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Authentication of Smartphones through Ear Shape and Arm Gesture

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Abstract: ***To develop the smart phones in order to maintain the instinctive gesture of responding phone calls using two different biometrics. It is developed in order to authenticate our personal phone calls. The main objective of this project is to provide measurement of both prominence and connection of data captured by each sensor involved (accelerometer, gyroscope, and camera) according to various features extraction, features matching, and data-fusion techniques. Another great objective of this project is that we can proliferate tempo and expertise of the overall performance.***
Keywords: Biometrics, authentication, security, ear shape and arm gesture

I. INTRODUCTION

Based on biometrics, person authentication and identity verification is becoming a very common practices now a days as well as in future too, but now fusion of these biometrics is quiet less, in future it is expected to be in high level. It can be achieved through the latest generation mobile devices which include more accurate and reliable sensors with the more powerful processor. The worldwide mobile communication has made two billion smartphones embedded with a single device consisting of high-resolution cameras, digital compass, gyroscope, accelerometer, positioning system, etc. Such characteristics make these devices suited to operate these biometrics based authentication. These biometrics terminal can be operated by capturing the image, progressing it and comparing those biometrics for both identity verification and recognition for each and every applications. Some limited raw computing power available in these mobile devices forces biometric application designers and developers to make some kind of compromise by selecting and adapting the right algorithm. However, it leads to the advantage of their usage for security-related procedures. This is particularly true for the average user, which arguably would prefer to be checked in the most transparent possible way instead than be forced to undergo a rigid acquisition procedure. This paper stems from the preliminary proposal of a authentication based on ear shape and arm-gesture presented in, by experimenting various experiments to assess the contribution of two biometrics as well as the advantage in their fusion and the prominence and correlation of data captured by each sensor involved (accelerometer, gyroscope, and camera) according to various features extraction, features matching, and data-fusion techniques.

II. EXISTING WORKS

In the earliest, Key stroke analysis was developed with composite authentication algorithm which was a transparent bear out. Then smart phone technologies and wireless networking developed the smartphones for the blind people with face recognition providing audio feedback in identifying other persons through the GPU based implementation approach. This improved speed in an exact matching and feature extraction with reduction of energy consumption. Multi-model developed with ear ,voice and iris biometrics. The mobile devices had approached gait recognition by exploiting embedded accelerometers. Then for implicit identification touch dynamics were proposed. All of these techniques and algorithms where not helpful for confidential files and also reduced the overall speed and performance of the system.

A. Related works

An application that allow a smartphones as a biometric-capture device is shown. The main of our proposal is that, this capture, and later, recognition can be performed during a standard web session using the same architecture. The biometric capture and recognition is either performed locally in the mobile or remotely but using special communication protocols and/or connection ports with the server. The Next is in-depth analysis of the present mobile web-browser limitations. Smartphones are now becoming the choice for the presents of biometric-based identity verification, like face, fingerprint and even iris have already been proposed on mobile devices. On this basis, a multi-modal approach to person authentication based on ear biometrics and gesture analysis is proposed in this paper. The idea is to fuse the discriminant power of ear, captured during the act of responding to a phone call, with the user's arm dynamics affecting the smartphone motion pattern due to behavioural and anatomical characteristics involved in this gesture. According to this experiments conducted on a specifically built multi-modal database comprising a hundred subjects, we

confirm that the "responding gesture" has important distinguished the power and combined to ear features provides even greater speed and accuracy in mobile authentication. As now every process are digitalised, they introduce additional demands in terms of security. As the security related keystroke analysis or number related password are difficult to member everything. We propose the use of more advanced biometric methods as an alternative. the discussion focuses upon the concept of keystroke analysis. Results of a practical evaluation are presented based upon the entry of both telephone numbers and text messages on a mobile phones. Hence keeping this as an basis we propose an biometrics based systems for authentication.

