

The Smart Attendance Management System

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Abstract: Our project is a sophisticated version of the existing attendance management system which helps to maintain the record of both students and the faculty accurately. The project is much handy than the current ones because of the use of IoT technology so as to make it portable. The idea of associating attendance with OTP based authentication leads to high accuracy and genuineness. The usage of the raspbian code makes this project much simpler from the developer's point of view and highly robust from that of client's. Raspberry Pi acts as a tiny and affordable computer that becomes an interface connecting all other devices such as speaker and microphone. Other modules like the Espeak and the Speech Recognition makes venture easy to use. Hence, the entire process of linking the attendance with technology makes the system well efficient to maintain authentic and legitimate records of attendance without any scope for flaws or vulnerability.

Keywords: IoT, OTP, Espeak, Speech Recongition

I. INTRODUCTION

IoT is a trending technology which is playing a major role in the development of the ongoing projects. It makes the project look simple but is the most efficient when used. The current technology of using finger print sensors have some defects in it. The main idea of initiating the project was to eliminate the illegal means by which students gain attendance. As we kept developing the project, new ideas of extending this project to the utility of a section of public who are physically disabled, to the people affected with adermatoglyphia and the elders who have lost their fingerprints have evolved. Hence, this venture can most widely be used by all sections of public. The main framework of this product is to authorize the attendance management using the One Time Password methodology so that the fraud proxies can be eliminated. The device also matches the voice modulation of the person i.e, there is no need to manually enter the credentials into the device. Everything will be on the basis of speech recognition. This becomes the major strength reducing the human burden from physically typing to vocally speaking and verbally listening. The attendance after the authentication process will directly be stored into the database and there is no need to maintain any form of registers. The monthly aggregate percentage of

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attendance can directly be stored into the portals and the huge burden of maintaining and submitting attendance will directly be carried forward by this simple device. Hence, this product can directly be used in schools, colleges, universities and also in government offices.

II. SYSTEM DESIGN

A. PIP

This is a supreme module which contain classes of all the requirements of this venture. We must have a system which has Python version above 3.6 to support this module. Else, we externally have to download it. The versions above 3.6 have this module in-built within it.

B. PY Audio

PyAudio is a Python for PortAudio, the inter-platform audio I/O library. With *PyAudio*, you can easily use Python to record and play audio. This is a module which helps the system to process the audio to the device. It acts as a platform for recognizing the speech. This module must be installed from pip. Once the classes are installed, any form of audio can thereby be collected and used by the device for its further requirements. It can either save or process an audio file as per the requirement of the user according to his project.

C. Speech Recognition

The Speech Recognition of a person is carried out by the Google Speech Recognition API classes which lie in the pip module. We first need to install this module so that the packages are ready to be used. To recognize the speech of a person, we connect an external microphone to the device which can collect the data of speech from the user and process it to the device. We have used a microphone which possesses an inbuilt noise cancellation technology so that the signals can be accurately recognized by the system. Therefore, the microphone, coupled with the modules of speech recognition and pyaudio collect the user input accurately.

D. TWILIO

This is a third party API which helps in sending messages to the respective mobile numbers. The classes must initially be installed from pip. We need to create an account in Twilio so as to enable the device to send the messages. OTPs are the 4 digit numbers generated by using a random number function. There are other third party APIs which help in sending the messages but twilio is much faster and secure than all other APIs. Each twilio account is provided a unique ID and a secret key which helps in sending these messages.



E. ESpeak

The Espeak module is also a third party application which needs to be downloaded from its official website. This module helps in converting text to speech. It helps in interacting with the user vocally without the use of any physical devices. The path must be set in the environment variables of the system. To present the output from Espeak module, an external Bluetooth connected speaker is equipped in the device. Any form of output will be presented to the user by the voice from this speaker and the input from the user will be taken from the microphone attached previously.

III. PROBLEM STATEMENT

The prime objective that we began with was to minimize the false attendance, i.e any type of proxies. In the mean of developing the project, many other necessities have crept in such as providing the attendance to blind students. We henceforth introduced the concept of verbally communicating instead of physically entering the credentials. The other types of objectives included recognizing speech and sending OTPs to respective mobile numbers. The main goal is to change the face of the way in which attendance is actually taken, include the technology in it to experience the results without tampering the genuine attendance. Accountability has to be maintained in doing so. Hence, Transparency had to be improved so that we can easily access and maintain genuine punctuality of students as well as faculty. We were fruitful in accomplishing and overcoming the above difficulties by the help of the modules mentioned in the earlier segments.

