Published on *Telsoc* (https://telsoc.org)

A Secure Attendance System using Raspberry Pi Face Recognition

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JTDE - Vol 10, No 2 - June 2022 [3]

[4]

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Abstract

This study aims to develop a machine-learning-based attendance management system using face recognition and Raspberry Pi. The proposed system is composed of two main subsystems. The first is a Raspberry Pi, to be installed in each class, and the second is a web application fed by data from the Raspberry Pi. To take attendance, an instructor commands a

Raspberry Pi camera through a web-based subsystem. Then, the camera takes a picture of the whole class and detects faces using trained Haar Cascades. It sends back a file with the class picture and Cartesian coordinates of the detected faces. The web application parses the file, looking for the coordinates of faces. For each Region of Interest, it uses the Support Vector Machine algorithm to recognize faces based on their HOG (Histogram of Oriented Gradients) features. The recognizer uses a pre-built dataset of that particular class containing the students' personal photos, names and ID numbers. Features of each face were extracted using HOG and trained to construct the model over a given class of students. Once every detected face is recognized, the application generates a report for the instructor showing the list of students' names and attendance status.

Please refer to PDF download for the full paper.

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530-bin_hamed-article-v10n2pp62-75.pdf [6]

Cite this article as:

Rhouma Bin Hamed, Tarek Fatnassi. 2022. *A Secure Attendance System using Raspberry Pi Face Recognition*. JTDE, Vol 10, No 2, Article 530. http://doi.org/10.18080/JTDE.v10n2.530 [8]. Published by Telecommunications Association Inc. ABN 34 732 327 053. https://telsoc.org [9]
