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AUTO ATTENDANCE USING FACIAL RECOGNITION

A Report for the Evaluation 3 of Project 2

Submitted by

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SCHOOL OF COMPUTING AND SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

Certified that this project report **"AUTOATTENDANCE USING FACIAL RECOGNITION"** is the bonafide work of "**PRINCE PAWAN**" who carried out the project work under my supervision.

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LIST OF ABBREVIATION USED

1.	IOT	:	Internet Of Things
2.	AI	:	Artificial Intelligence
3.	BP	:	Back Propagation
4.	LRM	:	Linear Regression Model
5.	T.D.	:	Total Dissolved
6.	MLP	:	MultiLayer Positron
7.	ANN	:	Artificial Neural Network
8.	BOD	:	Biological Oxygen Demand
9.	COD	:	Chemical Oxygen Demand
10.	DO	:	Dissolved Oxygen
11.	POI	:	Point of Interest
12.	stMTMV	:	spatio-temporal Multi-view Multi-task learning framework
13.	ARMA	:	AutoRegressive Moving Average
14.	FT	:	Forward Train
15.	FP	:	Forward Prune
16.	BT	:	Backward Train
17.	BP	:	Backward Purne
18.	RMSE	:	Root Mean Square Error
19.	SCADA	:	Supervised Control and Data Acquisition
20.	OS	:	Operating System
21.	LSTM	:	Long short term memory

1) **Introduction**

a) **Overview**

AUTO ATTENDENCE is IOT based home application for monitoring the people in the building. Internet of Things (IoT) conceptualizes the idea of remotely connecting and monitoring real world objects (things) through the Internet. When it comes to our class, this concept can be aptly incorporated to make it smarter, safer and automated. This IoT project focuses on building a smart wireless home security system which sends alerts to the owner by using Internet in case of any trespass and raises an alarm optionally, also alert via email services.

Having completed the idea pitchin phase, our product is in the development phase. Prototype of it was displayed in the 16th National Technological Festival, LOCUS, and we received positive reviews about it. We have been trying to incorporate all those suggestions and propositions in the prototype as far as possible. Our project focuses on the idea of giving the best experience for everyone by detecting trespass and anonymous activities

b) Objectives

This project is done solely for getting knowledge about Artificial Intelligence and implementing AI for solving real life in case of image processing. The purpose of our project is to match the face id and use it to detect the harm to the home. The major objectives are as listed below:

a. Primary Objectives

- To gain knowledge about AI and image processing
- To know and use various algorithm related with Artificial Intelligence
- To generate faceid and use it to identify people
- To alert about tracepasses via mailing sites
- To predict the behaviour of people though their activities

b. Secondary Objectives

- To develop the business plan
- To predict the harm-ness level of people though their activities

2) **Proposed Plan**

For the preparation of this project, we decided to use different tools and different implementation. This Project can be better defined in block diagram as:

Fig: Basic logic flow diagram for program design and development.

a. FaceID Collection

This portion of the project contains the part in which the faceID of the people will be stored. In this part the faceID are tabulated in database and categorized for various applications

b. Create FaceID

Human Face represents complex, multidimensional, meaningful visual motivation. It is difficult to develop a computational model for face recognition. Building good computer system similar to human ability to recognize faces and overcome humans' limitations is regarded as a great challenge. Developing such systems will be important in the current world of insecurities. Creating FaceID uses various machine learning and deep learning technique

Principle of Back Propagation technique

The BP neural Network is the most popular model among all the neural network architectures that are based on the research of biological neurons. The basic structure of the BP neural network is a feedforward network which is composed of one input layer, several hidden layers, and one output layer. Neurons between every two layers connect each other by connection weights and there is

no relation between neurons in the same layer. The output of the former layer is the input of the next layer. The BP neural network consists of forward propagation of the signal and back propagation of the error. In the first stage, the sample indices enter the input layer and then are transmitted to the output layer after being processed layer by layer. If the actual output values are inconsistent with the desired values, then the algorithm turns into the phase of back propagation. In this stage, the output values are transmitted layer by layer back to the input layer in a certain way and the error is allocated to each neuron of the network so that each error signal which is a prerequisite of revising the weight value between every two neurons is obtained.