III.PROPOSED SYSTEM

The proposed identity authentication method stems from the observation that whenever a smartphone user responds to or places a call, the mobile device's motion sensors called as gyroscope will record the motions along with the phone-holding hand that can be considered as the "end effector". upper-arm and lower-arm plus hand referred to as "arm." At the same time, the smartphone's front camera could be in a favourable position to capture a sequence of ear images, one or more of which could possibly be used for extracting differentiating features. It results in the two authentication techniques may then be combined together. This approach is basically composed by three components: 1) the ear subsystem; 2) the arm-motion subsystem; and 3) the fusion-decision subsystem.

A. Arm Wave Accession

The smartphone interface starts recording the gesture data from both accelerometer and gyroscope till the readings show the gesture is over. This acceleration is mainly due to gravity whereas the gyroscope is exploited to confirm the completion of relevant movements. Acceleration data are captured at the rate of 50 samples at a possible indeed each ample contains four values (x y z t) including three axes and time elapse. The output 4D vector is thus used as feature extraction. The min aim is to improve the reliability of the biometrics, the accession process is repeated only 5 times and the average of five vectors is saved. Then the whole set of sampled data are evaluated by using the coefficients of the signal's Fourier Transform form (FFT). The adopted low-pass filter was designed to cut the ¾ or 7/4 of the whole spectrum.

B. Ear Accession

The ear is sensed either contextually for a call or authentication purpose. The accession involves recording of a short video sequence at a frame rate of at least 30 frames per second that indicates as an input for ear detected. There are many optimal ear sizes that threshold to stop detection process. The user's ear crops are arranged according to the sharpness, the aim of selecting the most feature rich image. This is achieved by measuring the pixel of the image between each frame and copy of blurred image by gaussian filter. This results to be less stopped or blurred possible due to focusing . So the Frame that maximises this calculation's is the original user of the subsequent feature extraction techniques. Feature extraction of the physical shape is performed by local binary patterns algorithm (LBP) which is popularly known as Computer vision leading to a finally concatenation descriptor comprising 6400 values.

C. Fusion Decision Subsystem

The comparison of ear shape to a gallery template is performed by means of Euclidean distance between two n dimensional features p=(p1, p2,p3,…….pn) and q=(q1,q2,q3q……..qn) . *as,*

D(p,q)=root [(q1-p1)^2+(q2-p2)^2+…+(qn-pn)^2]----------(1)

The overall distance between two persons Is the sum of all the Euclidean distance calculated between 25 couples of subsequent histograms, normalised as [0,1].

The arm gestures that are captured are of different lengths, we exploit them using DTW algorithm(best suited to find the algorithm between two signal curve of an non linear transformation with respect to independent variable). The formulation od DTW metric with two generic time series as, R=r1,r2,……rn and S= s1,s2,s3……..sn of length n and m respectively to align two sequences using m by n matrices which contains distance d(ri,sj) a wrapping path w is the set of matrices element that is mapped between R and S. the kth element of W is defined as Wk =(i,j)k so we have

W=w1,w2,w3……wk max(m,n)<=K<m+n-1----------(2)

Various matrix have been evaluated against the base line by 3D Euclidean distance: Mono dimensional(DTW-D) and the multidimensional distance(MD-DTW). Eventually by applying gaussian filter to each dimension we use the final formulation with n*m matrix according to

D(i,j)=Sum of |R(i,k)-S(j,k)|,where k=1 to K----------(3)

This gives the best synchronization standard.

