

A Study on the Use of Biometric Attendance System in the Private Sector

¹ Dr.Anviti Rawat, ²Ms.Tulika

¹Assistant Professor,

¹Department of Commerce,

¹Maharaja Surajmal Institute(Affiliated to GGSIPU), Delhi, India

Abstract : Present study was conducted to assess the use of Biometric Attendance system in the private sector of Delhi. Research was conducted by collected the data through a self-made questionnaire which was administered on 30 staff members of Human Resource department of the various private companies of Delhi. Through percentage analysis it was found that finger/thumb print as a method of biometric attendance system is the most preferred method in private sector. Also, Biometric Attendance system had positive impact on various aspects of HR management such as punctuality, security and ease of pay roll. Thus although Biometric attendance system is being considered as good practice but it should be used by catering the issues which are, monitoring attendance of employees who directly go to field work or are doing work from home becomes difficult in this system. many a times finger prints of the staff is not recognized and takes too long to record and employees prefer traditional ways of monitoring

IndexTerms - Biometric Attendance System, Private Sector, Types of Biometric monitoring system

I. INTRODUCTION

The word Biometric comprises of two words, “bio” meaning “life” and “metric” means “to measure”. Thus, biometric means to measure something using any unique physiological or behavioral trait of life which usually do not change with the passage of time. With a large number of individuals being engaged with various organizations, there arises a need to monitor their presence for a variety of purposes due to which the concept of biometric attendance comes into picture. Biometric attendance monitoring system is nothing but a technology to clock the entire working hours an employee is devoting to the organization using his/her physiological or behavioral traits. This system basically adopts a process of authentication and grants access to a person while identifying ‘one from n’, where n refers to the total number of individuals or their traits pre-recorded in the system.

History of Biometric System:

The practice of using unique human traits for identification purposes is not a new one and can be traced back to centuries. Findings shows various caves which are estimated to be thousands of years old have paintings with handprints as unforgettable signatures, fingerprints being used by merchants and traders and many more such things to portray use of human traits for identification and verification purposes. In modern times with the invention of computers, this technique is digitally being implemented for various purposes, attendance being the most common one in the organizations. It can be said that true biometric systems began to emerge in the latter half of the twentieth century. The nascent field experienced an explosion of activity in the 1990s and began to surface in everyday applications in the early 2000s

TIMELINE OF BIOMETRIC SYSTEM:

- 1858: This was the year when very first hand images were captured systematically by Sir William Herschel, working for the Civil Service of India to distinguish his employees from others.
- 1870: Bertillon developed anthropometries, a method of identifying individuals based on detailed records of their body measurements, physical descriptions and photographs. Police authorities throughout the world used his system, until its use quickly faded when it was discovered that some people shared the same measurements.
- 1903: New York state prison used fingerprints for identification of criminals.
- 1936: The concept of iris pattern for identification was proposed in this year.
- 1965: North American Aviation developed signature recognition system for the first time.
- 1969-70: Various behavioral traits of humans like finger prints, hand geometry etc are automated.
- 1985: The concept that no two irises are alike is proposed by Dr. Leonard Flom and Dr. Aran Safir.
- 2011: DNA and face recognition technology is used to identify the remains of Osama bin Laden.
- 2013: Apple incorporated fingerprint scanner into the smartphones launched by the company.

II. TYPES OF BIOMETRIC ATTENDANCE SYSTEMS:

Since there are numerous unique human traits, biometric technology can be classified into two broad categories, physiological and behavioral. The popular ones used worldwide are mentioned below:

1. Fingerprints: In this type of recognition fingerprint images of a person are recorded to identify a unique pattern of minutiae points which is the point where the ridges end, join or split.

2. **Palm print:** In this type of recognition palm print of an individual is recorded. Just like the finger print palm of an individual has unique characteristics like principle line, minutiae points, ridges etc. it provides a wider surface area for identification and verification purposes.

3. **Iris:** Iris is the thin circular layer in the eye that controls the light entering the pupil. It also provides the color to the eyeball which we easily recognize. Studies in past have proved that no two irises are same, even for the identical/monozygotic twins. Iris of each individual exhibits complex and unique patterns which can be recognized on close examination and thus it proves a good feature for biometric verification.