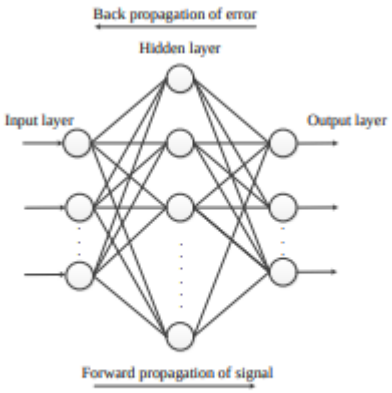

Figure 2. Architecture of the typical BP neural network.

Principle of LSTM

Long short-term memory (LSTM) is an artificial recurrent neural network (RNN) architecture used in the field of deep learning. Unlike standard feedforward neural networks, LSTM has feedback connections that make it a "general purpose computer" (that is, it can compute anything that a Turing machine can).

A common LSTM unit is composed of a cell, an input gate, an output gate and a forget gate. The cell remembers values over arbitrary time intervals and the three gates regulate the flow of information into and out of the cell.

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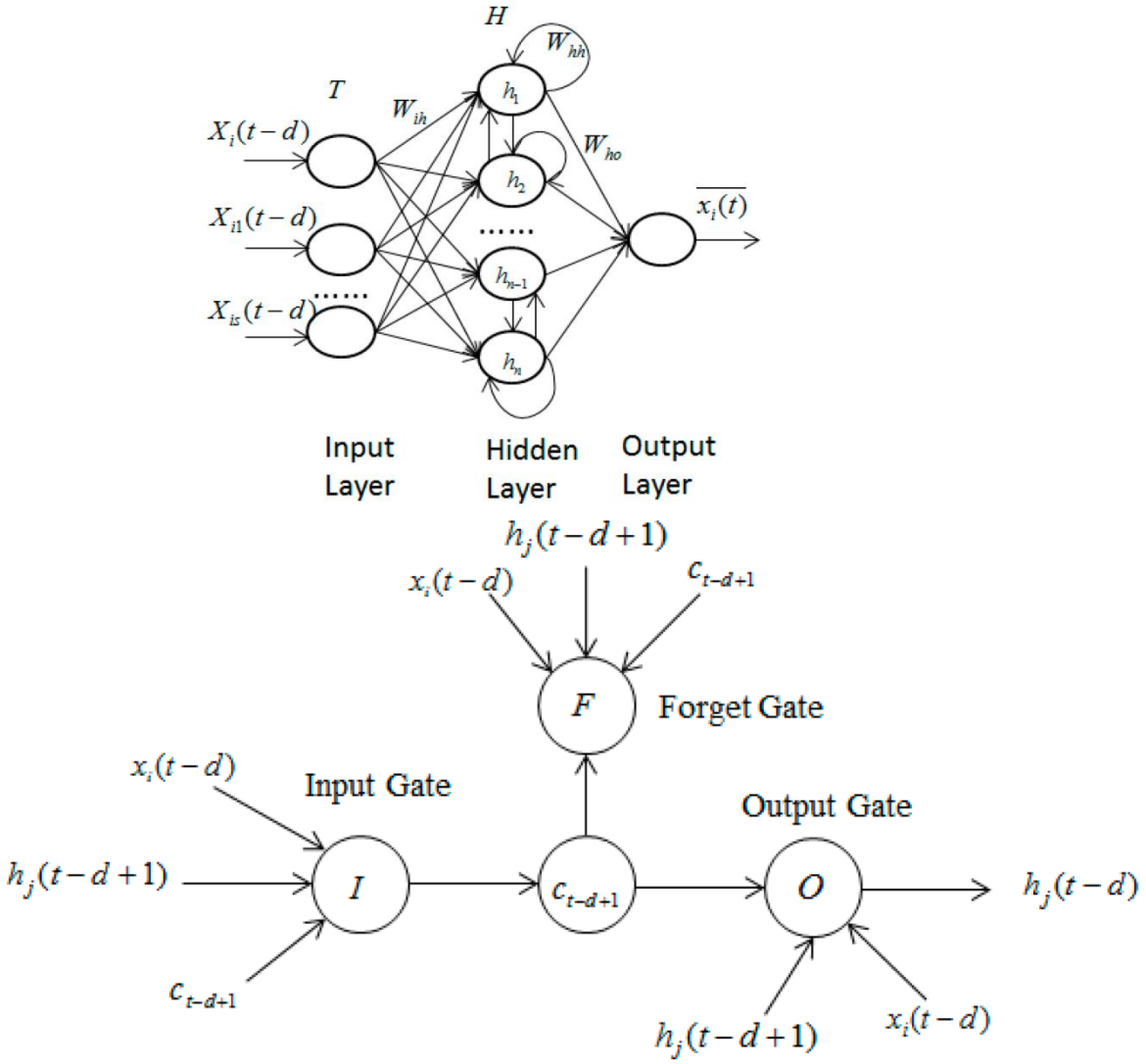

