THE ROLE OF BIOMETRIC SYSTEM AT WORK PLACE. A NEW TOOL FOR THE IDENTIFICATION OF INDIVIDUALS

Imran Jawaad[1*], Farah Wasim[2], Abdur Rahman[3], Shazia Omer[3], Muhammad Abdullah Shehzad[4], Amna Asif[5]

[1] *Forensic Medicine & Toxicology, University College of Medicine The University of Lahore, Pakistan
[2] Forensic Medicine & Toxicology, Azrah Naheed Medical College, Superior University Lahore, Pakistan
[3] University College of Medicine, The University of Lahore, Pakistan
[4] Rahbar Medical and Dental College Lahore, Pakistan
[5] Fatima Memorial Hospital, College of Medicine & Dentistry, Pakistan

*Corresponding Author: Imran Jawaad
*E-mail: imranjawaad@hotmail.com

Abstract

Introduction: Organizations use different tools to make sure physical presence. Traditionally attendance was marked manually at work place or in class rooms. With change in technology new methods of marking attendance were incorporated as biometric system. **Objective:** To make sure that attendance of person who is physically present at work place is marked and nobody else can mark his presence. **Material and Method:** The study was conducted on all employees of university where biometric identification with thumb impression is used for attendance purpose. **Results:** The total staffs undergoing biometric attendance were 2500, about 0.8% members of different category have issues with biometric attendance. People involved in manual working and handling majority of things manually rather than using computer were 10 (0.4%), who faced issues with biometry, 02 (0.08%)staff members from teaching faculty above the age of 65 years were having biometry issues due to age, they faced same problem at multiple other places such as banks, security places etc. 03 (0.12%) people had damaged their palmer surface of the hands while working at home and all were females. 05 (0.2%) people spent a large time working in the garden had rough palmer surface which was a problem in their biometry. **Conclusion:** Biometric technology as the only means of identification has got some drawbacks. This problem is highlighted in countries like Pakistan where majority of people belong to lower class and have to make their livelihood by working with hands and to use rough object and surfaces which distorts their fingerprints.

Key words: Biometry, Forensic medicine, Anthropometry, Dactylography, Amblyopia

Introduction

A new tool of identification i.e. biometric identification has its way in the life of all communities globally. It is a technology in which digital imaging of a part of the body of a living person recorded previously is compared with the current image of the same part of the body to ensure that both images belong to the same person.[1] The parts of the body commonly used in biometric

identification are digital prints of thumbs, fingers, scan of the retina, facial recognition and vocal identification.[2] The application of this technique have greatly facilitated the medicolegal importance of identification in Forensic Medicine, which was following the traditional system of identification such as anthropometry, dactylography etc.

This system does not record the entire imprint or a physical feature of a person but only that much feature or portion that is time invariant within some statistical limit. As human body keep on changes with time, the statistical algorithm must be flexible to an extent to match a previously stored image with the later live scan of the same person. This curtails limits about uniqueness of the image of the person.[3] To counter this issue multiple images of same person from different views can resolve the problem. The other way to tackle this problem is to use multiple information such as images; biometry and other information which when compiled can confirm the uniqueness of the individual.[4]

The advantage of biometry as compared to other methods of identification is less time consuming, easy, no special training required and very economical.[5] This has made this application useful for many institutions such as schools, colleges, universities, offices etc. Data processing and interpretation are essential in scientific research. Statistics helps summarize and analyze large datasets using measures like mean and variance. These methods apply across various scientific areas. Genetics and breeding have unique challenges that require an understanding of biometrics and quantitative genetics.[6] This knowledge helps breeders make better decisions, reduce mistakes, and maximize the benefits of selecting certain traits. It also ensures the preservation of genetic diversity.

