

BTECH PROJECT ABSTRACTS 2021-2022

1) Students:

Jaykumar More: 1 1 1807023

Yash Naik: 111807026

Mihir Kale: 111807047

Guide:Mr. R. P. Chaudhari

Title: OPTIMIZED FLAME DETECTION

Abstract:

Existing flame detection techniques include detection based on smoke, temperature, gas sensors. However, these can detect flames only in their vicinity, and often at high thresholds. Also, these systems are not suitable in large buildings having dense environments. The need for early flame detection systems to prevent further damages has increased significantly. Image processing-based detection includes finding flame content based on colour and motion between successive frames. But this technique is computationally intensive, having higher response time and thus not suitable for real time detection. Deep learning-based techniques include convolutional neural networks.

2) Students:Advait Dixit 111807010

Mrudula Jadhav 111807065

Guide: Dr. Rashmika Patole

Title: ACOUSTIC ENVIRONMENT IDENTIFICATION USING SEMI-SUPERVISED LEARNING

Abstract: Audio forensics is a branch of forensic science that deals with the capturing, processing, and interpretation of audio recordings that can be used as evidence in the court of law and for other official purposes. This entails verifying the integrity of the inquiry audio. The main aim of our project is to authenticate the audio by identifying the environment it was recorded in using Semi-supervised Learning. The project uses a combination of the DCASE2016 and 2017 datasets along with T1-model for Semi-supervised learning. The results highlight the advantages of using this approach over the general Supervised techniques. Furthermore, the limitations of this model and scope for future work in this domain is elaborated.

3) Students:Isha Birla 111807005

Sharvari Deshpande 111807050

Atharva Deshpande 111803111

Guide: Dr. Mrs. D. V. Niture and Dr. Mrs. Y. V. Haribhakta

Title:SMART AND LUCRATIVE WASTE SEGREGATION

Abstract:

The project builds upon an idea where a computer can independently detect and segregate garbage without any form of human intervention. This classification is based purely on the substance that the item is made of, and is entirely independent of its shape and size. It is largely centered on the identification of waste that is commonly dumped on the streets. In order to maximize benefits, the system will attempt to segregate the items into 12 distinct categories. At the same time, it will also be more cost-effective and require minimal maintenance.

The main objective of our project is to introduce an automated waste segregation mechanism controlled by modules deployed using Raspberry Pi (or an equivalent method) - that has the capability to serve as an alternative to the laborious methods employed currently. Further, it attempts to make the process faster and cleaner; while also not degrading the ecosystem. Following classification, all biodegradable products can be utilized for making compost; and the rest can be recycled.

The proposed system will have the ability to solve a number of problems. The project primarily concentrates on a smart method of waste segregation, which will aid in minimizing manual labor and enable separation of waste items in an automated manner. It can be installed along the streets, and will prove to be extremely beneficial in segregating the waste at the site of disposal itself.

The successful development of such a system will enable the adoption of an automated waste segregation approach at the municipal level. This will help introduce an alternative to the existing manual method of waste segregation; while also ensuring that the process is faster, cleaner and more environment-friendly. Devising an efficient, economical and user-friendly segregation system - as outlined above - will definitely improve the waste management process in India. Additionally, we also intend to construct the project in a way that ensures ease of use, reduced health hazards, and reasonable speed; while requiring only an initial investment.

4) **Students:**Aakanksha Atul Patil 111807058

Rashi Haresh Rupchandani 111807080

Pranav Sanjay Gandhe 111807081

Guide: Prof. Dr. Rajshri C. Mahajan

Title:REAL TIME ASSISTIVE SYSTEM FOR THE VISUALLY IMPAIRED

Abstract: Visual impairment is defined as a loss of vision that cannot be corrected to normal vision, even with the use of eyeglasses or contact lenses. People who are completely blind or have low vision face numerous challenges while navigating. This report presents the concept of creating an assistive system to assist visually impaired people with their daily tasks. The device will assist the visually impaired in tasks such as reading a document or a sign board, describing the environment around the user, sending an alert to the user's guardian in the event of an emergency, and providing real-time assistance for obstacle detection. A USB webcam will capture the scene around the user. The system's architecture includes a Raspberry Pi 4, a Neo 6M GPS module, and a USB webcam. The SSD Mobile Net Architecture is used in the obstacle detection module. Texts are read using the Tesseract, an open source text recognition engine. The Neo 6M GPS module is used to track the visually impaired person's location and send it to his guardian in case of an emergency.