c. Faceid storage

FaceID will be stored in the database for future purposes. This database is used at last for future detection of abnormalities.

d. FaceID detection and alerting

FaceID of incomers will be recorded and then compared with the IDs in the database. Then if it matches then system works normals but if it doesn't then the system will try to alert the concern department though mailing their face images. It can be used for police case if something horrible happens or if the system finds it hard to take trace of.

3) **Application of this Project**

a) Face and gesture based auto attendance and monitoring with live cloud based data update

In this system employees need not to fingerprint for the attendance. As he/she enters in the office, his/her face is recognized and that updates the attendance. This system makes employees and officials accountable to their work as their continuous monitoring system on them.

b) IOT based gesture controlled devices

A large no. of fans, heaters, bulbs, laptops, desktops servers are being run in the office. These all operations of ON and OFF is to be done manually. But in this system, through the use of gestures and mobile phones, these devices shall be turned ON and OFF automatically. This system also detects the presence of person in the cabins or rooms and these devices will act accordingly. Meaning, no person in the room, all gadgets are OFF, you enter the office and they run automatically

#No. of employees prediction on certain day using data from previous days' data

c) Central monitoring of various offices status within the entire area or city

This monitoring system works in hierarchical order. The high level officers shall have access to the camera data of employees working in lower hierarchy thus monitoring their work and providing recommendations when needed.

4) Features used in this project

Computer vision

Computer vision is an interdisciplinary field that deals with how computers can be made to gain high-level understanding from digital images or videos. From the perspective of engineering, it seeks to automate tasks that the human visual system can do. Computer vision is concerned with the automatic extraction, analysis and understanding of useful information from a single image or a sequence of images. It involves the development of a theoretical and algorithmic basis to achieve automatic visual understanding. As a scientific discipline, computer vision is concerned with the theory behind artificial systems that extract information from images. The image data can take many forms, such as video sequences, views from multiple cameras, or multi-dimensional data from a medical scanner. As a technological discipline, computer vision seeks to apply its theories and models for the construction of computer vision systems.

Machine learning

Machine learning is the scientific study of algorithms and statistical models that computer systems use to effectively perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model of sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to perform the task. Machine learning algorithms are used in the applications of email filtering, detection of network intruders, and computer vision, where it is infeasible to develop an algorithm of specific instructions for performing the task. Machine learning is closely related to computational statistics, which focuses on making predictions using computers.

Data science

Data science is a multidisciplinary field that uses scientific methods, processes, algorithms and systems to extract knowledge and insights from data in various forms, both structured and unstructured.

Data science is a "concept to unify statistics, data analysis, machine learning and their related methods" in order to "understand and analyze actual phenomena" with data.It employs techniques and theories drawn from many fields within the context of mathematics, statistics, information science,

and computer science.

IoT

The Internet of things is the network of devices such as vehicles, and home appliances that contain electronics, software, sensors, actuators, and connectivity which allows these things to connect, interact and exchange data.

The IoT involves extending Internet connectivity beyond standard devices, such as desktops, laptops, smartphones and tablets, to any range of traditionally dumb or non-internet-enabled physical devices and everyday objects. Embedded with technology, these devices can communicate and interact over the Internet, and they can be remotely monitored and controlled.

5) Software Frameworks and hardware used

Our product-service system shall have hierarchical order of monitoring system. For this purpose, we shall have admin management website for high level official in the office of in the entire city which will be embedded with videos of live CCTV cameras and also the attendance sheet of the organization.

For the employees and officers, their will be account login system in which their status as an employee will be recorded.

The technical frameworks we use are NodeJS for server hosting, Python for machine learning and AI algorithms along with web front end languages like HTML, CSS, Bootstrap, Javascript & JQuery for the system.

