

BRANCH = EXTC (2012)

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Carol V D'mello (42)
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Title: Emergency Messaging System

Project Guide: Dr. T. S. Rathore

Keywords:

Abstract:

The heart-rate and temperature are measured by monitoring one's pulse using portable system called mobile health alert system. Human health is of utmost concern. People spend huge money on it because once a person gets sick or dead, anything else becomes meaningless. The existing systems are too complex in size and not user friendly. On the other hand, the mobile health alert system provides an immediate aid. Therefore, the system whose reference voltage varying from one user to another will be designed in the project. The main application of the system is that, it is a personal life support system. It will also be used for the patients who have a high probability of a certain illness. The LM35 used is precision integrated - circuit temperature sensor, whose output voltage is linearly proportional to the temperature in Celsius (Centigrade).

A heart beat sensor will be used to measure the cardiovascular pulse wave which is found throughout the human body. An algorithm will be developed to detect the heart rate out of the change in the arterial and aortic pressure signal. The output of the sensor is filtered by high pass filter and sampled using analog to digital converter that is compatible with microcontroller. As the signal from each user is different, the microcontroller processes the signal such that the system will be compatible for each user. The Max-232 chip is used to make the GSM modem compatible with the microcontroller 8052. A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides location and time information in all weather, anywhere on or near the earth, where there is an unobstructed line of sight to four or more GPS satellites. Embedded C for programming with the Keil software used in the project. μ Vision is a Windows-based front end for all Keil Compilers and Assemblers.

Author: M Lobo (083029)
R N Mascarenhas (083032)
W N Menezes (083033)

Title: Tracking and Monitoring of Commercial Vehicles Using GSM, GPS & ARM Processor

Project Guide: Ms K Jayasudha

Keywords:

Abstract: Transportation of finished products safely and on time is of prime importance in the industry. If a track is kept on the route taken, the idle time, and the speed of the vehicle it will keep the owner aware of the status of his vehicle. This is of great use while planning for better efficiency and safety during transportation. Fleet management is a crucial factor in improving the efficiency and safety while transporting products. Real time vehicle tracking system involves installing an on-board unit (OBU) which offers to keep a track of the vehicle movement. The OBU has a GPS module; strings from which can be manipulated to extract the vehicles position, speed and other parameters. The manipulation of the data is done in the ARM processor where the latitude, longitude and speed are extracted and saved continuously. GSM module is used to further send this data to the customer requesting for it

after checking the password and assuring client authenticity. Also the LCD module on the OBU indicates these parameters to the driver. Further this data log is available on the company website and can be viewed from the clients account. Apart from being widely used in fleet management this system can also be explored in the military field, to monitor the position of military tankers and troops. On a humanitarian front, this circuit after necessary modifications, can be used to track the location of a blind person .It can also be used by travel agencies to track their vehicles carrying vehicles.

Author: N R D'Mello (07)
K A Hudlikar (10)
C J Pamprakaran (19)

Title: 3-D Imaging for 2-D Multislice MRI Scans

Project Guide: Ansari Vaqar

Keywords:

Abstract: Detection of tumorous cells in brain tissues manually by physicians from the present day Magnetic Resonance Images is prone to human error due to misinterpretations. Detecting tumor automatically thus reduces the probability of this error. Furthermore, the information obtained from these scans is visually limited to a particular plane. However, certain complex surgeries require information scanned at different angular planes which are non- obtainable from a regular MRI machine. A matrix formed from successive 2-D MRI scans can be used to obtain information at required angular planes. The purpose of obtaining the oblique view is to give a perspective vision to the doctors, desirable for image-guided minimally invasive surgery. Further research in this field would help in detecting the abnormalities in different parts of the body which cannot be viewed in the available scans.

