

# ATTENDANCE SYSTEM USING DEEP LEARNING FACE IDENTIFICATION ALGORITHMS

A PROJECT REPORT

*Submitted by*

JOEL REGO - 20171CSE0271  
MEDHA M H - 20171CSE0387  
AKSHAY KRISHNA - 20171CSE0036  
MAHESHA R - 20171CSE0359

*Under the guidance of*

PROF. RAVINDRANATH

*in partial fulfillment for the award of the degree*

*of*

BACHELOR OF TECHNOLOGY  
IN  
COMPUTER SCIENCE AND ENGINEERING

At



Department of Computer Science and Engineering  
School of Engineering  
PRESIDENCY UNIVERSITY  
BANGALORE  
JANUARY 2020

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
SCHOOL OF ENGINEERING**

**PRESIDENCY UNIVERSITY**

**CERTIFICATE**

This is to certified that the Project report “**Attendance System using Deep Learning Face Identification Algorithms**” being submitted by Joel Rego (20171CSE0271), Medha M H (20171CSE0387), Akshay Krishna (20171CSE0036), Mahesha R (20171CSE0359), in partial fulfillment of requirement for the award of degree of **Bachelor of Technology in Computer Science and Engineering** is a bonafide work carried out under my supervision.

**Dr. Mohan K G**

HOD  
Department of CSE  
Presidency University

**Mr. Ravindranath**

Guide  
Professor  
Department of CSE

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING  
SCHOOL OF ENGINEERING**

**PRESIDENCY UNIVERSITY**

**DECLARATION**

I hereby declare that the work, which is being presented in the project report entitled “**Attendance System using Deep Learning Face Identification Algorithms**” in partial fulfillment for the award of Degree of **Bachelor of Technology in Computer Science and Engineering**, is a record of our own investigations carried under the guidance of **Mr. Ravindranath, Assistant Professor, Department of Computer Science and Engineering, School of Engineering, Presidency University, Bangalore.**

We have not submitted the matter presented in this report anywhere for the award of any other Degree.

**Joel Rego (20171CSE0271)  
Medha M H (20171CSE0387)  
Akshay Krishna (20171CSE0036)  
Mahesha R (20171CSE0359)**

## TABLE OF CONTENTS

CHAPTER NO.	TITLE	PAGE NO.
	ABSTRACT	ii
	ACKNOWLEDGMENT	iii
1.	INTRODUCTION	
	1.1 WHAT IS DEEP LEARNING	1
	1.2 EXAMPLES OF DEEP LEARNING	2
	1.3 HOW DEEP LEARNING WORKS	5
	1.2.2.1 General	8
	1.2.2.2. ....	10
	1.2.2	12
	1.3	13
	1.4	15
2.	LITERATURE REVIEW	16
	2.1 GENERAL	17
	2.2	19
	2.2.	20

## **ABSTRACT**

Face detection, feature extraction and face recognition are three of the most crucial steps in a multi-stage process of face recognition using deep learning algorithms. This process could be a computationally expensive. Most applications of face recognition, such as a student and/or employee attendance system that is traditionally done using pen and paper, use Convolutional neural networks to produce a deep-metric image encoding and a K-NN to classify the students' faces. In order to improve the speed and allow such methods to be used in already existing on-premise low-memory devices such as CCTV cameras, we encode the images with histogram of oriented gradients (HOG) instead of CNN. This allows us to encode faces without a GPU (with only a CPU) with sufficient speed with moderate accuracy.

Thus, this project offers a better, more robust, and faster implementation of deep-learning face-recognition system for student attendance.

## ACKNOWLEDGEMENT

First of all, We indebted to the GOD ALMIGHTY for giving me an opportunity to excel in our efforts to complete this project on time.

We are extremely grateful to **Dr. C. Prabhakar Reddy**, Dean, School of Engineering and **Dr.Mohan K G**, Head of the Department, Department of Computer Science and Engineering, for providing all the required resources for the successful completion of this project.

We sincerely thank our project guide, **Prof. Ravindranath**, for his guidance, help and motivation. Apart from the area of work, we learnt a lot from him, which we are sure will be useful in different stages of our life. We would like to express our gratitude to Faculty Coordinators and Faculty, for their review and many helpful comments.

We would like to acknowledge the support and encouragement of our friends.

**Joel Rego (20171CSE0271)**

**Medha M H (20171CSE0387)**

**Akshay Krishna (20171CSE0036)**

**Mahesha R (20171CSE0359)**

# 1. INTRODUCTION

## 1. 1 DEEP LEARNING

Deep learning is a machine learning technique that teaches computers to do what comes naturally to humans: learn by example. Deep learning is a key technology behind driverless cars, enabling them to recognize a stop sign, or to distinguish a pedestrian from a lamppost. It is the key to voice control in consumer devices like phones, tablets, TVs, and hands-free speakers. Deep learning is getting lots of attention lately and for good reason. It's achieving results that were not possible before. In deep learning, a computer model learns to perform classification tasks directly from images, text, or sound. Deep learning models can achieve state-of-the-art accuracy, sometimes exceeding human-level performance. Models are trained by using a large set of labeled data and neural network architectures that contain many layers.

In a word, accuracy. Deep learning achieves recognition accuracy at higher levels than ever before. This helps consumer electronics meet user expectations, and it is crucial for safety-critical applications like driverless cars. Recent advances in deep learning have improved to the point where deep learning outperforms humans in some tasks like classifying objects in images.

While deep learning was first theorized in the 1980s, there are two main reasons it has only recently become useful:

1. Deep learning requires large amounts of labeled data. For example, driverless car development requires millions of images and thousands of hours of video.
2. Deep learning requires substantial computing power. High-performance GPUs have a parallel architecture that is efficient for deep learning. When combined with clusters or cloud computing, this enables development teams to reduce training time for a deep learning network from weeks to hours or less.

## **1. 2 EXAMPLES OF DEEP LEARNING IN REAL LIFE**

Deep learning applications are used in industries from automated driving to medical devices.

- **Automated Driving:** Automotive researchers are using deep learning to automatically detect objects such as stop signs and traffic lights. In addition, deep learning is used to detect pedestrians, which helps decrease accidents.
- **Aerospace and Defense:** Deep learning is used to identify objects from satellites that locate areas of interest and identify safe or unsafe zones for troops.



- **Medical Research:** Cancer researchers are using deep learning to automatically detect cancer cells. Teams at UCLA built an advanced microscope that yields a high-dimensional data set used to train a deep learning application to accurately identify cancer cells.
- **Industrial Automation:** Deep learning is helping to improve worker safety around heavy machinery by automatically detecting when people or objects are within an unsafe distance of machines.
- **Electronics:** Deep learning is being used in automated hearing and speech translation. For example, home assistance devices that respond to your voice and know your preferences are powered by deep learning applications.

### **1.3 HOW DEEP LEARNING WORKS**

Most deep learning methods use neural network architectures, which is why deep learning models are often referred to as deep neural networks. The term “deep” usually refers to the number of hidden layers in the neural network.

Traditional neural networks only contain 2-3 hidden layers, while deep networks can have as many as 150. Deep learning models are trained by using large sets of labeled data and neural network architectures that learn features directly from the data without the need for manual feature extraction.



---

## List of Tables

Sl. No.	Table Name	Table Caption	Page No.
1	Table 1.1	Software modules versus Reusable components	5

---

## List of Figures

Sl. No.	Figure Name	Caption	Page No.
1	Figure 1.1	Software modules versus Reusable components	5