5) **Students:** Sanket Dilip Bankar (111807002)

Tushar Sugriv Kadam (111807016)

Vedant Rajendra Korhale (111807019)

Guide: Mrs. A. A. Kulkarni

Title: "Real Time Sign Language Recognition Using Deep Learning"

Abstract: In today's time, sign language has gained importance and its use is increasing day by day. Specially challenged people must not remain in the dark due to their disabilities. Also, this everlasting skill can, without a question, make people better-rounded. Learning the skill of sign language gives emphasis on the fact that deaf and dumb people are part of our society and they have every right to communicate with other people just like normal beings and that their voices should never be muted or disregarded. So we proposed a model to recognize sign gestures using YOLOv5 (You only look once version 5). This model can detect sign gestures in complex environment also. For this model we got the accuracy of 88.4% with precision of 76.6% and recall of 81.2%. The proposed model has evaluated on a labeled dataset Roboflow. Additionally we added some images for training and testing to get better accuracy. We compared our model with CNN (convolutional neural network) where we got accuracy of 52.98%. We checked this model for real time detection also and got the accurate results.

6) **Students:**Ajit Pawar (111807033)

Pranit Chikhale (111807068)

Siddharth Chordiya (111807070)

Soham Khadilkar (111807071)

Guide: Mr. G. K. Andurkar

Title:Image Caption Generation

Abstract: Not available

7) **Students:**Aditya Vilas Surutkar 111807041

Snehal Wagh 111807040

Satyajit Menon 111807054

Guide: Mr. Swapnil G. Mali

Title:Distance Speech Enhancement using Deep Learning

Abstract:One of the main issues for Audio processing and recognition is the presence of different types of background noises like construction, Machinery, People talking in the Background of different frequencies and quality reducing the intelligibility of the speech. Techniques of deep learning like CNN are used when source separation in audio comes into the picture. This report presents the implementation and demonstration of the application of the UNET architecture coupled with a Wiener filter for Speech Enhancement. UNET is a modification of the general CNN architecture. UNET was formerly developed for medical imaging and used for the task of source separation. It is preferred because of its capability of working with fewer training epochs and yields more accurate segmentation.

8) **Students:**Dharati Rathod 111807035

Sheel Rahul 111807055

Shreyas Kale 110807056

Aakanksha Jarode 111807063

Guide: Dr. S. P. Metkar

Title: Exploring Complexity Reduction Techniques for intra-prediction mode in High Efficiency Video Coding (HEVC)

Abstract:

High efficiency video coding (HEVC) is the latest video coding standard developed by JCT-VC. It aims to provide a doubling in coding efficiency with respect to the H.264/AVC high profile, delivering the same video quality at half the bit rate. Though it significantly reduces bit rates over the preceding H.264 standard but at the expense of extremely high encoding complexity due to the optimization processing in the efficient coding tools, especially the rate distortion optimization on coding unit (CU), prediction unit, and transform unit. Overall, the complexity of HEVC decoders does not appear to be significantly different from that of H.264/AVC decoders, but HEVC encoder is expected to be more complex.

This report states the analysis of HEVC HM encoder, HEVC intra prediction and aspects where the time complexity can be improved by exploring different techniques. A complexity analysis of the existing HEVC HM encoder is done. It is important to understand the complexity of each module to allow the design of new complexity reduction techniques to encode the depth maps. Study is conducted on a hierarchical complexity control algorithm for HEVC on the basis of the coding unit depth decision, a fast CU size decision and mode decision algorithm for HEVC intra coding to find least RD cost using Lagrange multiplier, a deep learning approach to predict the CU partition for reducing the HEVC complexity at intra mode which is based on convolutional neural network (CNN). In this report, complexity-related aspects that were considered in the standardization process are described. Finally, we attempt to adapt an approach to reduce the time complexity in intra prediction mode and compare its accuracy and complexity with the existing model.