Author: Aldrin D'Souza (Roll No 15)
Royston B Fonseca (Roll No 16)
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Title: Complete Home Security System

Project Guide: Kavita A. Sakhardande

Keywords:

Abstract: Home Security has been a major issue, where crime is increasing and everybody wants to take proper measures to prevent intrusion. Engineering is not only a theoretical study but it is an implementation of all we study for creating something new and making things more easy and useful through practical study. In today's technologically advanced world it is necessary to automate homes so that everyone can make use of the technology available. The Project "Complete Home Security System" aims to provide a cost efficient device that monitors all the aspects of home security, so that it can be made available to all the masses, breaking through their financial barriers. The most probable security aspects with regard to home include, an outbreak of fire due to explosions of the compressor in air conditioners, refrigerators, gas cylinders, microwaves and other such house hold electric devices. Robbery through intrusion via. doors, windows or any other possible entry or exit points to the house is another aspect of security that is commonly breached. The project takes all these aspects into consideration. Using the traditional magnetic switch equipped on doors and windows and motion sensors along the passage way covers the intrusion part of the security system. It also incorporates temperature sensor and smoke detectors to complete the security system. Hence the system will sound an appropriate alert when there is an attempt of break-in or if there is possible smoke or fire. The alert is in the form of various audio-visual aids. The control of the security system is in the hands of the user. The user can switch on or off either of the alarms as and when required. It is a completely digital system which can be easily customized according to the needs of the user. We as students aim to make something that could be useful to everyone.

Author: B L Correia (05)
V V Hegde (09)
J B Navdiya (17)

K P Shah (29)

Title: Automatic Detection of Hypertensive Retinopathy using Feature Extraction

Project Guide: Ansari Vaqar

Keywords:

Abstract: Hypertensive retinopathy is damage to the retina from high blood pressure. The retina is the layer of tissue at the back part of the eye. It changes light and images that enter the eye into nerve signals that are sent to the brain. Hypertensive retinopathy causes arteriosclerosis and it may also result in loss of vision. The presence of these early retinopathy signs is associated with an increased risk of systemic vascular diseases, such as stroke, cognitive impairment, coronary heart disease, heart failure and nephropathy. So it becomes necessary to detect this disease in early stages. It is usually time consuming to check these features in many fundus images, so an automated program would prove to be an advantage. The algorithm for detection of hypertensive retinopathy using certain peculiar features of the fundus image is implemented. Vessel detection is done using radon transform and morphological reconstruction. The main features considered are tortuosity and alteration in diameter to detect hypertension. Some other features include Exudates, Hemorrhages and Microaneurysms. Tortuosity is an alteration in the retinal vessel network which occurs during hypertension. Tortuosity measurement is based on partitioning each vessel and determining the ratio of curved length to straight length. The diameter of the retinal vessels changes during hypertension. The diameter measurement is based on image skeleton at the perpendicular segment of the vessel. Exudates are typically bright, reflective, white or cream colored lesions seen on the retina. These are detected using wavelet transform. Retinal Hemorrhage is the abnormal bleeding of the blood vessels which appear as red spots of uneven shape and size in the retinal image. Microaneurysms appear as small red circular spots. Hemorrhages and Microaneurysms are detected using various morphological operations. Diabetic Retinopathy can accompany Hypertensive Retinopathy. Early retinopathy signs, including retinal microaneurysms, hemorrhages, cotton-wool spots and hard exudates, are common vascular abnormalities found in middle-aged to older people with diabetes and hypertension. So the algorithm of detecting Diabetes Retinopathy and Hypertensive Retinopathy can be merged together and also there can be a fundus camera which may have an inbuilt algorithm for detecting all the features and displaying the output on a screen.

Author: T A Kalapurackal (11)

A A Pereira (59)

C C Pereira (60)

Title: Image Encryption using Chaotic Maps

Project Guide: Prof. K Jayasudha

Keywords:

Abstract: The proposed image encryptions scheme, an external secret key and chaotic map like logistic, PWLCM and henon map are employed. CKBA uses logistic map while ECKBA uses PWLCM and our proposed method uses henon. The initial conditions for chaotic maps are derived using the external secret key. In henon map, every pixel element is encrypted using addition operation keeping the value always less than 256. Furthermore every pixel runs for n rounds which are obtained from the chaotic map corresponding to that pixel which is random and different for every pixel making any kind of attack infeasible. Our project objective is two part objective of successfully recreating the original paper for logistic map (CKBA) and PWLCM (ECKBA) and to compare the results with our proposed method.