4. **Retina:** Retina is the innermost, light sensitive layer that lines the back of the eye. Each individual has unique retina vasculature which is very hard to imitate.

5. **Face:** Each individual has a unique face that helps in his/her recognition. This type of biometric identifies the face of an individual based upon 80 nodal points a human face has, which provides everybody his/her unique features.

6. **Hand Geometry:** Hand geometry is nothing but the dimensions of human hand in terms of its length, width, shape etc. This is not a very unique characteristic yet can be used for identification purposes.

7. **Signature:** It is believed that every human uses a unique way to write his/her name. This way is digitally recorded as it provides a cue of dynamic features of one's hand writing and is verified each time an individual claims an identity.

8. **Key Strokes:** This type of recognition technology measures a person's writing or typing style and pattern.

9. **Voice Recognition:** In this type of recognition aspects of one's voice like pitch, tone, voice pattern and speaking style are recorded for future identification purposes.

III. PROS AND CONS OF BIOMETRIC ATTENDANCE SYSTEM

Like any other technology, biometric attendance system also has some advantages and disadvantages. To list a few advantages out of the various known ones are, that it leads to ease of HR functionality, with the advent of biometric attendance system the work load of HR personnel has reduced in terms of manually recording the presence and absence of each employee. The system is capable of generating daily, weekly, monthly or annual reports which helps in accurate payroll calculations. The same also enhance transparency. The other advantage of such a system is security as it creates a barrier or discourages the non-registered individuals to enter the premises. Thus, presence of any individual who is not an employee can be easily checked. It also motivates the employees to be punctual at work as their presence is being monitored electronically. It also leads to fair payment system which further motivates the employees. Also the operational cost of this system is less as compared to that of manual one. However, this is not a system without any drawbacks. One of the major drawbacks of this system is its high initial cost. Such a cost might not be feasible for small organizations. It also produces noisy data sometimes as the sensor of biometric system requires high maintenance to provide accurate results. Due to non-maintenance or over a period of time they start producing noisy data i.e. rejection of authorized person or acceptance of an unauthorized person. Also almost all the physiological traits of a human can undergo changes in a variety of cases, like ridges in a finger print start diminishing with age, appearance of face changes, diabetes affect the eyes of an individual etc.

IV. LITERATURE REVIEW:

Gladys Anne C. Villaroman (2018) assessed the Use of Biometric Attendance Recording System (BARS) and Its Impact on the Work Performance of Cabanatuan City Government Employees. Biometric technology as a means of identifying and verifying an individual's characteristic is widely used in many aspects of peoples' lives nowadays. In this regard, Local Government Unit (LGU) uses this technology to provide a more comprehensive system in monitoring employee attendance and how it may affect their performance. The study assesses the impact of the use about the Biometric Attendance Recording System (BARS) on the work performance of Local Government Unit (LGU) employees based on their Individual Performance Commitment Review (IPCR) rating and the respondents' self-assessment and perception. Noticeably, the majority of the respondents perceived that the use of BARS had a positive impact on work performance. Results also demonstrated a significant increase in respondents' level of performance.

Ceyda Unal and Vahap Tecim (2018) explored the use of Biometric Technology for Effective Personnel Management System in Organization. The aim of this article was to design and implement a web-based attendance system for personnel in an organization by using biometric system (fingerprints and facial recognition combining with RFID card and password authentication) and support managers to make effective and efficient decision-making process. The proposed system has been implemented by following the steps of Software Development Life Cycle (SDLC). In the process of software development, a waterfall model was chosen that was used in many software projects and that composed of analysis, design, coding, test, version and maintenance phases. Since it is a linear sequential, progress is seen as flowing steadily downward (like a waterfall) through the phases of software implementation. Even though the waterfall approach is the earliest approach, it is still most widely known for software development. This research is expected to help managers in educational institutions in terms of effective personnel management, especially for institutions that have large number of employees. In addition, the developed system can also help educational institutions for adopting their personnel attendance system to new technologies. It was also known that private organizations use this kind of systems. However, educational institutions can also take advantage of biometric data in the web-based personnel management system.