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D. Figures

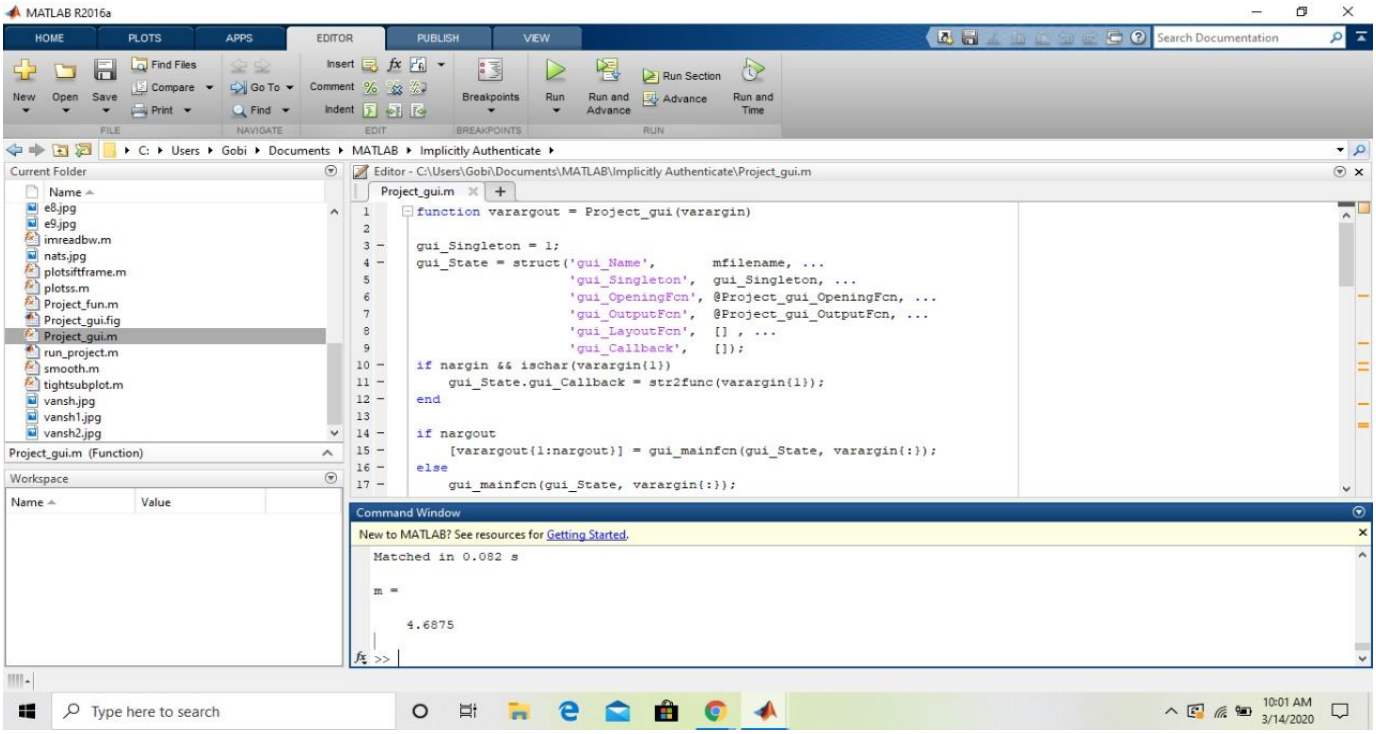