Author: Savio Poullose (22)

Vaishnavi S Shetty (31)

Kinjal A Shah (63)

Title: Speech Recognition Application using MFCC and DTW

Project Guide: Prof. Santosh Chapaneri

Keywords:

Abstract: Speech is the primary means of communication between people. For reasons ranging from technological curiosity about the mechanisms for realization of human speech capabilities, to the desire to automate simple tasks inherently requiring human-machine interactions, research in automatic speech recognition (and speech synthesis) by machine has attracted a great deal of attention over the past five decades. Digital processing of speech signal and speech recognition algorithm is crucial for fast and accurate automatic speech recognition technology. For a reliable and high accuracy of speech recognition, simple and efficient representation methods are required. We have come across multiple techniques for speech recognition from our study of various papers. For our project, we have used Mel Frequency Cepstrum to calculate the features of the input speech signal and Dynamic Time Warping (DTW) algorithm has been implemented for feature matching. Moreover to improve the accuracy rate, we have modified the methods of MFCC and DTW by using few enhanced techniques, resulting in an accuracy of over 90% for our speech recognition system. Our project demonstrates isolated spoken digits recognition for digits 0 to 9 over a database containing large variety of speakers.

Author: Sumeet Barve (02)
Mrunmayi Churi (04)
Onish Dabreo (06)

Title: Zooming of Digital Image using EASE

Project Guide: Ms. Monika Cheema

Keywords:

Abstract: Zooming is the process of enlarging an image not only in appearance but also in physical size. Typically zooming is related to scaling up images to be able to see more details. Many zooming techniques currently used produce undesirable artifacts and they are not very efficient in edge detection. The EASE scheme is based on the bilinear interpolation method; however, the interpolation error will be amended by the interpolation error theorem in an edge-adaptive fashion. Directions of the interpolation points are determined by the Sobel operator. EASE shows an ability to preserve edges much better than the conventional linear interpolation schemes. The EASE scheme has been compared with the existing algorithms viz. Nearest Neighbour, Bilinear and Bicubic Spline Interpolation with respect to perception as well as PSNR (Peak Signal to Noise Ratio) and SSIM (Structural Similarity). The EASE scheme is similar perceptionwise to the Bicubic Spline Interpolation scheme and requires less computation time as compared to the conventional interpolation schemes.

Author: S S More (Roll No 15)
P N Bandekar (Roll No 38)
S S Lasrado (Roll No 52)
R D Mascarenhas (Roll No 56)

Title: Speech Recognizing Talking Calculator

Project Guide: R E Chaudhari

Keywords:

Abstract: Speech is the primary and most convenient mode of interaction between humans. For this reason, speech has the potential to greatly enhance natural human-machine communication. The prevalent interface between the human and machines is through devices such as the keyboard, printing device for input and visual display unit or printer for output which limits the use of this machine to people who are computer literates, conversant with written English. Automatic speech recognition systems serve as a remarkable platform for information exchange between humans and computers providing a very convenient and productive human and machine interface for a wider section of society. The calculator is a device which is used by humans on a daily basis for faster calculation. If the device is enabled with speech then it can help people with eyesight and limb deficiencies. The 'Speech Recognizing Talking Calculator' is especially designed for such people. It is designed to be a simple, easy to use, for simple calculations. It's always easier and less prone to human error to have someone read the numbers out for you. The voice is a high quality sample of a real person. It is a calculator which makes use of two blooming

technologies automatic speech recognition (ASR) and text to speech conversion. These processes make it easier and convenient to use the calculator. The calculator that we are implementing can perform operations like addition, subtraction, multiplication and division and performs one operation at a time.