Mudasir M Kirmani (2017) assessed the impact of Biometric Attendance System on Secondary and Higher Secondary Educational Institutions Across J&K. The study indicates that biometric modalities are universally secure and accurate, but in practice the scenarios of attendance systems in Jammu & Kashmir has highlighted some loopholes which are existing at present in the Biometric attendance system.

Oloyede Muhtahir O & et al (2013) explored the Fingerprint Biometric Authentication for Enhancing Staff Attendance System. This study was conducted using a telecommunication company in the South West region of Nigeria, in order to determine the specific biometric identifier that can be used to enhance their traditional staff attendance system which presently affects the productivity of the organization. The study was conducted using a quantitative approach by designing a questionnaire as the data collection instrument based on different biometric technologies. The survey involved 37 employees based on stratified random sampling technique. The results however show that fingerprint biometric identifier was found suitable for the staff attendance management system of the organization. It therefore, implies that attention should be paid to several factors before recommending biometric technology as a means of improving the productivity of an organization business processes.

V. OBJECTIVES OF THE STUDY:

The objectives of the present study are:

- To identify the use of Biometric Attendance System in Private sector of Delhi.
- To identify the most preferred mode of Biometric Attendance System.
- To identify the effectiveness of Biometric Attendance System from the perspective of HR Personnel.
- To identify the problems faced by HR personnel in the use of Biometric attendance system.

VI. RESEARCH METHODOLOGY:

In the present research study descriptive research method was used.

6.1 Sampling:

In the present study pure random sampling method was used. The data was collected from the 30 staff members of Human Resource department of the various private companies of Delhi.

6.2 Tools used:

In the present study a self-made questionnaire was used to collect data from the respondents.

6.3 Data Analysis Techniques:

Data analysis was done through percentage analysis and diagrammatic representation was done through the pie charts.

VII. RESULTS AND DISCUSSION

The analysis of the results was obtained based on the questionnaire filled by the respondents who are working in the private sector of Delhi. The objective wise data analysis is presented as under:

Question 1: Which type of biometric attendance monitoring system do you use in your organization?

Table 1

S.No	Biometric Attendance Type	Percentage
1	Finger/Thumb Print	81.5%
2	E Signature	3.7%
3	Card Access Entry	3.7%
4	Face Recognition	11.1%

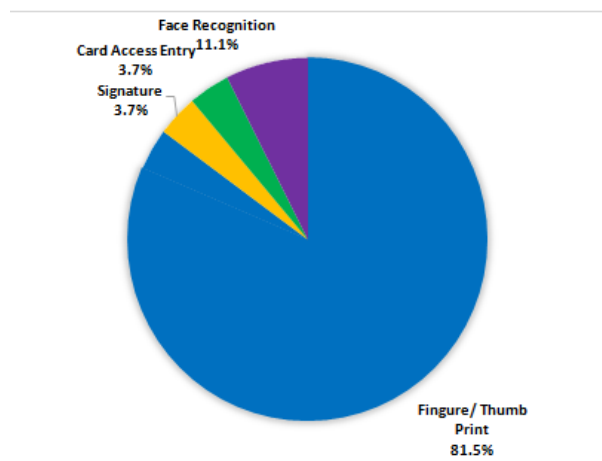


Figure 1

Figure 1 reveals that majority, i.e., 81.5 % of organizations use finger/thumb print as a method of biometric attendance system to monitor the presence of an employee. Others like E-signature, card access entry and face recognition are used but in a very less proportion.

Question 2: Do you think biometric attendance monitoring is contributing to effective HR management practices in your organization?

Table 2

S.No	Response Type	Percentage
1	Yes	78%
2	No	22%

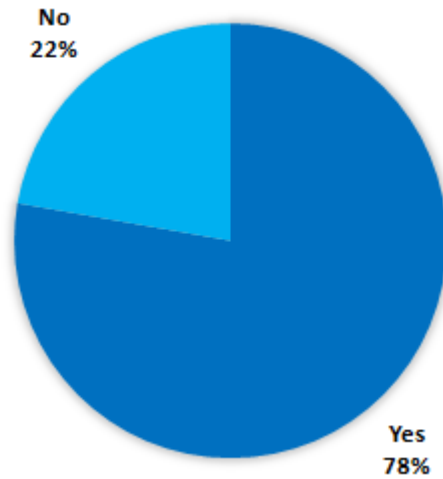


Figure 2

From figure 2 it is evident that 77.8% of HR personnel agree that biometric attendance monitoring system is contributing effectively to various HR management practices in their organization. Whereas 22.2% of HR personnel disagrees that biometric attendance system contributes in the overall effectively of HR practices in their organization.