9) **Students:** Sakshi Patil (111807032)

Piyusha Taware (111807039)

Sonali Sargar (111807053)

Guide: Dr. Abhishek Bhatt

Title: An Intelligent Pose Recommendation System using feature fusion for humans

Abstract:

With rapid development of technology and easy access to mobile phones and other smart devices, there has been an increase in the number of social media platforms. Since the pandemic, globally a hike in the number of social media users is observed. It has become a virtual platform for people to express themselves. To gain more attention and audience, people want to have the best photos and project themselves in a better way. However, it is

hard to guarantee the quality of such uploaded images because of poor image acquisition devices and lack of professionalism in the pictures as everyone is not a professional photographer. In order to tackle these problems, this study proposes an intelligent photo pose recommendation method to recommend professional photo pose according to the background of the input image. Given a query image with only background, the global features are extracted from it using VGG 16 and ResNet 101. Secondly, the local features are extracted using colour histograms. These features are concatenated to give a final feature vector. The feature vector then is used to get the most similar image. Open pose is used to extract pose from the most similar image and is superimposed on the query image to give pose recommendation.

10) **Students:**Akriti Bhardwaj (111807004)

Arnima Mehta (111807045)

Aniruddha Gaikwad (111807061)

Guide:Prof. Dr. Vibha vyas

Title:"Contactless Mask Monitoring and Biometric AttendanceSystem"

Abstract:

This report attempts to give an overview of the system which is designed keeping social distancing guidelines in mind. Our system will detect in real-time, if the person in the captured video stream is wearing a mask or not using a mask detecting algorithm developed using deep learning and neural networks. If the person is wearing a mask, they will be allowed to scan the iris and hence record their attendance. If the person is not wearing a mask, they will not be allowed to record attendance. Now, to scan the iris we developed a robotic arm to translate the position of the person's face into coordinates and go to scan iris with an iris scanner camera placed at the end effector of the arm. The system employs a 'four degrees of motion' robotic arm that can automatically adjust itself for the task of iris recognition of a person standing in front of it. It runs on battery and has 4 motors used for motion in y axis and x-z plane which creates an effective workspace for a person to successfully scan the iris. All the detailed information about our system is explained in the chapters below where chapter 1 talks about the introduction, chapter 2 gives the information about previously done work on similar subtopics of our project. Chapter 3 and chapter 4 contain details about the software and hardware part of our system respectively. Results are discussed in chapter 5 and conclusion is given in chapter 6.

10) Students:

Mihir Deshmukh 111807009

Pranay Junare 111807073

Mihir Kulkarni 111807074

Guide:Prof. (Dr.) Prashant P. Bartakke

Title: DEEP LEARNING BASED ROBOTIC GRASPING

Abstract:

The problem of robotic grasping is still an unsolved problem with many approaches trying to generalize grasp predictions for unseen and dynamic environments. Here we explore two approaches, one based on transfer learning, and another using a popular grasp detection model known as GG-CNN. In the transfer learning approach we tried 2 base models, VGG-16 and ResNet50. ResNet-50 provided better results with a testing accuracy of 83.3% while VGG-16 provided an accuracy of 78.2%. In order to test our model on a real robotic arm, we built a 5-DOF arm and added a custom parallel plate gripper.

Complete ROS and Moveit support is added to our developed robotic arm. The processed RG-D image from the KinectV2 camera is given as an input to the model which predicts the 5-D grasp configuration. Required electronic system design and its PCB is built which controls the robotic arm. The predicted 5-D grasp configuration is then transformed to the object pose w.r.t the base link frame of the robot. Finally, A ROS node that automates the task of picking objects lying in different positions & orientations and sends the joint angle values over pyserial communication to the Arduino (PCB) is written. Thus, we have developed a complete pipeline for the task of Deep Learning based robotic grasping.

11) **Students:**JayeshSanjivSawant MIS Non 11807037
SudarshanDuteMIS No.111807012
Sougat DasMIS Non 11807052

Guide:Dr R.A. Patil

Title:Smart Carts for shopping and billing using image processing

Abstract:

Image processing is the process of transforming images into a digital form and performing certain operations to get some useful information about it. The image processing system treats all images as 2D signals when applying certain predetermined signal processing methods. Object detection is one of the key applications of Image processing. Object detection is basically a technology of deep learning, where things, human beings, and other objects can be detected as objects in images and videos. TensorFlow Lite acts as an efficient object detection model tool which is used to train the dataset of images for object detection.