Author: R. R. GOMES (Roll No 08)
B. V. SHAH (Roll No 28)
N. V. AGERA (Roll No 36)
N. L. ALVARES (Roll No 37)

Title: Facial Expression Recognition Using Gabor Filter and Neural Networks

Project Guide: Dr. D. J. Jayaswal

Keywords:

Abstract: The most expressive way humans display emotions is through facial expressions. Although humans recognize facial expressions virtually without any effort or delay, enabling computer systems to recognize and infer facial expressions from the user image poses a great challenge. Facial expression is one of the most powerful, natural, and immediate means for human beings to communicate their emotions. We present a system for automatic facial expression recognition. The system contains two components: extraction and recognition. Extraction involves applying Gabor filter for analyzing the facial expression from the images. After which the transformed image is cropped to obtain the desired features i.e. eyebrows and lips. Using neural networks we recognize the desired expression. Five different facial expressions were taken into consideration. The percentage of correct classification for JAFFE database was found to be above 70% and for the local database was 40%.

Author: Dheeraj M Shetty (30)
Suraj P Singh (32)
Bharatkumar H Tak (33)

Title: Hand Glove Controlled Helicopter

Project Guide: Dr. D J Jayaswal

Keywords:

Abstract: Human Interface Devices have emerged as a viable communication channel between the controller and the world around it. One of the vital examples for the same can be given as the interaction between the human being and mechanical devices using various input and output interfaces like Hand glove controlled Helicopter. The aim of the project is to achieve this kind of interface by controlling the movement of Helicopter using the user's hand actions. Accelerometer based Glove is a new kind of interface born for reducing the risk of loss of life involved in manned vehicle control. It offers provision for left, right, upward, downward motion and acceleration in desired directions due to the advantages of analog output as compared to restrictions imposed by digital switches. An accelerometer sensor in the glove senses the motion of palm to produce a proportional analog voltage, digitized for processing via the microcontroller, encoded in a specific bit pattern and finally transmitted wirelessly to be decoded into respective Helicopter movements at the receiver. It also incorporate the obstacle detection with the self decision ability which very much reduces the risk of life over manned controlled.

Author: Omkar V Hardikar (19)
Ronald J Main (50)
Flavio J Bastos (53)
Alister N D'souza (55)

Title: Motion Sensing PowerPoint Controller (with MP3 playback)

Project Guide: Dr. T S Rathore

Keywords:

Abstract: The Motion Sensing PowerPoint Controller is a device which enables a user to change the slides of a public PowerPoint presentation and thus view the information at leisure. One does not need to depend on the fixed rate timer. It will play different media like

videos and images. This will enhance the interaction between a human and the device. The GUI would be created using Visual Basic. Inputs to this device will be via two IR sensors and a PIR sensor. These sensors will be polled by a microcontroller which will decide the input to the computer running the GUI. Connection between the computer and the device will be through USB. The device will emulate an USB-HID keyboard. A PIR sensor helps in detection of Human motion, thus enabling validity of inputs at the IR sensor and avoiding false triggering. Video and Image transitioning is made possible by the Visual Basic GUI.

Author: Nitin Naresh Kamble (12)
Dheeraj Narayanan Panangat (20)
Deepak Alex Saldanha (25)
Glen Alex Sequeira (27)

Title: Image Watermarking using Neural Network

Project Guide: Prof. Santosh Chapaneri

Keywords:

Abstract: The major source of communication today is digital media. As it is quite easy to manipulate digital media, it becomes essential to protect it by legitimate means. Digital Watermarking has evolved as one of the latest technologies for digital media protection. Many techniques based on spatial and frequency domains have been developed and are being used for effective watermarking. However, there is always a trade-off between robustness and imperceptibility features of watermarking offered by these techniques. We have implemented two methods: Image watermarking using back propagation neural network and full counter propagation neural network, and have also compared both these methods. In each method, zero watermarking scheme is used, wherein the watermark is not embedded in the cover image; instead it is embedded in the weights/synapses of the Neural Network. The techniques provide good visual quality and also possess high robustness.