Combining statistical techniques with models specific to genetics and breeding can be tricky. Only a few software programs are designed to meet these needs. They allow users to make quick, accurate decisions with reliable interpretations.[7] For breeders, it's important to obtain additional genetic information, like heritability, intraclass correlation, and genotypic variance. Most standard statistical software doesn't provide these details. That's where Rbio comes in. It offers all the genetic information needed for informed decision-making without requiring programming skills in R. Rbio's outputs are easy to use. They clearly show the significance of statistical tests and explain how to interpret the results. The software also simplifies mean comparisons by automatically highlighting differences.[8] This is especially helpful for beginners in data analysis. Experienced users who know statistics and biometrics but lack time to write R code will also find Rbio valuable. It allows breeders to run analyses quickly and efficiently using pre-written scripts. This makes Rbio a great tool for both novices and experts.[9]

Amblyopia develops when a child's visual system doesn't mature properly, leading to abnormal vision in one or both eyes.[10] Common types include anisometropic, strabismic, and ametropic amblyopia, with the latter two often lacking clear signs of ocular misalignment, making them harder to detect. Early intervention, ideally during infancy or early childhood, is crucial for effectively correcting amblyopia before the visual system fully matures. For this reason, early vision screening is strongly recommended worldwide.[11] Refraction testing, using a handheld autorefractor or photorefractory, is an effective method for detecting amblyopia or significant refractive errors during vision screening. These newer devices reportedly reduce the impact of accommodation on refraction better than conventional handheld autorefractors, which require patients to gaze into a target within the instrument. However, even with these advancements, neither autorefractors nor photorefractory can fully eliminate the effects of accommodation on refraction without the use of cycloplegics. Amblyopia, often known as "lazy eye," happens when a child's visual system doesn't develop correctly, leading to poor vision in one or both eyes. Common forms include anisometropic, strabismic, and ametropic amblyopia. The last two types often don't show obvious signs of eye misalignment, making them harder to spot. The best time to treat amblyopia is in infancy or early childhood, before the visual system has fully developed. This is why early vision screening is so important.[12]

To catch amblyopia early, refraction tests using handheld devices like autorefractors or photorefractory are very useful. These tests help identify significant refractive errors that could lead

to amblyopia. Now, newer handheld photorefractory with special software are available. These devices reduce the effect of accommodation (the eye's ability to focus) on the test results better than older autorefractors. However, without using cycloplegics (eye drops that temporarily paralyze the eye's focusing muscles), these devices can't completely remove the effects of accommodation.[13] The aim of this study is to evaluate the effectiveness of biometric identification systems. Specifically, it focuses on thumb impression-based attendance among employees at The University of Lahore. The study examines the challenges faced by different employee groups, such as manual laborers and older staff. It explores how physical work and other factors might impact the accuracy of fingerprint recognition.

Material and Methods
This section outlines the study design, participant selection, data collection process, and analysis methods employed in this research to evaluate the effectiveness and challenges of biometric attendance systems at The University of Lahore.

Study Design
This study was a cross-sectional, descriptive research project aimed at assessing the practical application and challenges of the biometric system, specifically fingerprint recognition, used for attendance tracking among employees at The University of Lahore. The focus of the study was to understand the factors influencing the reliability of the biometric system and to identify any common issues faced by employees from various job categories.
The study employed a quantitative research approach, utilizing self-administered questionnaires to collect primary data from participants. This method was chosen to obtain detailed, firsthand information about employee experiences with biometric systems in a structured and organized manner.

Study Population
The study targeted all employees at The University of Lahore who were required to use biometric systems for attendance tracking. This included both teaching and non-teaching staff. The non-teaching staff comprised individuals in roles such as security personnel, janitors, maintenance workers, and other manual laborers.

Ethical Considerations
Prior to the commencement of data collection, ethical approval for the study was obtained from the appropriate ethical review board of The University of Lahore. The study adhered to the following ethical principles:
1. **Informed Consent:** All participants were provided with information about the purpose of the study, the voluntary nature of participation, and the potential use of the data. Consent was obtained from all individuals before they participated in the survey.[25]
2. **Confidentiality:** The confidentiality of all participants was ensured. Data was anonymized, and no personal identifiers were collected. All information was securely stored and only accessible to authorized personnel.
3. **Right to Withdraw:** Participants were informed of their right to withdraw from the study at any time without facing any negative consequences.
4. **Non-Coercion:** Participation in the survey was entirely voluntary, and employees were not under any pressure to participate.

