq K_d \leq K_d^{max}$$

Where K_p^{min} and K_p^{max} are the lower and upper bounds of gains the time constants of the controller respectively.

Section 3

Result and Discussion

Table 2 Optimized Parameters for PID Controller for Wind Fluctuation using SFS

Parameters	SFS based PID Controller	SFS based PI Controller
K _p	-1.9639	-1.9214
K _i	-0.1345	-0.1264
K _d	-1.4129	-----
ITAE	0.8815	1.8865

Table 3 Optimized Parameters for PID Controller for Solar Irradiation Fluctuation using SFS

Parameters	SFS based PID Controller	SFS based PI Controller
K _p	-1.9799	-1.9738
K _i	-0.1591	-0.1439
K _d	-1.8225	-----
ITAE	1.0335	1.4357

Table 10.4 Optimized Parameters for PID Controller for Multiple Disturbances using SFS

Parameters	SFS based PID Controller	SFS based PI Controller
K _p	-1.9555	-1.9704
K _i	-0.1268	-0.1313
K _d	-1.7877	-----
ITAE	0.9101	1.5107



Fig. 4: Wind Power Change Pattern

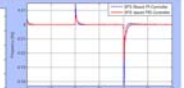


Fig. 5: MG Output Frequency

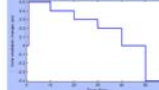


Fig. 6: Solar Power Change Pattern

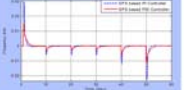


Fig. 7: MG Output Frequency



Fig. 8: Multiple Disturbances in Load, Wind Speed and Solar Irradiation

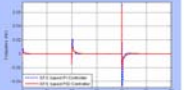


Fig. 9: MG Output Frequency

Conclusion

In this project, a novel approach is made by introducing a SFS algorithm for proposed PID controller for frequency control of an islanded microgrid. The SFS based PID controller along with SFS based PI controller are designed in a way to reduce the impacts of ΔP_{wind}, ΔP_{solar} and ΔP_{load} disturbances and dynamic perturbations. The simulation results obtained from SFS based PID controller are compared with the results obtained from SFS based PI controller. From the comparison, a conclusion can be made that SFS based PID controller gives better result than the SFS based PI controller. The time-domain simulation results show that the proposed controller can balance the power generation and load properly, and regulate the MG frequency effectively. Hence, the disturbances in Microgrid frequency can be overcome by proposing the SFS based PID controller.

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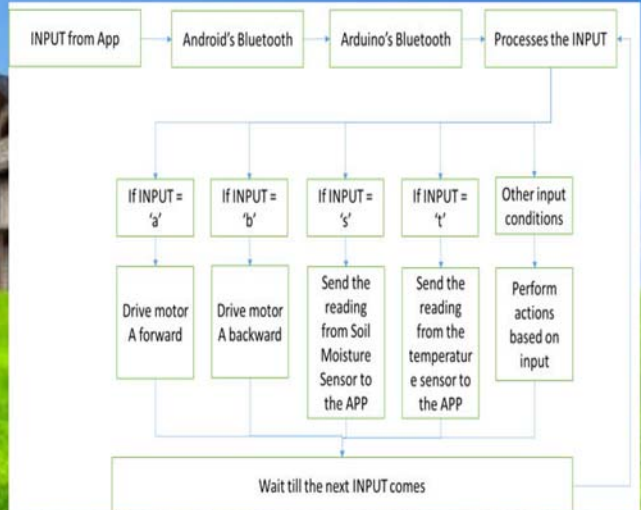
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Automatic Plantation Bot for Cactus Garden

Project id: 9531

Presented By :- Raj Kumar Pathy, Dharmesh Ranjan Sahu
Guided by :- Dr. Satya Sopan Mohato

Description - The plantation bot has a holding dock for the plants on top of it which currently holds 3 plants for now. It has 2 hands and each hand serves a specific function. The right hand is used as a drill to make the hole where the parts will be planted. It also has a part of the soil moisture detection sensor just before the drill bit. The other hand is used to lower the plant from the upper dock zone to the lower and then into the hole. The arms are using Wiper motors and the whole is using high torque box motors for its movement. It is powered by a 12V supply. The microcontroller we used, Arduino MEGA is used for communicating with the Android app that is specifically made for this bot using the Bluetooth interface. Other thing that the bot can measure is the temperature and humidity of the surroundings.



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HoverBoard

(Two wheeled self-balancing robot)

Project id:9575

Manojit Paul(201310210) and Raman Kumar Mahato(201340178)

Our Work

We have implemented a small scale replica of a two wheeled self balancing scooter or "HoverBoard" that has the ability to balance on itself. Moreover, it's forward and backward movement resemble that of an actual size hoverboard.

Movement

It is really simple to ride a hoverboard since the robot mainly balances on its own. To move forward, simply shift your weight or lean forward, same goes for the reverse. Simply stand upright and the hoverboard will brake.