Author: Nigel N Pais (18)
Ashish APujari (23)
Nishid S Ranka (61)

Title: Hand Gesture Recognition Using Neural Network

Project Guide: Ms.Namrata Mankad

Keywords:

Abstract: The American Sign Language (ASL) is the language used by deaf and dumb people in most countries in the world. Our project is an aid for them to communicate with people who don't know ASL but only the standard English Alphabet. We recognize hand gestures for the ASL using Artificial Neural Networks (ANN), namely the Back-Propagation Algorithm and the Probabilistic Neural Network. Hand images are gathered from ten (10) selected persons using a webcam and frontal view of the hand area is captured. Image Processing tools are used to process the image with regards to enhance it and to extract feature vector information. This information is fed to the ANN whereby the training algorithm is performed in order to extract the knowledge of the image in the form of a set of weights. Finally, when the system is fed with a similar image it recognizes it and displays the corresponding alphabet on the screen, besides playing a sound file that says the alphabet too. The system is also designed to be completely flexible by training itself on the fly on the off chance that a gesture is recognized wrongly. An analysis is carried out to compare the two neural networks. The significance of various parameters in neural networks is shown by carrying out an analysis.

Author: Vimarsh A Jani (Roll No: 50)
Savio S Saldanha (Roll No: 62)
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Title: Automatic Multiple Meters Reading System

Project Guide: Mr Gautam A Shah

Keywords:

Abstract: Automatic Multiple Meters Reading System (AMMRS) is an engineering solution

to improve the method of meter reading. The principle benefit of the utilization of this telemetry system as a management tool is to increase business efficiency and substantially reduce operational costs. Having encompassed the hardware and software aspects of a telemetry system, AMMRS is, in itself, a complete, robust and practical modern day telemetry solution to meter reading. Essentially, the hardware of AMMRS consists of microcontrollers and a computer. The number of microcontrollers can be determined by the number of Meters and Reader Units used. The software of AMMRS consists of a Graphical User Interface and Database to be installed in the computer to effectively operate the hardware in a userfriendly manner. Moreover, microcontrollers are programmed for the operation of Meters and Reader Units. The computer is considered to be a Collector Unit and it is used to send Request SMS of pre-determined format to a Reader Unit. Reader Unit accumulates the Meter Identification Numbers and Meter Readings from the Meters and sends them to Collector Unit as Data SMS. Also there are auxiliary features such as sending SMS containing customer current consumption information, due date reminder, balance enquiry for prepaid connection and help query to the support centre.

Author: T D Attavar (Roll No.1)
L J J Carvalho (Roll No.3)
N D Panchal (Roll No.21)
S R Machado (Roll No.54)

Title: Monitoring Car Loan Using ARM

Project Guide: Prof. N A Mankad

Keywords:

Abstract: Equated Monthly Installment, popularly known as EMI is one of the methods of paying back a loan lent for property or car or personal use. The EMI comprises of two components, the principal loan amount and the interest amount to be paid within specified or calculated months. In today's world, people generally take loans but tend to forget its timely payment causing displeasure to the lender. Hence, we have designed a system specifically for banks for timely recovery of their EMIs for loans taken against cars. This objective is achieved by locking the vehicle ignition system whenever the customer fails to pay the installment. The implementation of this system is possible with the use of a GSM module and lock system. The lock system comprises of an ARM based microcontroller and a relay which controls the vehicle ignition system. Whenever the customer pays the installments on time, the vehicle runs uninterrupted but if the customer fails, the vehicle stops working. In this way, the banks will be able to monitor car loans with ease and less human intervention.