The report includes information regarding different concepts in object detection, different types of models used to train the datasets like the YOLO (You Only Look Once) algorithm, TensorFlow Models, and details about the OpenCV library used exclusively for object detection in python. Smart Carts are developed with object detection being the prime

domain in it. Smart Carts are key to making shopping a seamless and comfortable experience. The dataset includes the images of products which are trained using object detection models. The report highlights how Raspberry Pi can be used for object detection. The raspberry pi camera module and LCD display screens are interfaced to the raspberry pi module which forms the basic and core circuit of the Smart Carts.

13) **Students:** Vyankatesh Goski 111807015

Majeed Mulla 111807024

Gaurav Vyas 111807072

Guide: Mr. Swapnil Mali

Title: Audio Source Count Estimation Using Deep Learning

Abstract:

Modern technology applications which respond according to human voice commands need to accurately identify the number of concurrent speakers present in a single-channel mixture. In daily communication, several speakers speak simultaneously resulting in the generation of overlapping speech signals. To separate the speakers using unsupervised learning, estimating the maximum number of speakers present in a mixed-signal is essential. In several speech-based applications like speaker diarisation, blind source separation, and crowd monitoring, estimating the source count is the initial step.

We propose a unifying model based on the intensity variation of the frequencies in the time domain. For designing an architecture that makes the model independent of the speaker's dialect, identity and verbal message use of Short-Time Fourier Transform (STFT) as a feature is helpful. The sparsity in the spectrogram varies depending upon the number of concurrent speakers. This feature is fed to the supervised multi-class Convolutional Neural Network (CNN) which predicts the number of speakers present in the audio segments of 1-second each for the entire audio file of a specified duration. The predicted results are verified with Voice Activity Detection (VAD) plots of individual speakers to ensure that the ground truth holds good

14)**Students:**Ms. Sanjana Shivdas Dhadwad (141907001)

Ms. Krutika Kashinath Kadam (141907004)

Mr. Bhushan Manohar Chaudhary (111807006)

Guide:Dr. Ranjit Sadakale

Title:SMART AGRICULTURE: LOW POWER INVENTIVE SEEDING SYSTEM

Abstract:Agriculture is India's backbone. Advanced Farming is a low-cost, high-tech alternative to traditional farming techniques that meets farmers' needs while decreasing labor and time, resulting in higher outputs. The mechanism of a 3D printer is useful for sowing seeds anywhere we wish.

In the end, a robot minimizes all work while saving time and energy. The farming activities that this robot can accomplish is seed cultivation. With a few modifications, the robot can be converted into a 3D printer. Aluminum frames, Stepper motors, DC motors, Driver IC's and an Arduino UNO are among the components used where the robot is controlled by Arduino IDE software. As there are three arms assigned to it, we have three stepper motors for X, Y, and Z-axis movements. The major tasks of seed sowing are performed by the Z-axis, which is equipped with a servo motor, seed container and pipe. The A4988 driver controls the stepper motor, the L298 driver controls the DC motor which is powered by a 12V power source. The operation is controlled by an Arduino through driver IC. This robot is user-friendly and economical due to its simple design, ease of operation, and ease of maintenance.

15) **Students:** Shreya Gatne 111807013

Rutuja Kolhe 111807018

Anshika Varshney 111809051

Guide: Dr. V. V. Ingale

Title: Prototype for Hardware Implementation of RealTime Heart Beat Detection and Heart Rate Variability Analysis for ECG signals

Abstract:

An Electrocardiogram (ECG) is defined as a test of the electrical activity of the heart muscle that is performed to detect any abnormalities in the cardiac cycle. A normal ECG in the normal sinus rhythm follows the sequence of waves in the order of P-QRS-T. The ECG signals that deviate from this particular rhythm indicate some problem. Now, of the various morphological markers of ECG, the R

peak is considered to be the most important point in the signal due to its larger amplitude. Being the sharpest component with respect to all the other peaks in a Normal Lead-I ECG, it is considered to be a good parameter for easier evaluation. One can determine the heart rate from the number of R peaks in a specific interval. R peak plays a vital role in diagnosing heart rhythm irregularities, heart rate and can help us learn the irregularities in the various facets of the heart. However, the ECG signal can easily be contaminated by several kinds of noise. This can lead to inaccurate analysis. Hence, it becomes necessary to devise an efficient algorithm that can deal with the noises and other interferences and irregularities in the ECG signal.

To accelerate the development of portable ECG analysis devices that can be easily accessible by general public, it is essential to implement the software algorithm into hardware as well. Therefore, this project aims towards developing the prototype for the hardware implementation of a Real-time heartbeat detector.

