

Fingerprint Changes and Verification Failure among Senior Faculty

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Abstract: The Medical Council of India (MCI) has decided to install biometric attendance machines in all medical colleges to combat the menace of rampant fudging of faculty records. The biometric attendance is supposed to be linked with Aadhaar cards and eliminate "ghost" faculty members. The move is part of the Digital Mission Mode Project (DMMP) to bring in more transparency in the attendance system in all medical colleges. The study was undertaken on the faculty of a GGS Medical College Faridkot, undergoing biometric verification for register with their Aadhar Card details so that it could be linked with the biometric attendance system for Online Faculty Attendance Monitoring System (OFAMOS) under DMMP project. The conclusion drawn, wearing down of fingerprint pattern was found to be a major source of errors in registering biometric fingerprint attendance. Databases developed by such methods are prone to limitations which have to be considering addition to fingerprints in order to improve inclusiveness and accuracy of the system.

Keywords: Biometric identification, Online Faculty Attendance Monitoring System (OFAMOS), Digital Mission Mode Project (DMMP), Medical Council of India, Adjara cards.

INTRODUCTION

Fingerprints are formed in the womb, usually during the first trimester of the pregnancy. The fingerprints grow larger as the person grows (from infancy to adulthood), but the basic shape and pattern does not change with time.

These patterns, consisting of various ridges and furrows, are permanent and unique in every individual -- even for identical twins. Based on the patterns, there are three main fingerprint types: loop, whorl, and arch. A person can have one or a mixture of these types. In addition, *permanence* and *uniqueness* are the two fundamentals of fingerprints:

- **Permanence**

This means that fingerprints do not change with time. As aforementioned, the size of a fingerprint increases as the person grows older, but the patterns stay the same.

- **Uniqueness**

As the name suggests, no two individuals (including identical twins) have the same fingerprints. The ridges on the hands and feet of all persons have three characteristics (ridge endings, bifurcations and dots) which appear in combinations that are never repeated on the hands or feet of any two persons [1].

Medical council of India (MCI) has started a digitization initiative for tracking in real time daily attendance of faculty in medical colleges across the country, in a move aimed at exposing ghost faculties in institutions and making the process transparent. Under Digital Mission Mode Project (DMMP), the MCI will be able to monitor attendance of faculty members in all medical colleges through biometric system. The most important thing of this project is monitoring of attendance of faculty through a biometric system and a unique identification for each and every medical faculty across the country. There have been issues of fake and ghost faculty in many medical colleges. The digitization project, apart from enabling online submission of applications for opening of new medical colleges or seat enhancement, will create a national database of faculty in medical colleges which will be linked with their Aadhar Card and have biometric verification.

MATERIALS AND METHODS

The study was undertaken on the faculty of a GGS Medical College Faridkot, undergoing biometric verification for register with their Aadhar Card details

so that it could be linked with the biometric attendance system under DMMP project. Out of 265 faculty members, 14 (5.28%) had problems registering. These 14 subjects were divided into three categories namely Elderly>60 years age; having skin problems, females.

Careful examination of fingerprints was done using high power magnifying glass as aid. The biometric capture device is with Resolution 500ppi model certified by UIDAI. (Fig.1)



Fig-1: biometric capture device

OBSERVATIONS AND RESULTS

It was observed that out of total 265 registered faculty members for Online Faculty Attendance Monitoring System (OFAMOS) under Digital Mission Mode Project (DMMP), 14 people had problems registering their attendance through biometric means (5.28%). Out of these 8(57.14%) faculty members belonged to elderly senior faculty category (> 60 years); 1 (7.14%) having skin problems; 5 (35.71%) were females faculty were also doing various household chores. (Table 1) In majority of cases the most probable cause for non-registering of attendance by biometric machines was age (57.14%). As age increases, skin on

finger tips becomes less elastic and the ridges get thicker. This doesn't change fingerprint, but it's harder to scan or take a print from it. The loss of finger print pattern by wear and tear (28.57%), As is evident excessive use of digits over prolonged time intervals results in wearing down of finger print pattern and is clearly seen on close examination of fingers. Physical injuries damaging deeper dermis also cause error in biometric readings. Among the female faculty members 4 had worn out fingerprint ridge pattern due to various household chores; one had an old healed injury on finger. One faculty member had skin problem by which the fingerprint ridge pattern are damaged.

Table-1: Categories having problems with Biometric Attendance

S.N.	Category	Number	(%)
1.	Senior Faculty >60 Years	8	57.14
2.	Skin Problem	1	7.14
3.	Females	5	35.71
Total		14	100

Table-2: Main Reasons for non-registering of Attendance by Biometric devices

S.No	Category	Number	(%)
1	Age	8	57.14
2	Wear and tear	4	28.57
3	Physical injuries to fingers	1	7.14
4	Skin Problem	1	7.14
Total		14	100

DISCUSSION

Since the 1920s, fingerprints are accepted as evidence in courtrooms due to their uniqueness and permanence, their uniqueness has been scientifically

validated, but permanence is not. Our fingerprints do slightly change as time progresses — which could have implications for everything from law enforcement to unlocking your iPhone [2]. Belief in the permanence of

human fingerprints largely hinges on evidence gleaned from studies done by Soweon Yoon and Anil Jain wanted to provide deeper scientific context.

They examining 10-print fingerprint records generated from 15,500 repeat offenders in a Michigan State Police database. In case you aren't familiar, 10-print records are created in a controlled setting by dipping all 10 fingers in ink and rolling each finger onto a card. Each criminal included in the study had five or more of these records spanning five years to 12 years, which allowed researchers to examine changes in prints over time [3].

This study seems to indicate that, our fingerprints do change over time. But those slight changes aren't enough to befuddle the machines in use today. Though for forensic scientists at least, the study is certainly food for thought. Fingerprint verification failure is a significant problem among patients with hand dermatitis. It is mainly due to fingerprint dystrophy and abnormal white lines [4].

The UIDAI's Biometric Standards Committee headed by Director General NIC (National Informatics Centre), published a report in December 2009 and advised that a biometric system based only on fingerprint might present challenges in India and urged the UIDAI to consider the use of Iris in addition to fingerprints in order to improve inclusiveness and accuracy of the system. The Unique Identification Authority of India (UIDAI) conducted a Proof-of-Concept (PoC) study of biometric enrolment from March 2010 to June 2010 in the predominantly rural areas of Andhra Pradesh, Karnataka, and Bihar. The study that involved 135,000 biometric enrolments found out that older people took longer (20% longer enrollment time) to enroll than younger people. In January 2012 UIDAI published a report on the biometric technology of the UID project for the purposes of UID enrollment. It goes into the proof of concept studies conducted in India, analysis of the study results, design decisions on biometric modes necessary in the Indian context, implementation of client and server side systems for enrollment and finally concludes with the accuracy and performance achieved by the UID biometric system using 8.4crore real enrolments [5].

CONCLUSION

Biometric technology is a reliable means of identification with certain lacunae's. This may leads to certain physical limitations that can result in uncorrectable errors in biometric identification systems. As advised by UIDAI to consider the use of Iris in addition to fingerprints in order to improve inclusiveness and accuracy of the system.

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