Popularly known as "hoverboard", the self balancing scooter is one of the latest tech gadget in the world today.

MATTER OF BALANCE

The self-balancing scooter balances on itself by slightly moving forward and backward depending upon the weight shift.

Future Work



Ola wheels is a new initiative by Ola to provide transportation within office buildings, by using self-balancing electric scooters.

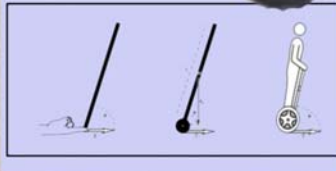
AI based robots that can be used as waiters are currently in the testing phase. Because of their ability to balance they can easily balance food trays and water glasses.

Self-balancing concepts are widely being used in various vehicles. For example, A wheelchair that has the ability to ascend or descend stairs while keeping the rider upright, thereby preventing him to tumble and fall of the wheelchair.



Working Principle

Self-balancing two wheeled drives or as they are popularly called "Hoverboards" work on the simple principle of an inverted pendulum, in which any object is prevented to fall by the momentum of the base on which the object rests. This technique is quite difficult to explain through a verbal medium. Therefore, let's actually visualize how it works.



In a similar way when the weight is shifted forwards or backwards the motors respond accordingly to balance the Hoverboard. The more we lean the more speed it gains.

Under the Hood



The Arduino Uno microcontroller was used as the brain of this device.

A Dual channel Cytron motor driver controls the direction and speed of the motors, depending upon the values relayed by the microcontroller.



MPU 6050 4 axis gyroscope sensor to detect the orientation of the board and relay that message back to the microcontroller.



Heavy Duty Planetary Dc geared motors were used to control the movement of the hoverboard.



2.1volt, 8000mAh, Lithium Polymer batteries were connected in series to provide enough juice for all the devices, including the motors and the microcontroller.

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Reinforcement Learning based Adaptive Control of a Crawling Robot

Project id: 9608

Tanmay (201310094), Amlana (201310066)

Crawling Robot (CR)



Side View of CR



Back View of CR

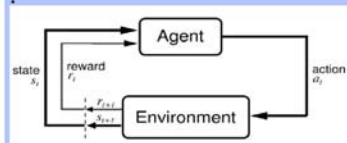
FOUR STEPS OF A SIMPLE CYCLIC FORWARD-WALKING POLICY.

robot	time	state	reward	action
	0	up, left	0	right
	1	up, right	0	down
	2	down, right	0	left
	3	down, left	1	up

Crawling Mechanism of CR

Learning Algorithm

Reinforcement Learning (RL):



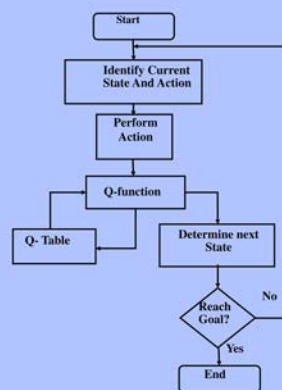
It is learning what to do how to map situations to actions so as to maximize a numerical reward signal

Q-learning:

An agent tries to learn the optimal policy from its history of interaction with the environment.

- Inputs
- S is a set of states
- A is a set of actions
- γ the discount
- α is the step size
- Local
- real array Q[S,A]
- previous state s
- previous action a
- initialize Q[S,A] arbitrarily
- observe current state s
- repeat
- select and carry out an action a
- observe reward r and state s'
- $Q[s, a] = Q[s, a] + \alpha(r + \gamma \max_{a'} Q[s', a'] - Q[s, a])$
- $s = s'$
- until termination

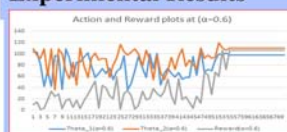
Algorithm Flow-chart



Conclusion

- ❖ We have successfully design and develop the crawling robot.
- ❖ An adaptive controller using Reinforcement Learning has been used on the robot.
- ❖ The Experimental results shows that robot is capable of learning to crawl in subjected to different terrains .

Experimental Results



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Feature Extraction for Motion Segmentation in a Video

Ajay Kumar Khetan (201312333)