Fig. 1 program coding for inputs

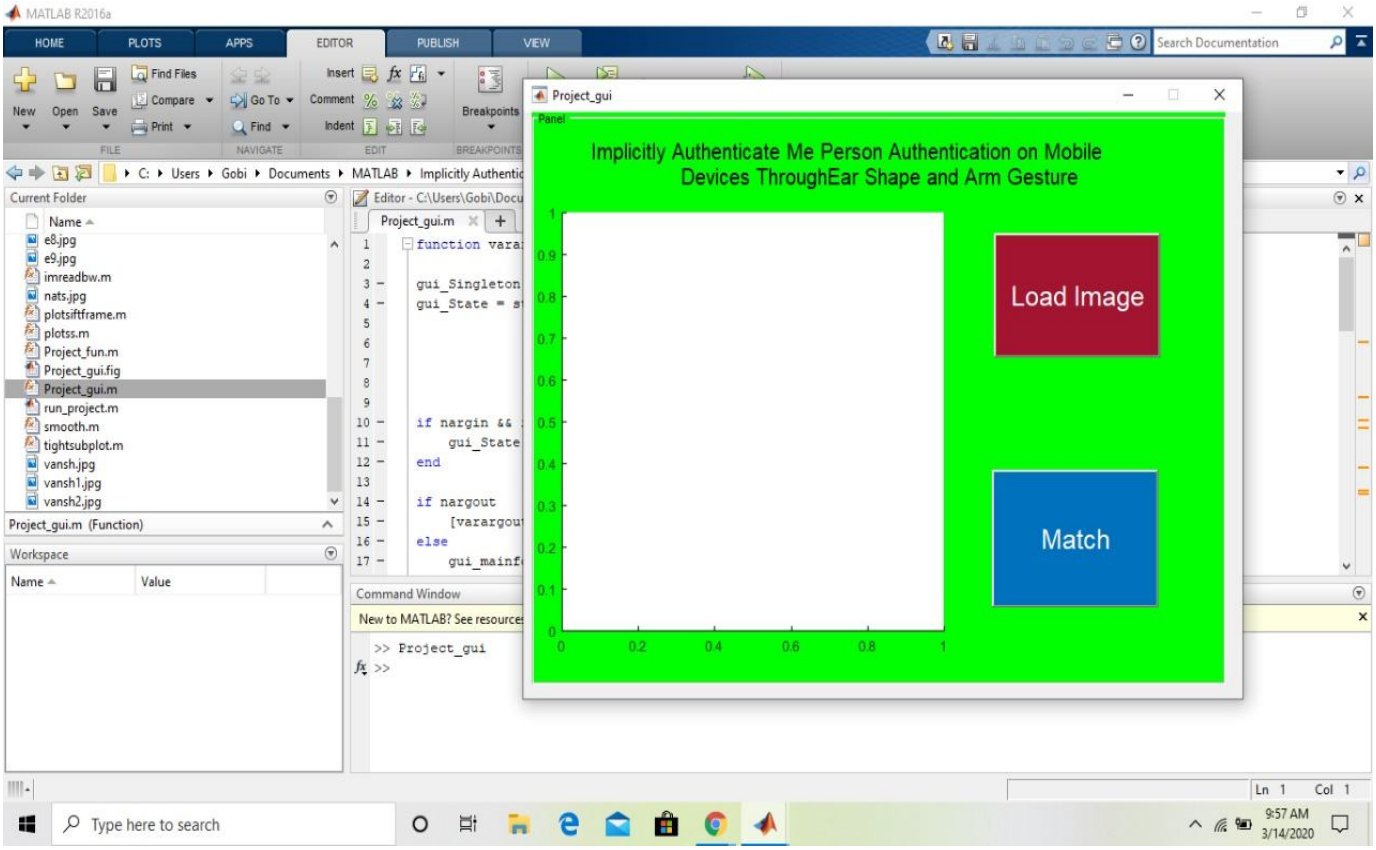

Fig. 2 select either load or match images