Data Collection
The primary data collection method involved a self-administered questionnaire. The questionnaire was designed to gather information on the use of biometric systems for attendance, the challenges employees face, and the impact of factors like skin conditions, age, and the nature of their job on the reliability of biometric scans.

Design of the Questionnaire
The questionnaire was divided into several key sections:
1. **Demographic Information:** Participants were asked about their age, gender, job role, and working hours. This helped in categorizing responses and analyzing variations based on demographic and professional factors.
2. **Biometric System Experience:** Questions focused on employees' usage of the biometric system, the frequency of problems encountered, and specific issues (e.g., recognition failure, system errors).
3. **Job-Related Factors:** Participants were asked to describe their work tasks and whether physical labor or the handling of rough materials impacted the clarity of their fingerprints for biometric scanning.
4. **Skin Conditions:** A section was dedicated to understanding if participants had any physical conditions (e.g., calloused palms, damaged skin) that affected the biometric system's accuracy.
5. **Feedback and Suggestions:** The final section included open-ended questions that allowed participants to offer suggestions for improving the biometric system or share general feedback on its effectiveness.

Data Collection Process
The survey was conducted over the course of 12 months, from January 2022 to December 2022. The process was as follows:
1. **Distribution:** The questionnaires were distributed in both online and paper formats to accommodate all employees. Online versions were sent via email or available on the university's internal portal, while paper copies were distributed to non-teaching staff and those who preferred to fill them out manually.
2. **Assistance for Participants:** Research assistants were made available to clarify any questions or concerns employees had regarding the survey, ensuring that those with limited technological literacy or experience could still participate.
3. **Reminders:** Periodic reminders were sent to ensure a high response rate. The survey was actively monitored by the Human Resources department to make sure all eligible employees were given the opportunity to participate.

Inclusion and Exclusion Criteria
Inclusion Criteria[24]:
Employees who used the biometric system for attendance. Both teaching and non-teaching staff. Employees who provided informed consent.

Exclusion Criteria:
Employees who did not use the biometric system for attendance. Individuals who chose not to participate or did not provide consent. Temporary or contract workers not involved in routine attendance monitoring.

Data Analysis
After data collection was completed, the responses were processed and analyzed using descriptive statistics to summarize the data and inferential statistics to explore relationships and significant differences among various groups.

Results
The total staffs undergoing biometric attendance were 2500, out of this number 20 (0.8%) members of different category have issues with biometric attendance marking. People involved in manual working and handling majority of the things manually rather than using computer were 10 (0.4%), who faced issues with biometry, 02 (0.08%) staff members from teaching faculty above the age of 65 years were having biometry issues due to age, they faced same problem at multiple other places such as banks, security places etc. 03 (0.12%) people had damaged their palmer surface of the

hands while working at home and all were females. 05 (0.2%) people spent a large time working in the garden had rough palmer surface which was a problem in their biometry.

It is quite evident that people involve in rough work use their hands particularly palmer surface excessively which results in wear and tear of the superficial surface damaging the pulp of the fingers which make it difficult to record their fingerprints for biometric purpose. Age does play its role resulting in loss of the elasticity of the skin surface resulting in problem to record fingerprints. Some professions demand rough physical work such as gardening, sanitary work etc. which results in damage to hands particularly the palmer surface which sometime is deep enough to cause damage resulting in distortion of the fingerprints. The teaching faculty included 1700 employees (68 %), 800 employees included non-teaching staff (32%) Table 1.