Similarly, the database used under our system is MongoDB (NoSQL). In the same manner the feature of IoT is obtained using Raspberry Pi coded with python having relay connected to its output pin(s).

6) Business Plan

Basically, our idea is a product-service compromised system. This is a new and innovative approach incorporating the latest technologies that assure us of the cent percent safety. The following points will highlight the standing out of our product-system

- There is no such system as effective monitoring in various public and private administrative offices.
- The present system like thumb print is time basis, and also some defects such as have been found in recent world,but our system is fully automatic and eliminates such defects.
- Our system being IOT based, saves manual labour, energy.

- Increases security at security concerned areas like parliament , president class, embassies, and so on

How does market/environmental factors support your business model?

Today's world is the world of effective administration. Organizations and government offices failing to do so, circulates negative impact of them and public raise question on those ineffective conduction of the duty.

In the earlier days, attendance system on register were supposed to be traditional. However if we think about future, thumb print system is also bound to be obsolete.

An officer, mostly prevalent in governmental sectors, may be deceiving from higher level officials about work. This system keeps eye upon them and all and will be rightly caught for their misdeeds.

Secondly, a man, a peon , a guard or even the officer may forget to turn off the lights, fans, heaters, coolers, computers. This causes waste of energy. Our system detects the presence of man/woman in the office and those gadgets act accordingly.

Market Size and Growth potential.

Our product is a service system, service system that increases administrative efficiency. Initially we have targeted 50 private organizations and all 32 ward offices(if permitted). This is a scientific approach and is bound to succeed. As it succeeds, we will shortlist the offices eager to increase administrative efficiency and provide maximum quality service to their customers and then implement the system.we also planned to implement it in parliament and president class for monitoring various entries and exits. In addition with security alert feature for guards

Competition or probability of competition in future?

Strictly saying,there is no such thing as competition in context of our idea; our idea being a system to enhance administrative efficiency of a organization. However, we can't write off any idea or a team that may come up with the better solution to this one.

CCTV cameras, thumb print system, manual control of electronic gadgets are prevalent system. We intend to substitute those with more holistic approach.

Private organisations like Google amazon

Value Proposition

Basically, its a feature of an organization for the employees to abide by the rules and regulations. The employees need to be accountable to their work and be responsible towards their duties. Similiarly, the manual task of operating electronic devices is solved by this product service system.

Target market variables

Our target market variable is the demographics of organizations, no. of employees present in those organizations and security.

Mission, Vision of your business/venture

"Automatic" and "Time saving" is what humans have always wanted. And our system incorporates those issues along with Energy saving.

Our product-service system "NIGRAANI", is the venture of modern scientific methods and tools. It uses Computer Vision, Internet of Things(IOT), Data Science, Machine Learning, Cloud based server, etc. which are modern science elements. There is also open road to modifying changes according to the need of future.

SWOT analysis of your idea/business model/team

Our strength is our modern technology.

Our weakness lies in the implementation hindrances.

This system having used up- to- date technology, there are great opportunities of flourishing.

Marketing plan

We can incorporate the following marketing strategies.

- Word of mouth
- Social media marketing
- Visual marketing
- Paid search advertising

Revenue Structure

Our main source of income will be the sale of our system on contract basis to the governmental and private organizations.

Also,from organisations who will product like database charge.

Cost structure

Cloud-600 per GB

Software-30,000

IoT devices-3000

How do you plan to retain customers and build good customer relationship?

Our customers are the organizations where large large no of employees work. The effectiveness of our product service automatically uplifts the good relationship between we vendors and our customers. However timely update of the system addresses their increasing demand and we have the capability to do that.Also, we can demonstrate the no of customers satisfied with the organizations' work rate and how it has affected the peoples life.

Sustainability

Our product-service is based on the latest technology that determines to substitute the outdated methodologies of administrative management. Also it has the features of expandability that make it dynamic with time.

7) Conclusion

IOT based Security is emerging field in the globe. Integrating AI into IOT for the sect of providing people security is the field the top IT and Engineering companies are dreaming of. This project integrates the IOT With AI then use various UI development tools for the sect of providing the customer security. This project brings forward a secure home by the help of modern AI technique in the field of image processing and create the FaceID which is used as an ID for user helping system to detect anomalies in the location

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