Today, non-invasive methods for analyzing the functional activity of the human cardiovascular system are preferred methods of investigation because of the almost imperceptible nature of data capture. Today, the use of technological tools, methods of analysis and diagnostics that extract maximum information about the condition of the individual with minimal impact on his body is coming to the fore and Heart Rate Variability analysis is one such technology. Hence, the project aims to perform the Heart Rate Variability analysis to analyze the ECG signal pertaining to different heart conditions under different age groups and gender. This analysis pans across time, frequency and geometrical domains.

16)**Students:**Navande Balaji (MIS 111807028)

Mahak Khurana (MIS 111807064)

Pranali Gaikwad (MIS 111807067)

Guide:Prof. Yogita Kapse

Title:ORTHOAGONAL FREQUENCY DIVISION MULTIPLEXING(OFDM)

Abstract:

Nowadays Orthogonal frequency division multiplexing (OFDM) is becoming the most popular modulation technique for wireless communication networks. OFDM can provide large data rates and it is very robust in the face of radio channel impairments. OFDM has become the core of most 4G communication systems as fixed Wi-Fi system , mobile Wi-Fi system ,fixed WiMAX system, mobile WiMAX system, and Long Term Evolution (LTE) system. The capacity, speed and quality of a network can be increased by using Digital modulation techniques. In this paper the detailed simulation of different OFDM systems with study of the effect of various design parameters on the system performance is presented. OFDM System i.e. Transmitter, Channel & Receiver is modeled in Matlab taking some random binary data as input. A sample text is also transmitted and received in order to verify the result. OFDM System is modeled for different modulation techniques and for different FFT lengths. Results have been taken by varying the cyclic prefix lengths and carrier frequency offset also. All the results are presented in this report.ct:

17)**Students:**

Puneet Chougule (MIS 111807007)

Sumit lengare (MIS 111807021)

Aditya Rawte (MIS 111807036)

Rohan Tarate (MIS 111807038)

Guide:Prof. Neelima Kolhare

Title:Design of Smart Irrigation & Farm Monitoring system using IOT & LoRa

Abstract:

Water is the most vital resources in the 21st century. In India, around 80% of the water is consumed by the agriculture sector. Significant amount of water resource is squandered due to improper management of water. Smart farming is one of the major applications of 10T technology. Monitoring field parameters is of great importance in taking farming-related decisions. This paper proposes a smart irrigation monitoring system based on 10T LoRa technology. In this system, the irrigation node is composed of a LoRa module, sensors for monitoring, a solenoid valve solar panel. The LoRa node sends monitoring data to the cloud via the gateway. The system can be controlled from the webpage remotely. The monitored parameters are stored in the cloud.

18)Students:

Abhishek Dnyaneshwar Gadewar - 1 1 1807060

Shivas Bhat - 111807051

Raj Raghunath Murumkar -111807075

Omanshu Shashwat -111807048

Guide: Dr. Vidya Nitin More

Title:Cotton Plant Disease Detection

Abstract:

In modern society, various plant diseases cause great loss in the quality of cotton crops. The identification of plant diseases is an important step. It is useful for pest detection, disease control, productivity improvement, etc. Every Year lakhs of cotton plants die due to various diseases, infections and environmental causes. In India where the main occupation is farming, it is of great concern. Cotton has a great demand in the cloth industry both in India and abroad so, it is of utmost importance to save plants from diseases. Symptoms of diseases in cotton are most evident in the leaves of plants. The aim is to create a model that studies symptoms of cotton diseases and gives diagnosis about them. This paper uses major algorithms such as Segmentation, GLCM (Feature extraction) and LightGBM Classifier (classification)

19)Students:

Aditi Nanaware 111807027

Shruti Bhala 111807003

Divya Maske 141907006

Guide: Dr. Mrs. P. P. Shingare

Title:Women Protection & Safety Device Prototype Using IOT

Abstract:

Today girls are not allowed to move freely even in the streets without worrying about their security. Parents are worried about their security, which has become the first barrier to letting their daughters go for a job. Day by day, women's harassment has been increasing. We cannot change society totally, but we can increase the security of girls by using modern technology. Here the security for the women is provided by the continuous monitoring of the pulse rate. The pulse rate is detected

by using pulse sensors. When the rate of pulse is increased more than that of the normal rate, the device gets activated. A camera module is added to capture photos and store them in memory. An external button can also be used to trigger the device. GPS / GSM is used for location tracking. When the device gets activated an alert message along with the location details are sent to pre-saved contacts.