Table 1: Total participants of the study n=2500

| Total staff				Male	Female
2500	Teaching faculty	1700	68 %	950	750
	Non-teaching staff	800	32 %	625	175

The staff having problems with marking their attendance by biometric means were 20 (0.8 %). Out of these people those belonging to manual work were 10 (0.4 %), staff above the age of 65 years were 02 (0.08 %), persons having some damage palmer surface, interfering with biometric attendance were 3 (0.12 %) and people with rough palmer surface were 05 (0.2 %). All these cases were examined very carefully with the help of a magnifying lens. The attendance marking is shown in Table 2.

Table 2: Biometric attendance marking problem group

Sr #	Group	Total number (n=20)	% age
1	Manual workers	10	0.4
2	Staff above 65 years of age	2	0.08
3	Damaged palmer surface of hand	3	0.12
4	Rough palmer surface	5	0.2

The process used aimed to improve the classification rate. First, an algorithm removed heartbeat waves that were very different from the standard wave. This step was crucial for increasing accuracy. Figure 1 shows that accuracy improved.

Each test sample mean wave was made from 20 heartbeat waves per subject. This number was found to be the best for achieving a higher classification rate. The horizonal lines shows number of waves while vertical show accuracy.
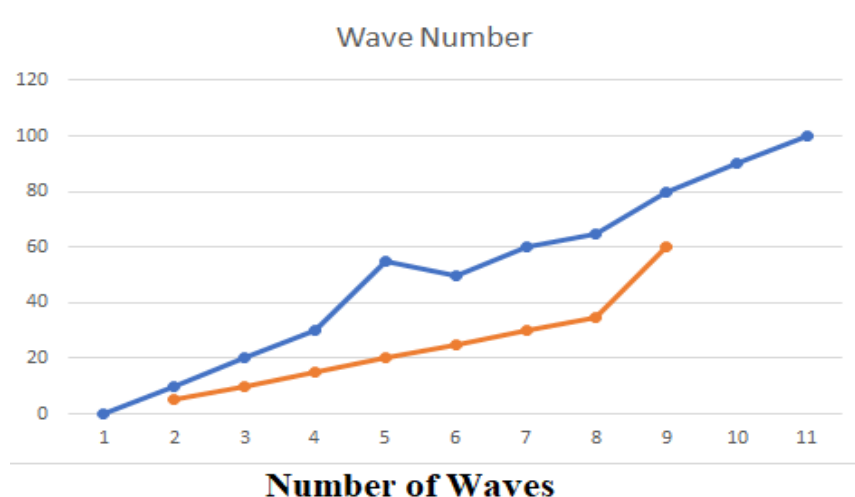
Figure 1: Generic Biometry Algorithm Based on Signal Morphology Information

Discussion

The quality of fingerprints varies with age, which is exhibited in people above the age of 65 years a study conducted in 2018 by Galbally J, Haraksim R, Beslay L and another study conducted by Yang R in 2018 supports the finding in the present study.[14] This fact speculates that the chances of distorted biometric identification increases with age, the reason are multiple, the common observation is loss of the elasticity of the skin a study conducted in 2021 by Joshi AS, Dabouei A, Dawson J, Nasrabadi NM is in favor of the present study.[15] With time multiple changes are reflected in the body of a human being. A reasonable algorithm helps in relating a stored image with a new image of the same person after many years to make identification possible. The advantage of such system is that it does not require physical presence of person; however, close proximity of two different individuals cannot be ruled out.[16] This limitation can be overcome by using multiple images from different views of the same person or images plus biometric image and other data available a study conducted in 2020 by Rungchokanun A, Chaidee W, Deerada C, Areekul V, editors support our study.[17]

Biometric identification is preferred to other methods of identification such as comparison of photographs or comparison of signatures as it is much accurate and less time consuming in a systemic review conducted in 2021 by Ryu R, Yeom S, Kim S-H, Herbert D supports our study. This urges majority of the organizations to prefer this method of identification above others a study conducted in 2020 by Olade I, Fleming C, Liang H-N supports our study another study conducted in 2020 by Trivedi AK, Thounaojam DM, Pal S supports the modern methods of identification i.e. biometry which favors the present study.[18,19]

