DEPARTMENT OF COMPUTER APPLICATIONS
20MCA246 – MAIN PROJECT

PRO FORMA FOR THE APPROVAL OF THE FOURTH SEMESTER MAIN PROJECT

(Note: All entries of the pro forma for approval should be filled up with appropriate and complete information. Incomplete Pro forma of approval in any respect will be rejected.)

Main Project Proposal No : _____ *(Filled by the Department)*	Academic Year : 2021- 22 Year of Admission : 2020

1. Title of the Project : IDENTIFYING ABNORMAL CUSTOMER BEHAVIOR FROM SURVEILLANCE CAMERA AND SECURITY ALERT BASED ON DEEPLEARNING

2. Name of the Guide :FEBIN AZIZ

3. Student Details (in BLOCK LETTERS)

Name	Register Number	Signature
ANJALI T P	MES20MCA-2008	

Date: 16/04/2022

Approval Status : Approved / Not Approved

Signature of Committee Members

Comments of the Guide Dated Signature

Initial Submission :

First Review :

Second Review :

Comments of the Project Coordinator Dated Signature

Initial Submission:

First Review

Second Review

Final Comments :

Dated Signature of HOD

IDENTIFYING ABNORMAL CUSTOMER BEHAVIOR FROM SURVEILLANCE CAMERA AND SECURITY ALERT BASED ON DEEPLEARNING

ANJALI TP

Introduction and Objectives:

Identifying customer's interests is valuable as it intuitively represents the product the customer wants. It can also be an effective marketing strategy for determining potential customers. Therefore, large retail vendors like Walmart and Costco analyze customer purchase history to identify customer interest. However, purchase history alone cannot fully determine how much interest in the product a customer has other than what they have purchased. In other words, products that the customer does not purchase but are interested can never be identified.While safety and security should be a priority all year round, you should pay even closer attention to these matters during the days.When it comes to overall safety and security of your businesses or SME's (small and medium enterprises) video surveillance and security cameras are most important. Living in this century it is very crucial to follow the trends of modern technology in terms of our security and safety.This project focuses on identifying a customer's interest based on behaviors from surveillance cameras. We detect the customer's gaze direction as this behavior accurately reflects customer interest in a particular product. CCTV is rarely used to PREVENT theft - that would usually require someone watching the video feeds constantly, which is impractical for the rare times it actually happens. Recorded video is more often used to aid in investigation and prosecution. Sometimes the deterrent factor can prevent theft - cameras are made obvious, and many stores will have "customer awareness" monitors at entrances, showing people that they're on camera. If potential thieves are made VERY aware that they're being recorded, they'll sometimes move on to somewhere else. In this project mainly focuses on identifying a customer's interest based on behaviors from surveillance cameras. We detect the customer's gaze direction as this behavior accurately reflects customer interest in a particular product and the security of the shop at night. If an incident occurs at night in a shop, Someone trespasses from outside (Thief), incase product may fall ,cross the animals if any changes occur (Abnormality was discovered due to any object), It is advisable to notify the appropriate security .A shop will have cctv running full time.in this case the video will be stored only if something happens at night. Background Subtraction Algorithm is used to find what goes on inside the shop at night(Abnormality). Machine learning is used to find out what is the cause of the abnormality.

Problem Definition:

EXISTING SYSTEM

Finding customer's interests is valuable. It can also be an effective marketing strategy for determining potential customers and if a customer walk into a super market there won't be enough staffs or salesmen to manage a bunch of customers. There will always have communication errors with the salesman and customer. For a shop customer is the primary investment so it's our responsibility to make the customer satisfied. Currently there is only customer purchase history to identify customer interest. However, purchase history alone cannot fully determine how much interest in the product .And cctv is rarely used to prevent theft that would usually require someone watching the video feeds constantly at night also , which is impractical for the rare times it actually happens. Recorded video is more often used to aid in investigation and prosecution. Sometimes the deterrent factor can prevent theft - cameras are made obvious, and many stores will have "customer awareness" monitors at entrances, showing people that they're on camera. If potential thieves are made VERY aware that they're being recorded, they'll sometimes move on to somewhere else.