Question 3: Do you face any employee resentment towards biometric attendance monitoring?

Table 3

S.No	Response Type	Percentage
1	Yes	41%
2	No	59%



Figure 3

According to figure 3, out of total respondents 59.3% of HR personnel say that they do not face any employee resentment towards biometric attendance monitoring. Whereas, 41% of HR personnel observes resentment by their employees towards biometric attendance system

Question 4: How do you rate the effectiveness of Biometric attendance monitoring system on the parameters given below?

Table 4

S.No	Parameters	Rate	Percentage
1	Punctuality	High	66.7%
		Medium	29.60%
		Low	3.70%
2	Security	High	70.30%
		Medium	18.60%
		Low	11.10%
3	Ease of Payroll	High	66.70%
		Medium	25.90%
		Low	7.40%

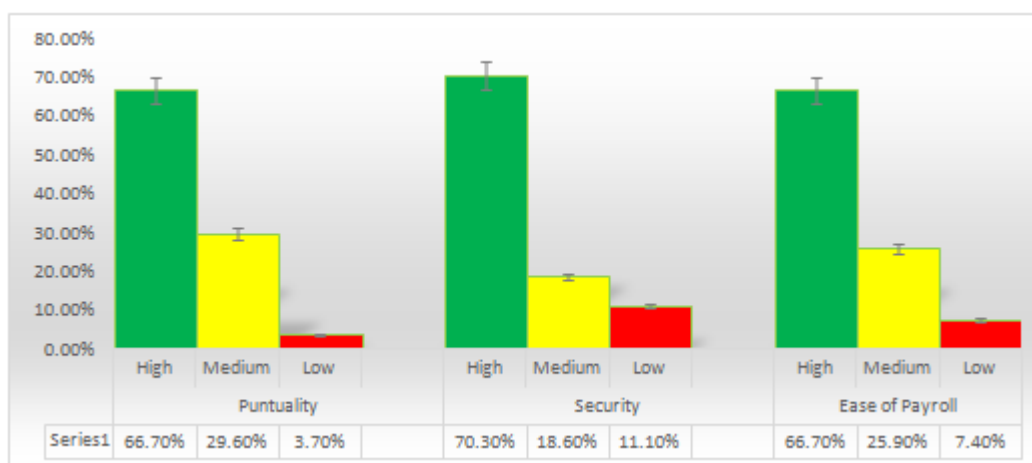


Figure 4

It is evident from Figure 4 that Bio metric attendance system has a positive impact on various aspects of HR management such as punctuality, security and ease of pay roll.

With respect to punctuality it is evident that 66.7% of HR personnel believe biometric system has a high impact on an employee's punctuality, 29.6% feel it has a moderate impact while 3.7% of them feel that this system has really low impact on an employee's punctuality.

With respect to security it is evident that 70.3% HR personnel believe that biometric attendance system has a high impact in maintaining security in their organization, 18.6% feel that it has a moderate impact while 11.1% feel that it has a really low impact on maintaining security in their organization.

With respect to ease of payroll , 66.7% of HR personnel believe that this system has really made payroll work easier. While, 25.9% of them find its impact moderate and 7.4% believe that it has not made their work easier in terms of preparation of payroll.

Question 5: Do you face problems in implementing Biometric monitoring system?