Lack of certain vitamins or some professions such as laborers, typist, and gardeners affect the smoothness of the skin and results in distortion of the ridges of the skin making biometric examination difficult in these people a study conducted in 2018 by Aytekin N, Mileva K, Cunliffe A and another study conducted by Tan H in 2021 is in favor of our study.[20] Criminals usually rub their fingers with rough surfaces to make it difficult to be identified by biometry, however, additional data such as iris scan and general body make plus anthropometry makes their identification quite accurate a study conducted in 2022 by Hunt-Blackwell S supports this study. Use of corrosives and rubbing skin surface against rough surfaces by criminals to distort their fingerprints in order to conceal their identity have been in practice since ages a study conducted in 2020 by Win KN, Li K, Chen J, Viger PF, Li K supports this study.[21]

When biometric identification is compared with other tools of identification in general, a common thing highlighted is that this system is quite easy and friendly in nature for the consumers, far less time consuming and accurate a study conducted in 2020 by Dargan S, Kumar M is in favor of this study[(22)]. However, so far studies have shown that due to these common things it has been adopted by many organizations for commercial use to ensure physical presence of their workers, but so far in is not commonly used for criminal purposes a study conducted in 2019 by JOSHI AK, TRIPATHI AK, PARASHAR AD, PATIL SR supports the finding of our study[(23)]. It has so far not been used to identify criminals as the only tool rather emphasis has been given to use multiple tools and their collective data have been relied to ensure identification. The findings from this study reinforce the idea that biometric systems can present challenges for certain individuals. Specifically, we observed that workers involved in manual labor and those over the age of 65 had more difficulties with fingerprint recognition. This is largely due to the physical changes that come with age, as well as the wear and tear on the hands caused by physical work, which can impact the clarity of fingerprints. These challenges raise important points for the broader use of biometric technology, especially in countries with a large manual labor workforce. It's clear that when designing and implementing biometric systems, the physical and socio-economic realities of the users must be taken into account. Systems should be flexible enough to handle a variety of job conditions and the impacts they may have on the body over time.

Conclusion

Biometric technology as the only means of identification has got some drawbacks. This problem is highlighted in countries like Pakistan where majority of the people belong to lower class and have to make their livelihood by working with hands and to use rough object and surfaces which distorts their fingerprints. This leads to limitations which make it difficult for these people to be identified by biometric system. In such environments this system needs to be re-evaluated and proper substitute be provided which should be less time consuming and equally effective.

Acknowledgment

Funding

Author's contribution

All authors contributed equally.

Conflict of interest

None

Reference

1. Olwig KF, Grünenberg K, Møhl P, Simonsen A. The biometric border world: Technology, bodies and identities on the move. Routledge; 2019 Oct 22.
2. Minaee S, Abdolrashidi A, Su H, Bennamoun M, Zhang D. Biometrics recognition using deep learning: A survey. Artificial Intelligence Review. 2023 Aug;56(8):8647-95.
3. Obuchowski NA, Reeves AP, Huang EP, Wang XF, Buckler AJ, Kim HJ, Barnhart HX, Jackson EF, Giger ML, Pennello G, Toledano AY. Quantitative imaging biomarkers: a review of statistical methods for computer algorithm comparisons. Statistical methods in medical research. 2015 Feb;24(1):68-106.
4. Jain AK, Nandakumar K, Ross A. 50 years of biometric research: Accomplishments, challenges, and opportunities. Pattern recognition letters. 2016 Aug 1;79:80-105.
5. Awad AI. From classical methods to animal biometrics: A review on cattle identification and tracking. Computers and Electronics in Agriculture. 2016 Apr 1;123:423-35.
6. Weaver KF, Morales VC, Dunn SL, Godde K, Weaver PF. An introduction to statistical analysis in research: with applications in the biological and life sciences. John Wiley & Sons; 2017 Sep 5.
7. Bernardo R. Reinventing quantitative genetics for plant breeding: something old, something new, something borrowed, something BLUE. Heredity. 2020 Dec;125(6):375-85.
8. Rosenlund SA, Bratlie SN, Vrolijk FA. *Utilization of Supervised Learning for Automatic Detection of Damages in Materials from Non-Destructive Testing Based Ultrasound Data* (Bachelor's thesis, NTNU).
9. Nakhle F, Harfouche AL. Ready, Steady, Go AI: A practical tutorial on fundamentals of artificial intelligence and its applications in phenomics image analysis. Patterns. 2021 Sep 10;2(9).
10. Khan J, Idris M, Darwesh NM, Haroon M, Rehman AU, Muhammad L. Assessment of the Frequency & Factors Leading to Amblyopia in School Children aging 5 to 15 years. Ophthalmology Update. 2018 Oct 1;16(4).
11. Sinha S, Sinha RK, Nishant P. Prevalence of spectacle use and amblyopia among young people presenting to a tertiary care institution of Bihar. Trop J ophthal otolaryngol. 2019;4(2):151-6.
12. Inchara R, Babu KY, Mohanraj KG. Problems associated with amblyopia. Drug Invention Today. 2018 Nov 2;10.