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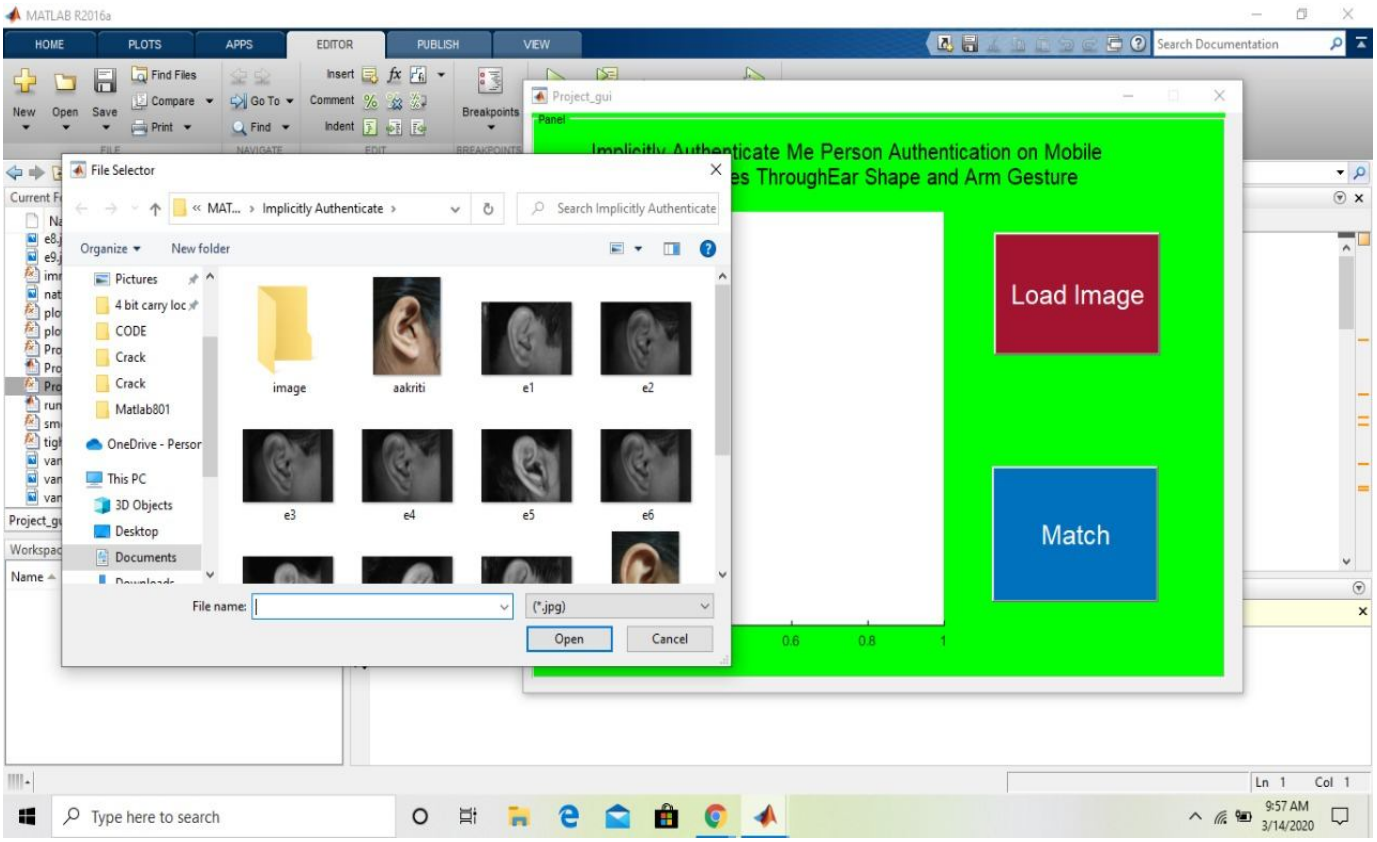