Table 5

S.No	Response Type	Percentage
1	Yes	41%
2	No	59%

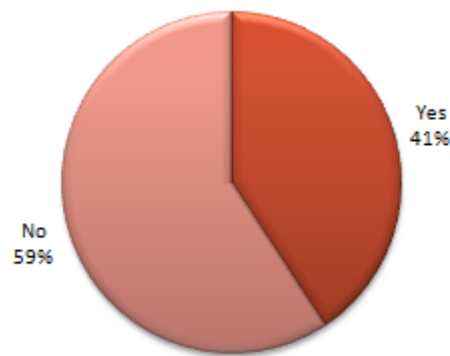


Figure 5

It is evident from Figure 5, that 59% that is more than half of the HR personnel do not face any problems in implementation of Biometric Monitoring system. On the other hand, 41% of them face problems in implementation of this system.

Question 6: List the problems you face in implementation of Biometric monitoring system.

The 41% of HR personnel who faced problems in the implementation of Biometric monitoring system listed the reasons mentioned below:

- Monitoring attendance of employees who directly go to field work or are doing work from home becomes difficult in this system.
- System has few loop holes that can be used to mislead the authorities.
- Many a times finger prints of the staff is not recognized and takes too long to record.
- Employees prefer traditional ways of monitoring attendance.

VIII. CONCLUSION AND RECOMMENDATIONS:

This study shows that biometric attendance system is surely a global ICT strategy that can be use to enhance staff attendance. Moreover, this study has come to a conclusion that fingerprint is the best biometric technology system that can sustainably solve the lingering problem of staff attendance in the proposed organization. This will eliminate buddy punching and increase staff productivity. It is therefore, recommended that attention should be paid to several factors before recommending biometric technology as a means of improving the productivity of an organization business processes.

REFERENCES

- [1] A.N. Ansari, A. Navada, S. Agarwal, S. Patil, and B. Sonkamble, "Automation of Attendance system using RFID ,Biometrics, GSM modem with . Net framework", IEEE International conference on multimedia technology, July 26- 28, 2011, pp. 2976-2979.
- [2] Akinduyite C.O, Adetunmbi A.O, Olabode O.O, and Ibadunmoye E.O, "Fingerprint-Based Attendance Management System." Journal of Computer Sciences and Applications 1, no. 5 (2013): 100-105. doi: 10.12691/jcsa-1-5-4.
- [3] Attendance Management System". African Journal of Computing and ICT (Journal of IEEE Nigeria Computer Section). 4(3):27 – 36.
- [4] B. Benyo, B. Sodor , T. Doktor, and G. Fordos, " Student attendance monitoring at the university using NFC" , IEEE Wireless Telecommunications Symposium (WTS), April 18- 20,2012.
- [5] Davide Maltoni Springer, Handbook of Fingerprint Recognition, 2003.
- [6] Kirmani M. M(2017). Impact of Biometric Attendance System on Secondary and Higher Secondary Educational Institutions Across J&K. Orient.J. Comp. Sci. and Technol;10(2)
- [7] M. Kamaraju and P.A. Kumar, "Wireless Fingerprint Attendance Management System", IEEE International Conference on Electrical Computer and Communication Technologies (ICECCT), March 5-7, 2015.
- [8] Saraswat, C. et al. 2010. "An Efficient Automatic Attendance System using Fingerprint Verification Technique". International Journal on Computer Science and Engineering. 2(02):264-269.
- [9] Whitman, Michael E. and Mattord, Herb Hong, L, Wan, Y and Jain, A.K."Fingerprint image enhancement: Algorithm and performance evaluation", IEEE transactions on Pattern Analysis and Machine Intelligence 20, 8(1998),777-789
- [10] Whitman, Michael E. and Mattord, Herb Shoewu, O, O.M. Olaniyi, and A. Lawson. 2011. "Embedded Computer-Based Lecture Attendance Management System". African
- [11] Ratha N. (etal), Automatic Fingerprint Recognition,2004.Ali, A. 2001.Macroeconomic variables as common pervasive risk factors and the empirical content of the Arbitrage Pricing Theory. Journal of Empirical finance, 5(3): 221–240.

- [12] Basu, S. 1997. The Investment Performance of Common Stocks in Relation to their Price to Earnings Ratio: A Test of the Efficient Markets Hypothesis. *Journal of Finance*, 33(3): 663-682.
- [13] Bhatti, U. and Hanif. M. 2010. Validity of Capital Assets Pricing Model.Evidence from KSE-Pakistan.*European Journal of Economics, Finance and Administrative Science*, 3 (20).