20)Students:

Anushri Baldawa 111807001

Krushna Wath 111807078

Mohit Bhaiyya 111807079

Shivam Sahu 111807084

Guide: Dr. Radhika D Joshi

Title:IOT BASED SMART CHARGING USING COMMUNICATION PROTOCOL

Abstract:

The Internet of Things (IOT) holds enormous potential for modernising technology. Electric vehicles (EVs) are becoming more popular around the world as more countries move toward pollution-free transportation. Electric Vehicle (EV) charging infrastructure will become a necessity as the number of electric vehicles grows. The performance of EV charging will be streamlined, and city planning will be improved, thanks to an IOT-enabled system. We want to create a system that can accurately handle interactions between end users, electric automobiles, and charging stations during recharging. The proposed technology is useful in transportation systems since it allows for semi-autonomous charging of batteries in electric vehicles with minimum human intervention. Smart charging based on the Internet of Things (IOT) has been developed in this way to monitor the status of batteries and make the charging process semi-autonomous. The suggested solution will offer a more pleasant charging experience as well as a better way to manage the entire charging process.

21)Students:

Chirag Patil 111807062

Parth Shastri 111807066

Poorval Wanere 111807077

Guide: Dr. Shrinivas Mahajan

Title:Adversarial Synthesis based Data Augmentation for Code-Switched Spoken

Language Identification

Abstract:

Spoken Language Identification (LID) is an important subtask of Automatic Speech recognition (ASR) that is used to classify the language(s) in an audio segment before ASR, speech data collection etc. Automatic LID plays a useful role in multilingual countries like India. In India, identifying a language becomes hard, due to the multilingual scenario where two or more than two languages are mixed together during speaking. This nature is followed not only in India but also in many Asian countries. This type of code-mixed data is hard to find which further makes LID harder. This work primarily addresses this problem using data augmentation as a solution to the minority code-switched class. LID is performed in Hindi, code-mixed with English. This work proposes Generative Adversarial Network (GAN) based data augmentation technique performed on the mel-spectrograms of the audio clips. GANs have proven to be accurate in representing the real data distribution in the image domain. This work exploits these capabilities of GANs in the audio domain. GANs are trained to generate mel-spectrograms of the minority code-mixed class and then are used to augment data for the classifier. The proposed method gives approximately 2-5% increase in performance as compared to a Convolutional Recurrent Neural Network (CRNN) classifier used as the baseline.

22) **Students:**

Mrudula Santosh Jetha Bhanushali MIS No. 111607043

Changdev Hausaji Bomble MIS No. 141807003

Guide: Mrs. Yogita M. Vaidya

Title: Pneumonia Disease Detection using Deep Learning and X-Ray Images

Abstract: Pneumonia is a disease caused by viruses, bacteria, or fungi. It is a disease that is difficult to detect and hence goes unnoticed sometimes. Pneumonia accounts for 15% of all deaths of children under 5 years old, killing 808694 children in 2017. It kills more children than any other infectious disease, claiming the lives of over 800,000 children under five every year, or around 2200 every day. Also, in 2012, 345 people for every 100,000 had one or more episodes of pneumonia. In 2017 itself, a total of 2.56 million people were killed. As this disease is difficult to detect in the early stages, it gets too late until it is detected and treated. So, it is evident that if this disease is detected in the early stages, it can be treated upon and can save many lives.

In today's world as technology advances, we observe that our daily tasks are accomplished using simple devices and technology. The tasks that needed to be done manually in the past are now accomplished using software and machines. This has not only made our work easier but a lot more efficient. This also reduces the amount of manpower needed to accomplish the tasks. Overall, the advancing techniques have made the world a better place.

Considering all the above factors, we understand that a more efficient way of detecting this infection is needed. Today, the most advancing field in Computer Science is Artificial Intelligence (AI). Artificial Intelligence can facilitate a computer to perform tasks like a human being would. Deep Learning is a sub-discipline of AI and Machine Learning. What this technique is going to do is build a model that will learn and later predict things on its own. So, if this technique is applied here, we might be able to make a software that does the detection of the infection for us.