IV. PROJECT FLOW

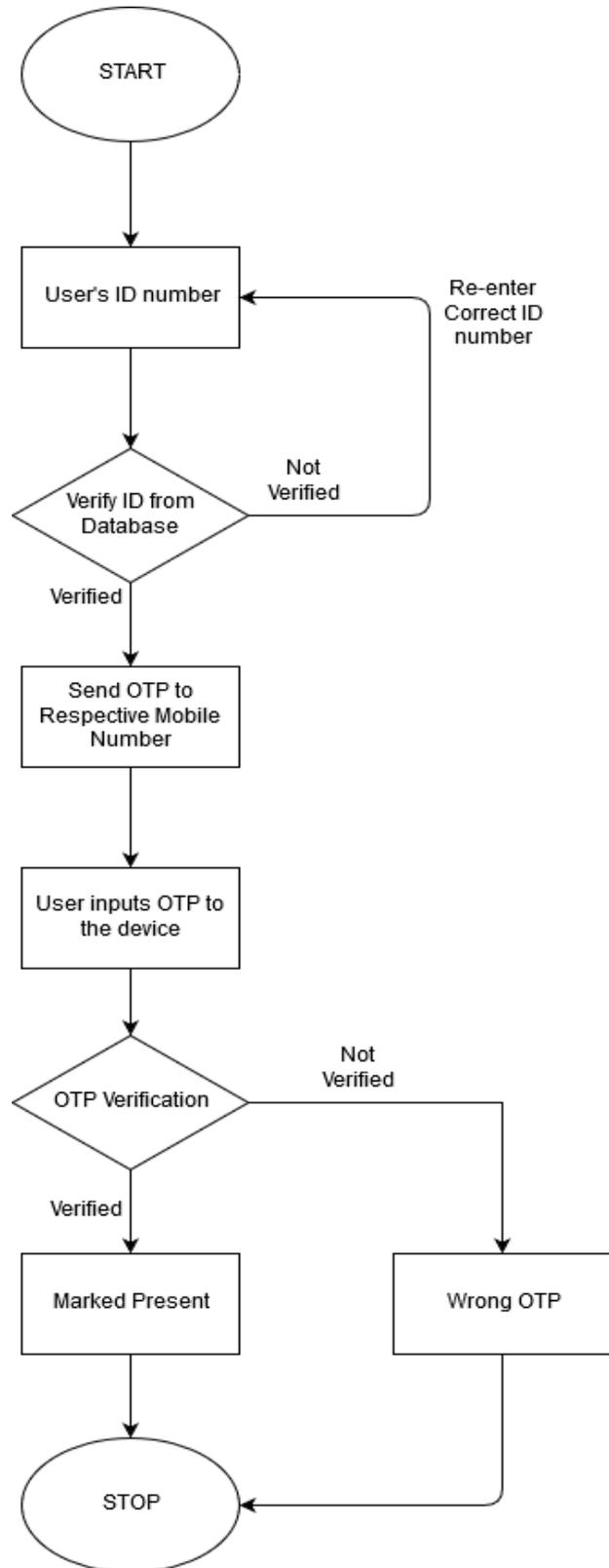


Figure 1 : Outline of the flow of project

V. IMPLEMENTATION RESULTS

Experiment 1: A user whose ID and mobile number registered in the device was asked to give an input to the device. As soon as he has given his ID number to the device, it has processed his voice modulation and matched the respective mobile number. The OTP which was received was said to the device within a time frame of 5 seconds. The device matched the OTP and marked him as present in the list of students.

Experiment 2 : Another user whose ID wasn't registered in the device was asked to give his input. The device didn't recognize him and asked to re-enter the correct ID number of the student.

Experiment 3 : A user whose ID number was registered has given an input to the system. As soon as it sent the OTP to the respective mobile number, he has entered wrong OTP. The device asked him to check the OTP.

V. CONCLUSION AND FUTURE SCOPE

This device can further be developed with the help of face detection for 2-step verification which would thereby increase the accuracy. It would lead the usage of this device to the people who are dumb. It would be helpful for the faculty to provide attendance to the students and also the management, in giving salaries according to the attendance of the faculty. It could also be efficiently used in government offices where the employees are age old in huge number. Though they have lost their finger prints, the can use this device for attendance.

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REFERENCES

1. Michael Weyrich, "Reference Architecture for Internet of Things", IEEE Software, Volume:33, 29th December,2015.
2. Tussanai Parthornratt, "People identification and counting system", International Conference on Electronics 2016, 30th January,2016.
3. Nur Aziza Aziz, "Text to Speech Synthesizer", International Conference on Advance Computer Science, 18th December 2011.
4. Vikramjit Mitra, "Medium Duration Modulation", IEEE International Conference on Acoustics, 9th May, 2014.
5. R.H.Goudar, "Multilevel Authentication using OTP and QR code", 2018 International Conference on Advances in Computing, 2018.
6. Libin Cai, "Audio Quality Measurement using digital watermarking", Canadian Conference on Electrical and Computer Engineering, Volume:2, 2004.