Fig. 3 Select either an image for the process

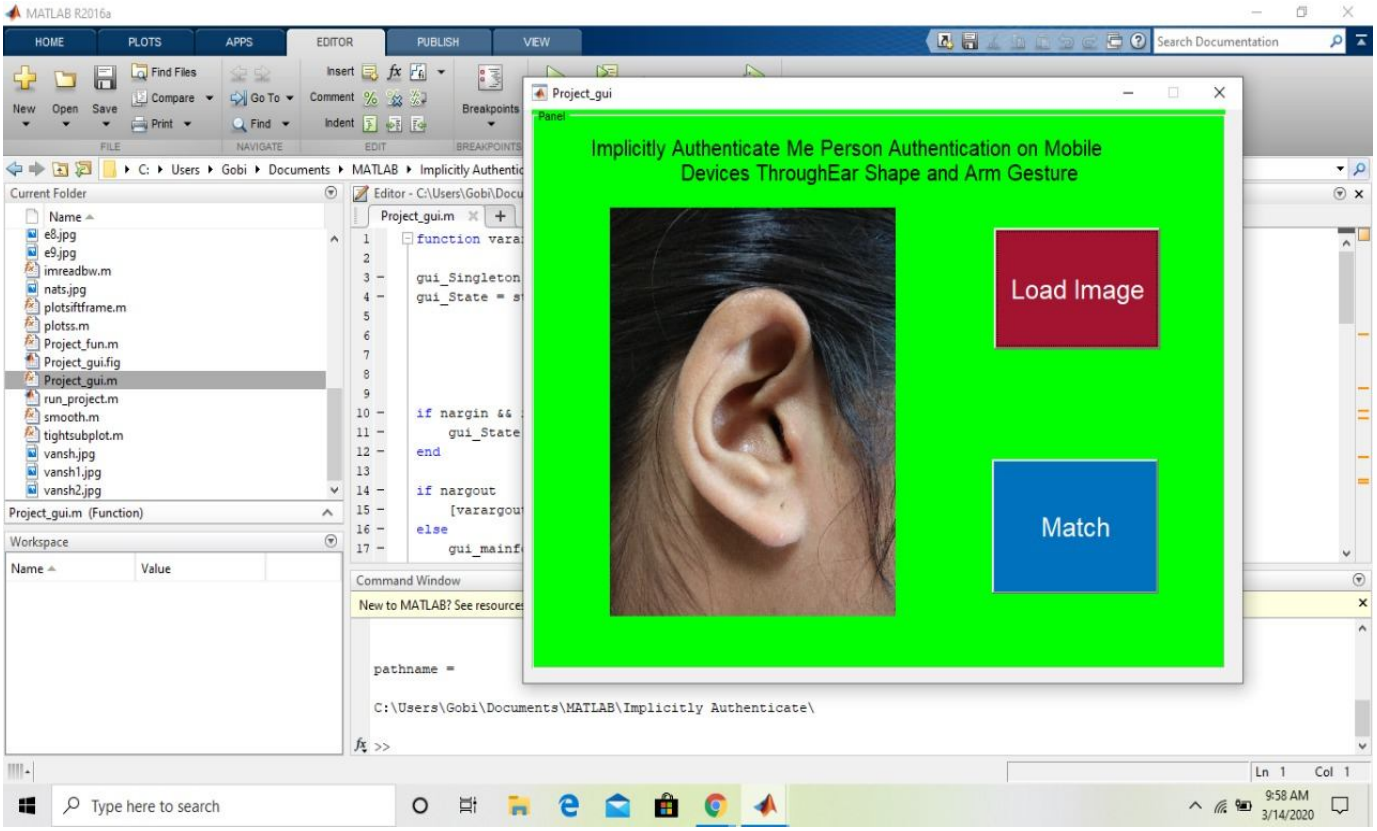

Fig. 4 Chosen image for the process

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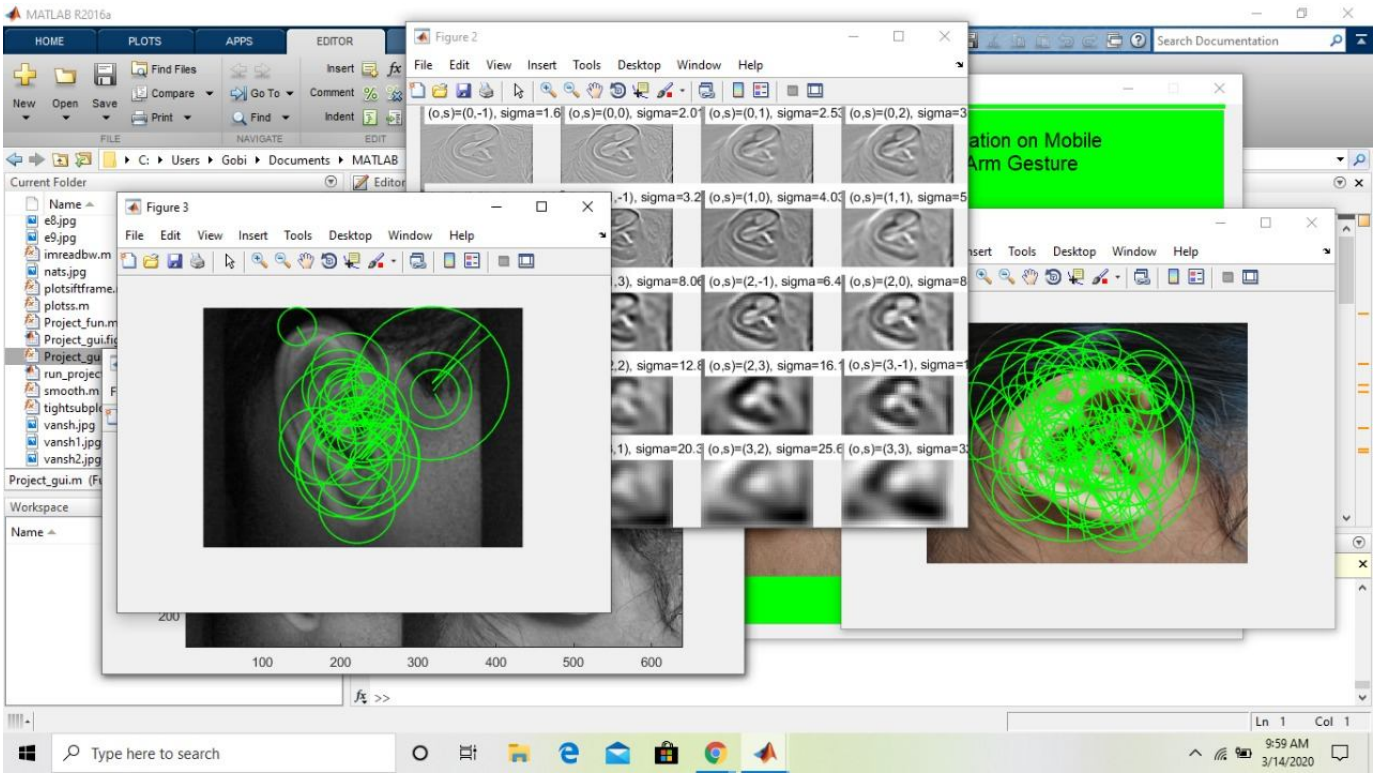


Fig. 5 finding the exact match

E. Decision Stage

Data fusion has two decision schema:

1) Authenticating the user only if both ear AND arm probes match the templates according to the claimed identity.

2) Authenticating the user if ear OR arm probes results genuine.

IV. CONCLUSIONS

This paper aims at the person authentication by means of acquired biometrics as per declaration. The proposed system that uses CNN algorithm exploits smart phone sensors to capture both physical and behavioral nature when placing a call according to the hypothesis which is advantage in combining physical biometric identifier with the behavioral nature.

According to the best EER values of ear and arm(0.1 and 0.13) for a single arm assumption is proven. This is more efficient when the results achieved on a hardware. Noise samples smoothened through proper filtering that improves the accuracy even if the users status is static/motion. The accuracy and robustness is improved in terms of these biometrics.

In the next couple of years, we can safely assume that more services will require multi-factor authentication, and devices like U2F keys will become cheaper and more common place. We can also expect to worry less about authenticating yourself in physical locations like offices and banks.