PROPOSED SYSTEM

This project focuses on identifying a customer's emotions through CCTV camera footages. We detect the customer's emotions and gaze towards a product in order to find interest in a particular product. We are using Facial Emotion Recognition data sets (FER) which contains emotions like happy, sad, angry, etc. And a method to identify customer's interests in the product through the estimation of gaze direction. For

effective identification, the FERdataset with various quality and conditions, including various behaviors of customers in the real-world store, was proposed. Considering that the accuracy of gaze direction depends on face detection,we applied the state-of-the-art face detection algorithms to the FER dataset.safety and security of your businesses or SME's (small and medium enterprises) video surveillance and security cameras are most important. Someone trespasses from outside (Thief), incase product may fall ,cross the animals if any changes occur (Abnormality was discovered due to anyobject), It is advisable to notify the appropriate security at that time. Foreffective identification,the Background Subtraction Algorithm and CNN algorithm are used

Basic functionalities:

Functional Module

Deep Learning:

Deep learning is a subset of machine learning, which is essentially a neural network with three or more layers. These neural networks attempt to simulate the behavior of the human brain—albeit far from matching its ability—allowing it to "learn" from large amounts of data. While a neural network with a single layer can still make approximate predictions, additional hidden layers can help to optimize and refine for accuracy. Deep learning neural networks, or artificial neural networks, attempts to mimic the human brain through a combination of data inputs, weights, and bias. These elements work together to accurately recognize, classify, and describe objects within the data. Deep neural networks consist of multiple layers of interconnected nodes, each building upon the previous layer to refine and optimize the prediction or categorization. This progression of computations through the network is called forward propagation. The input and output layers of a deep neural network are called visible layers. The input layer is where the deep learning model ingests the data for processing, and the output layer is where the final prediction or classification is made. Another process called backpropagation uses algorithms, like gradient descent, to calculate errors in predictions and then adjusts the weights and biases of the function by moving backwards through the layers in an effort to train the model. Together, forward propagation and backpropagation allow a neural network to make predictions and correct for any errors accordingly. Over time, the algorithm becomes gradually more accurate.

Background subtraction algorithm –

The background subtraction method (BSM) is one of the most popular approaches to detecting objects. This algorithm works by comparing moving parts of a video to a background image and foreground image.This method is used to find foreground objects by isolating them while comparing them to the frame where no objects are present; it will find the differences between them and create a distance matrix. Basically what it does is compare the difference in the value of two frames, one frame without an object and the other with objects to count, with the threshold value. The threshold value is predefined by using the first few frames of the video. Hence if the difference in the value of two frames is greater than the preset threshold value, the result is marked as a moving object detected.The background subtraction method considers the input video frame as "I" is made of static background "B," which does not change throughout the scene, in front of which an object is moving and observed.

Step1 :initialize frame as background [B(x,y,t)]
Step2 : inputframe [I(x,y,t)]
Step3 : if difference (I,B)>Threshold value Then Return(foreground object exist) Else Return (no foreground object exist)

CNNAlgorithm

There are multiple convolutional layers extracting features from the image and finally the output layer. CNN extracts the feature of image and convert it into lower dimensions without loosing its characteristics. The role of cnn is to reduce the images into a form which is easier to process, without losing features which are critical for getting good prediction.Each input layer is connected to the next hidden layer.The output obtained is compared with dataset and then predict the result. CNN is mainly used in image recognition , object detection and segmentation

User module

- Admin
- Security

1 **Admin**

- Login
- Add and Manage Security and staff
- Assign Duty both staff and security
- View Daily Report

2 Security

- Login
- View duty
- Add and manage daily report
- View Notification

3 Staff:

- Login
- View works and update status
- View notification from admin
- View notification from camera

HARDWARE AND SOFTWARE REQUIREMENTS:

HARDWARE REQUIREMENTS

The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

• Processor - Intel x86
• Speed - 1.1 GHz
• RAM - 700 MB (min)
• Hard Disk - 150 MB
• Key Board - Standard Windows Keyboard
• Mouse - Two or Three Button Mouse
• Monitor - SVG

SOFTWARE REQUIREMENTS

One of the most difficult tasks is selecting software for the system, once the system requirements is found out then we have to determine whether a particular software package fits for those system requirements. The application requirement:

- OPERATING SYSTEM: Windows 7 and above.
- FRONT END: Html, Css, Javacript
- BACK END: Mysql
- SOFTWARES USED: Jetbrains Pycharm, Android Studio
- TECHNOLOGY USED: Python,Java

- FRAME WORK USED: Flask
- Dataset - FER Dataset ,dataset(created)
- Web Browser - Google Chrome, Fire fox, Microsoft Edge
- Algorithms : Haar cascade Algorithm,CNN Algorithm