13. Andriani YF, Murdaningsih RP. Visual Stimulus Design for Strabismus in Preverbal Children in Serpong Area as a Prevention of Amblyopia. InNinth International Conference on Language and Arts (ICLA 2020) 2021 Mar 26 (pp. 371-375).

14. Galbally J, Haraksim R, Beslay L. A study of age and ageing in fingerprint biometrics. IEEE Transactions on Information Forensics and Security. 2018 Oct 25;14(5):1351-65.

15. Joshi AS, Dabouei A, Dawson J, Nasrabadi N. UFQA: Utility guided Fingerphoto Quality Assessment. arXiv preprint arXiv:2407.11141. 2024 Jul 15.

16. Li J. The benefit of being physically present: A survey of experimental works comparing copresent robots, telepresent robots and virtual agents. International Journal of Human-Computer Studies. 2015 May 1;77:23-37.

17. Deerada C, Phromsuthirak K, Rungchokanun A, Areekul V. Progressive focusing algorithm for reliable pose estimation of latent fingerprints. IEEE Transactions on Information Forensics and Security. 2019 Aug 12;15:1232-47.

18. Olade I, Fleming C, Liang H-N. Biomove: Biometric user identification from human kinesiological movements for virtual reality systems. Sensors. 2020;20(10):2944.

19. Trivedi AK, Thounaojam DM, Pal S. Non-invertible cancellable fingerprint template for fingerprint biometric. Computers & Security. 2020;90:101690.

20. Chae SA, Kim HS, Lee JH, Yun DH, Chon J, Yoo MC, Yun Y, Yoo SD, Kim DH, Lee SA, Chung SJ. Impact of vitamin B12 insufficiency on sarcopenia in community-dwelling older Korean adults. International journal of environmental research and public health. 2021 Nov 26;18(23):12433.

21. Win KN, Li K, Chen J, Viger PF, Li K. Fingerprint classification and identification algorithms for criminal investigation: A survey. Future Generation Computer Systems. 2020;110:758-71.

22. Dargan S, Kumar M. A comprehensive survey on the biometric recognition systems based on physiological and behavioral modalities. Expert Systems with Applications. 2020;143:113114.

23. JOSHI AK, TRIPATHI AK, PARASHAR AD, PATIL SR. Comparative Evaluation of Accuracy of Immersion A-scan Ultrasound Biometry and Optical Biometry in Cases Undergoing Small Incision Cataract Surgery. Journal of Clinical & Diagnostic Research. 2019;13(7).

24. Mohsin AH, Zaidan AA, Zaidan BB, Ariffin SA, Albahri OS, Albahri AS, Alsalem MA, Mohammed KI, Hashim M. Real-time medical systems based on human biometric steganography: A systematic review. Journal of medical systems. 2018 Dec;42(12):245.