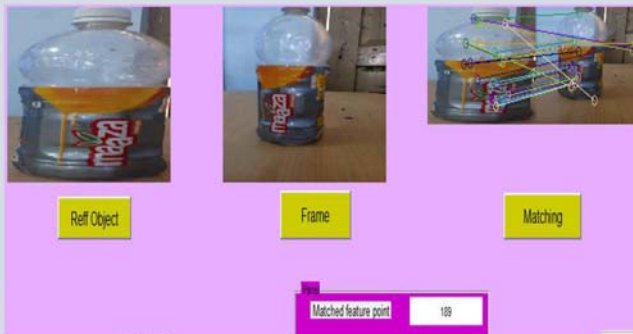
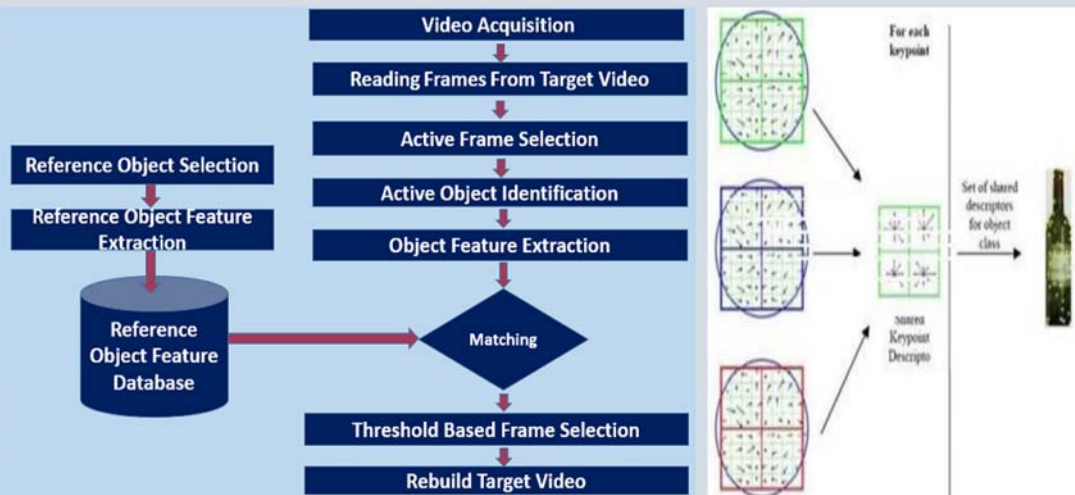
Roshan Poddar (201310570)

ABSTRACT

The feature based motion segmentation for video summarization is a mechanism to produce short summary of the video according to reference object. It is to give synthetic and visual abstract of the video. In this we have use SIFT feature of the object.

OBJECTIVE

The objective of our project is to detect and track particular object in a video based on matching feature with reference objects and then create a short summery of the video. Irrespective of the change in object like scale, viewpoint, illumination, rotation.



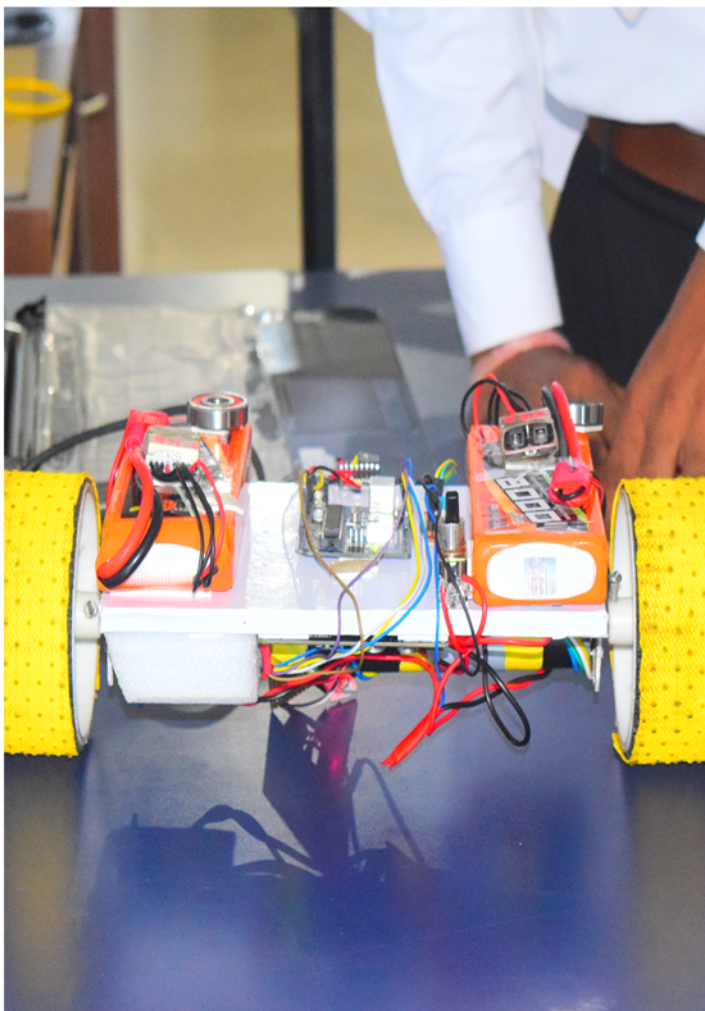
CONCLUSION

The proposed system acts as a support system for video surveillance. The result is comparable with the background truth in detecting and tracking object in different orientation and scale.

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