The main objective of this project is to provide a computer-aided diagnosis system which has the potential for improving diagnostic accuracy. In this work, we develop the computational approach for pneumonia regions detection based on single-shot detectors and deep convolution neural networks. In this project we are attempting to produce a model that can predict which lungs have the infection merely based on the x-ray images that will be provided. This will be achieved by training the model over multiple epochs using a Deep Learning Neural Network.

23) Students:

Ananya Popat -111813060

Vishal Gote -141907002

Vaishnavi Ingale - 141907003

Guide: Mr. Pankaj Tasgaonkar

Title: IOT Based Smart School Bus Security System

Abstract:

A vehicle monitoring system is used to track a bus's travel from any location at any given moment. It is critical to ensure the safety of students during their journey to and from school. Our System benefits both parents and school administration in monitoring and evaluating a variety of aspects such as the number of kids onboard, each student's details, pickup and drop-off times, location, and attendance system. A gadget is installed inside the vehicle that uses GPS and GSM technology to identify the bus's location. This device will allow users to continuously monitor a speeding vehicle on demand. The school organization and parents are both aware of the bus's status in the event of an emergency. Our system also makes use of RFID technology and NodeMCU for student authentication and maintains the database of student entry and exit on the school bus. An accelerometer helps in detecting emergency incidents.

24) Students:

Aaryan Kulkarni 111807059

Mahir Kapoor 111807085

Tejas Lohogaonkar 111807022

Pratik Zanak 141907008

Guide: Mrs. Ashwini Andurkar

Title:Examining the Implementation of Facial Expression Recognition using DCNN in Improving Market Research

Abstract:

This study aims at extracting valuable measurement parameters from facial expressions to classify them into seven emotions viz. anger, contempt, disgust, fear, sadness, happiness and surprise. The purpose of carrying out these tasks is to determine if facial expressions can prove to be a reliable source of feedback from customers and if they can be studied to formulate appropriate conjectures using existing psychological tools and material. For the aforementioned analysis, machine learning techniques including convolutional neural networks are used primarily. The results obtained are compared with models built using VGG-16, VGG-19 and ResNet-50 to conduct a comprehensive analysis. Two dominant emotions are identified from video snippets of faces, and these are further extrapolated to form conclusive psychological remarks for commercial use. These remarks provide a possible explanation to what could cause these emotions to be expressed by the consumer of a particular product or service.

The presented paper has been divided into chapters for an ease in understanding and interpreting data and results. The Introduction gives a brief idea on how facial emotion recognition plays a key role in understanding human psychology. The literature review that follows is an overview on the pre-existing research in this domain. The next chapter details the dataset employed for this research, namely CK+ and FER-2013 for training and a self-procured dataset for testing. The Methodology explains feature extraction and elaborated the inner workings of each model and how outputs are generated. Subsequently, the results obtained from these models are comprehensively compared and finally, suitable conclusions are drawn

25)Students:

Rushikesh Gherde 111807014

Tarun Kumar Allamsetty 111807029

Juhi Wani 111807044

Guide: Dr. Vanita Agarwal

Title:HDL Implementation of SNN for Event-based Dataset

Abstract:

Neural networks have for long been the most popular tools used to perform complex brain-like operations like classification tasks, pattern recognition and path finding to name a few. Variations of neural networks include Artificial

Neural Networks (ANN), Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN). Although several advanced architectures and training algorithms have been consistently improving the performance of these neural networks, they are getting increasingly computationally expensive, high power consuming and require a extensive hardware.

Neuromorphic computing aims to lessen these drawbacks by operating on "Spiking Neural Networks" (SNN). SNNs have a spiking neuron as their primary unit which is a model of the biological neuron. SNNs aim to mimic the operation of the human brain in terms of encoding the data in the form of spike trains and propagating spikes along the network. These networks have the potential of working with complex time-dependent recognition problems apart from the basic recognition and classification problems- while consuming much less power and involving much less computation when compared to traditional neural networks. These promising prospectives have sparked the developed of specialised hardware in the form of " Neuromorphic Chips" that perform computations by closely emulating the brain's functioning.

This project discusses the design and training of a Spiking Neural Network that operates on an event-based dataset and the development of the synthesizable network in SystemVerilog for deployment on a FPGA device. The methodology for the design and development of the networks has been discussed. The detailed architecture has been elucidated along with discussions on the experiments undertaken and the results obtained.

.