Author: Ramniklal J. Mota (Roll No. 16)
Rakeshsingh B. Rana (Roll No. 24)
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Title: Versatile Torso Pro-Bot

Project Guide: Mr. Ravindra E. Chaudhari

Keywords:

Abstract: There are several reasons to build a robot with humanoid form. It has been argued that to build a machine with human like intelligence, it must be embodied in a human like body. Others argue that for humans to interact naturally with a robot, it will be easier for the humans if that robot has humanoid form. A third, and perhaps more concrete, reasons for building a humanoid robot is to develop a machine that interacts naturally with human spaces; with the simpler versions of the humanoid turning out to be Torso robots or wheeled robots. The report presents one such technique to design the torso robot. The Programmable Robot (Pro-Bot) has the ability to move forward and backward, left & right and to grip objects. The feature making the robot versatile is the adaptation to different modes of navigation techniques such as line following, wireless control and using programmed sequence.

Author: Chirag J. Kava (13)

Rima F. D'sa (43)
Amruta S. More (58)

Title: Parallel Metal-Plated Tuning Fork Shaped Omnidirectional Monopole Antenna

Project Guide: Anjali A. Chaudhari

Keywords:

Abstract: This article proposes a parallel metal-plated tuning fork shaped omnidirectional monopole antenna for UWB application. Printed monopole antennas fabricated on a substrate offer impedance bandwidth, which can cover UWB. However, radiation pattern varies significantly over the bandwidth. The cross polar component increases with frequency and the pattern degrades from the desired omnidirectional characteristics. Omnidirectional radiation bandwidth can be increased significantly by decreasing the substrate thickness and using substrate material of low dielectric constant. In the proposed antenna, omnidirectional radiation bandwidth is further increased by using rectangular strips on both sides of a semi annular ring monopole antenna. The proposed metal-plated structure using air dielectric is designed, fabricated, and tested. The measured voltage standing wave ratio (VSWR) is <2 over 3.1–10.6 GHz frequency band. The antenna offers high efficiency; low cross polarization and its radiation patterns indicate its suitability for UWB applications.

Author: P G D'Souza (Roll No 40)
K S Date (Roll No 41)

Title: Landmine Detection and Terrestrial Surveillance Robot

Project Guide: M Cheema

Keywords:

Abstract: Detection and removal of anti-personnel landmines is an important worldwide concern. A huge number of landmines have been deployed over the last 20 years, and demining will take several more decades, even if no more were deployed in future. An adequate mine clearance rate can only be achieved by using new technologies such as improved sensors, efficient manipulators and mobile robots. This project presents more basic ideas on the configuration of a mobile system for detecting and locating anti personnel landmines efficiently and effectively. This project describes the main features of the overall system which consists of a sensor head detects certain landmine types, a manipulator to move the sensor head over large areas. A locating system based on the global positioning system, a remote supervisor computer and a robot used as a subsystem carrier. The whole system has been configured to work in semi autonomous mode with a view also to robot mobility and energy efficiency. A metal detector sensor head is used to find the presence of a landmine and if a mine is detected the geographical co-ordinates of the mine found using GPS receiver are sent to a remote computer wirelessly via a XigBee module where the latitude and longitude are displayed at the hyper terminal. Current methods of landmine detection employ the use of hand held mine detectors. Human demining is not only time consuming but also risky in the sense that even an accidental contact can trigger a mine and cause grievous hurt to the deminer. Our system employs a robot which speeds up the process and also the risk of accidental damage is reduced. The robotic vehicle used in our system speeds up the process and also the risk of accidental damage is reduced.

Author: Parth Gadhavi (48)
John Marshall (51)

Title: HIGH SPEED PHOTOGRAPHY CONTROLLER

Project Guide: Ms. Anjali Chaudhari

Keywords:

Abstract: The photographs that are captured in a very small moment in time, such as a water droplet splattering from a faucet or a balloon during the split second that it was bursting, human reaction and even a camera's shutter mechanisms are too slow to reliably capture such precise moments in time. Photographers interested in taking such pictures normally have to spend a lot of money on specialized equipment and lighting controllers, or they have to take multiple pictures and hope to get lucky. Our goal is to cheaply create a

reliable system for high speed photography.