25. Arifin SR. Ethical considerations in qualitative study. International journal of care scholars. 2018 Jul 31;1(2):30-3.

Questionnaire Performa for data collection
Survey on Biometric Identification System for Attendance at the Workplace
Study Title: The Role of Biometric Systems in Workplace Attendance: A New Method for Identifying Employees
Institution: The University of Lahore
Study Period: January 2022 - December 2022
Principal Investigator(s): Imran Jawaad, Farah Wasim, Abdur Rahman, Shazia, Muhammad Abdullah Shehzad, Amna Asif
Personal Information
(Your responses are confidential and will only be used for research purposes.)
1. **Gender:**
☐ Male
☐ Female
☐ Other / Prefer not to answer
2. **Age Range:**
☐ Under 30

☐ 31 – 45

☐ 46 – 60

☐ Over 65

3. **Your Role in the Organization:**

☐ Teaching Faculty

☐ Administrative Staff

☐ Non-Teaching Staff (e.g., Security, Maintenance, Cleaning, etc.)

4. **Average Daily Working Hours:**

☐ 1-4 hours

☐ 5-8 hours

☐ More than 8 hours

Biometric Attendance System

5. **Do you use the biometric system (fingerprint scanning) to record your attendance?**

☐ Yes

☐ No (Skip to Question 8)

6. **How often do you face issues while using the biometric system for attendance?**

☐ Never

☐ Rarely

☐ Occasionally

☐ Frequently

7. **If you experience issues, what problems do you encounter? (Select all that apply)**

☐ Fingerprint not detected by the scanner

☐ System errors or malfunctions

☐ Difficulty in positioning fingers correctly

☐ Fingerprint clarity issues due to skin condition (e.g., roughness, injury)

☐ Other (Please specify): _____

8. **What type of work do you primarily engage in? (Please briefly describe your job)**
 (For example: manual labor, office work, teaching, etc.)

9. **Does your job involve physical labor or handling tools and equipment that may affect the clarity of your fingerprints for biometric scanning?**

☐ Yes

☐ No

☐ Not Applicable

10. **Have you experienced any skin-related issues (such as rough or damaged skin) that interfere with biometric scanning of your fingerprints?**

☐ Yes

☐ No

☐ Not Applicable

11. **If you answered 'Yes' above, could you describe the skin conditions that make biometric scanning difficult? (Please check all that apply)**

☐ Calluses or cracked palms

☐ Finger injury or damage from tools

☐ Loss of skin elasticity due to age

☐ Previous hand or finger injuries

☐ Other (Please specify): _____**Age-Related and Health Factors**

12. **Are you older than 65 years of age?**

☐ Yes

☐ No

13. **If Yes, do you find it more difficult to use the biometric system due to age-related skin changes (e.g., wrinkles, reduced skin elasticity)?**

☐ Yes

☐ No

☐ Not Applicable

14. **Have you encountered similar biometric recognition problems in other locations (e.g., at a bank or security checkpoint)?**

☐ Yes

☐ No

☐ Not Applicable**General Feedback on Biometric System**

15. **Do you believe that the biometric attendance system is effective in your workplace?**

☐ Yes, it's quick and reliable

☐ Yes, but it sometimes has issues

☐ No, it is not effective

☐ I am not sure

16. **In your opinion, how could the biometric attendance system be improved? (Please provide any suggestions you might have) Do you consider the biometric system to be the most suitable method for tracking attendance in your workplace?**

☐ Yes

☐ No

☐ I am unsure

17. **If you do not think the biometric system is suitable, would you suggest any other alternatives for attendance tracking? (e.g., facial recognition, ID cards, etc.)**

☐ Yes

☐ No

☐ Not sure

If Yes, please specify: _____

Thank you for participating in this survey. Your feedback is important and will help enhance the effectiveness of biometric systems in workplace attendance tracking.