IoT based Smart Security System with Face Detection and Information E-mail

A Project

submitted in partial fulfillment of the requirements for

the award of the Degree of

BACHELOR OF COMPUTER APPLICATIONS

by

ANKIT TALUKDAR

(MAKAUT ROLL NO.: 10401215013 AND REGISTRATION NO.: 151041010013)

NIRMALYA BANERJEE

(MAKAUT ROLL NO.: 10401215058 AND REGISTRATION NO.: 151041010058)

DIPSA GANGULY

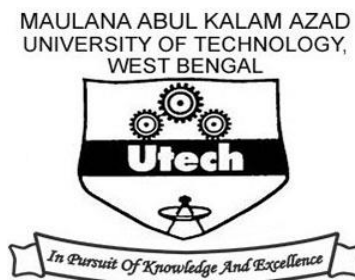**(MAKAUT ROLL NO.: 10401215038 AND REGISTRATION NO.: 151041010038)**

ATIN DAS

(MAKAUT ROLL NO.: 10401215020 AND REGISTRATION NO.: 151041010020)

KOMAL K. PARIKH

(MAKAUT ROLL NO.: 10401215050 AND REGISTRATION NO.: 151041010050)

Guided by Prof. Soumi Dutta

MAULANA ABUL KALAM AZAD
UNIVERSITY OF TECHNOLOGY,
WEST BENGAL

Utech

In Pursuit Of Knowledge And Excellence

DEPARTMENT OF COMPUTER APPLICATION

INSTITUTE OF ENGINEERING & MANAGEMENT

2018

DECLARATION CERTIFICATE

This is to certify that the work presented in the project entitled **"IoT based Smart Security System with Face Detection and Information E-mail"** in partial fulfillment of the requirement for the award of the degree of **Bachelor of Computer Applications** from Institute of Engineering and Management is an authentic work carried out under my supervision and guidance.

To the best of my knowledge, the content of this thesis does not form a basis for the award of any previous Degree to anyone else.

Date: 11.05.2018

_____

Prof. Soumi Dutta

Dept. of Computer Application

Institute of Engineering & Management

_____

Prof. Abhishek Bhattacharya

Head of the Department

Dept. of Computer Application

Institute of Engineering & Management

CERTIFICATE OF APPROVAL

The foregoing project entitled **"IoT based Smart Security System with Face Detection and Information E-mail"** is hereby approved as Major Project and has been presented in satisfactory manner to warrant its acceptance as a prerequisite to the degree for which it has been submitted.

It is understood that by this approval, the undersigned do not necessarily endorse any conclusion drawn or opinion expressed therein, but approve the project for the purpose for which it is submitted.

_____   _____

(Internal Examiner)   **(External Examiner)**

ACKNOWLEDGEMENT

No project has ever been possible without a major help from active and passive support. This project is no exception. We are highly thankful to our learned faculty, supervisor, mentor and guide, Prof. Soumi Dutta, for her active guidance throughout the course of the research work and main project. We would like to extend our gratitude to our seniors who have played a major role in helping us with the research and all those who couldn't be mentioned here but have played their part in inspiring the curtain.

We would also like to express gratitude to all the team members for their constant efforts, hard work and incessant toil towards the successful completion of the project work. Also, this project would not have been possible without the support of our parents, guardians and friends, who have always been there to boost our morale and help us in moving forward with the work despite numerous hardships. We are highly grateful to all for helping us throughout our journey for the success of this project.

ANKIT TALUKDAR (MAKAUT ROLL NO.: 10401215013)

NIRMALYA BANERJEE (MAKAUT ROLL NO.: 10401215058)

DIPSA GANGULY (MAKAUT ROLL NO.: 10401215038)

ATIN DAS (MAKAUT ROLL NO.: 10401215020)

KOMAL K. PARIKH (MAKAUT ROLL NO.: 10401215050)

CONTENTS

ABSTRACT

Security nowadays is a major issue and the only thing that comes to our mind when we think about a solution that's upto the mark with today's growing technology is a "smart" solution. So, a Smart Security System has been proposed which comes to the rescue by planning to implement Frontal Face Detection after detection of motion using IR (Infrared) sensors in front of the camera device installed at the door of the house and sending the mail to the concerned user. All of this is implemented using Raspberry Pi.

The project is divided into various segments. The Passive Infrared (PIR) sensor detects any movement around the camera device and it activates the camera to click images. The images are immediately sent to the user via Gmail using SMTP library (smtplib) in Python. The camera module of the Raspberry Pi is able to detect the face using the Local Binary Patterns Histogram (LBPH) Recognizer Algorithm by OpenCV in Python. The recognizer is trained earlier with the images stored in the database. As a face appears in front of the camera, the system compares it with those photos in the database. LBPH works by characterizing the local patterns in each location in the image and thus, it analyzes the image. If the face is a known face and the system is able to detect it, then the electronic lock shall unlock itself to allow the person to enter into the house, and the user is aware of it. However, if the face is unknown, the decision rests upon the user if he allows the person to enter into his premises. This reply sent by the user via Gmail is retrieved using imaplib in Python. Based on the user's "Accept" or "Deny" mail, an appropriate action is taken and a Boolean value true or false is sent accordingly to the electronic lock can unlock or lock itself respectively. Here, there is also an implementation of a database wherein the user may enter a new name when he clicks on "Accept" for the person at the door so as to detect the face automatically from the next time.