

# 얼굴 인식 기술로 인한 일터 출근제 구현: 짐바브웨 사례

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## Implementation of a workplace attendance system based on face Identification: A case of Zimbabwe

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### Abstract

Authentication has become an issue of interest in system security control and computer based communication. This has brought about human face recognition and fingerprints as a vital branch of biometric verification which has been widely used in most cases, these includes areas such as, human to computer interaction, and to avoid granting access to intruders to applications such as mobile phones etc. This paper looks into an Employee's Check in and check out Attendance System which will integrate with the face recognition technology using Python Open CV. The system will capture arrival time and departure time automatically as per prescribed working times at the workplace. The data obtained will be send to management for them to use it.

### 1. Introduction

A person's face has become the most physical feature which is used for identification or recognition purposes. Therefore with various researches a lot of techniques are being used to study this physical feature. This feature is very important when checking for attendance in various places like academic institutions and working environments. In Zimbabwe a traditional approach is still in use in all these places where a manual register or check and check out register is still in use at various institutions. This makes it to be time wasting as a lot of time is wasted doing the manual register marking as this may take 5 to 10 minutes to record attendance. Also at work places there has been a general call of concern whereby most employees leaves the workplace earlier and talk to their workmates to do the checkout for them whilst they left earlier. This means loss of revenues to the organization depending on the nature of activities involved. To avoid such losses of early departures from workplace, we are about use automatic process based on image processing. This approach encourages the use of automatic face detection and recognition. This program of face detection is able to differentiate one face from other faces and faces from non-faces thus making it more essential and accurate check in and check out for employees at work. A database which

includes all the names of the employees and their faces will be created. With the help of this system we can take attendance on any time and see arriving and departing time for each employee.

### 2. Related Research

In the 1960s the first attempts to use face recognition with semi-automated systems began. This led to identification of some features which could differentiate these faces using marks on photographs. Features such as eyes, ears, noses, and mouths were identified as major features. This was followed by computing some distance ratios and making a comparative analysis with marks to a common referral reference point to some reference data. Goldstein, Harmon and Lesk [1], in the early 1970s conducted a research in which they created a system of 21 subjective markers which included hair colour and lip thickness as markers for face recognition. This proved even harder to automate due to the subjective nature of many of the measurements still made completely by hand.

In 2014, Patil and Shukla[2] conducted a research on Implementation of classroom attendance system based on face recognition in class. For this system they were using a two-step mechanism which is face and face recognition. In their research they implemented the Viola Jones algorithm for face detection and also applied the

hybrid algorithm from PCA and LDA for face recognition. The Raspberry pi module is was then applied for face detection & recognition whereby a camera was connected to the Raspberry pi module. A separate database containing all student information like roll number and face images was. This raspberry pi module was installed at the front side of class in such a way that it can capture the entire class. This study was ideal in that it saves loss of time and it was not burdensome to the teachers.

The Connectionist approach [3] is also another approach which was used on face recognition, this study approach classifies the human face using a combination of both range of gestures and a set of identifying markers. A 2-dimensional pattern is usually implemented consisting of recognition and neural net principles. This approach is well known for requiring a huge number of training faces to achieve a certain level of accuracy; this has left it undesirable to be implemented on a large scale. The method using depth information [4] can overcome weak points of the conventional face recognition methods based on color picture that are easily affected by the illumination and are vulnerable to the attempts to steal users face information through fake face such as the photograph or the sculpture.

### 3. Workplace Attendance System Using Face Identification

For the purposes of obtaining the attendance of employees and to record their time of entry and exit at the workplace, the attendance management system based on face recognition technology in the institutions/organizations is proposed. This system takes availability of each employee at the workplace by continuous observation at the entry and exit points. Through many researches for face identification we have come to know that many methods such as biometric, RFID based etc., however most of which are time consuming and non-efficient. The finger print method is a perfect substitution to avoid a wrong person logging in and off on behalf of someone however it have a shortfall in that it is also time consuming. In order to overcome a set of above highlighted challenges then the face recognition becomes the most suitable on in that it is fast, efficient and accurate. The processes of proposed system is shown as Fig. 1.

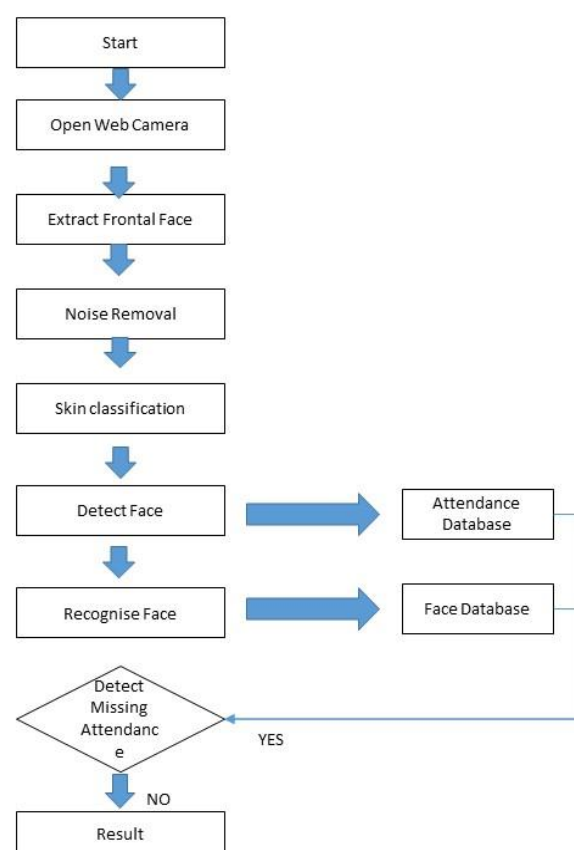


Fig. 1. Flowchart of attendance management system based on face recognition

### 4. Conclusion

In this paper, we proposed workplace attendance system based on face Identification. The system identify the workers face in the image so confirm the workers attendance. In further work, we intend to improve face recognition effectiveness by using the interaction among the system, the users and the administrators. This also can be expanded by extending it to capture faces which are not in the database and if such are detected and not recognized then there might be a need for security check-up as this may be a reporting of intruders. Other areas to focus on are to its applicability to identify culprits on bus stations, railway stations 7 other public places, by using this system. This will be helping hand to the police.

### References

- [1] A. J. Goldstein, L. D. Harmon, and A. B. Lesk, "Identification of Human Faces," *Proceeding of IEEE Conference on Computer Vision and Pattern Recognition*, vol. 59, pp 748-760, 1971.

- [2] A. Patil and M. Shukla, "Implementation of Classroom Attendance System Based on Face Recognition in Class," *International Journal of Advances in Engineering & Technology*, Vol. 7, No. 3, pp. 974-979, 2014.
- [3] O. T. Arulogun, A. Olatunbosun, O. A. Fakolujo, and O. M. Olaniyi, "RFID-Based Students Attendance Management System," *International Journal of Scientific & Engineering Research*, Vol. 4, No. 2, pp. 1-9, 2013.
- [4] S. K. Kwon, "Face Recognition Using Depth and Infrared Pictures," *Nonlinear Theory and Its Applications, IEICE*, Vol. 10, No. 1, pp. 1-14, 2019