REFERENCES

[1] Andrea F. Abate, Michele Nappi and Stefano Ricciardi, "I -Am: Implicitly Authenticate Me Person Authentication on Mobile devices Through Ear shape and Arm Gesture ,"*IEEE Trans syst., Man, cybernetics PP 2168-2216, 2017*

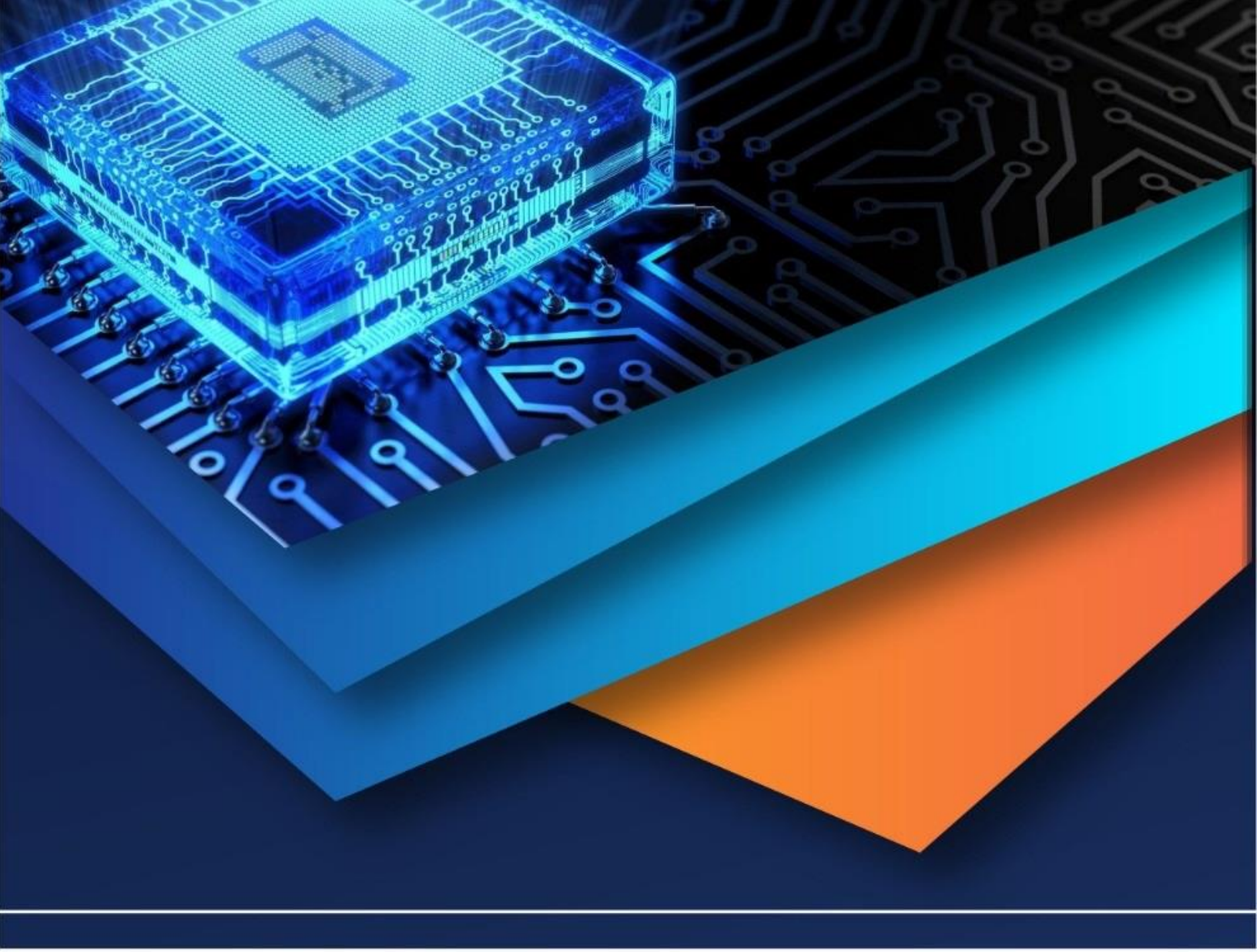
[2] C. Vivaracho-Pascual and J. Pascual-Gaspar, "On the use of mobile phones and biometrics for accessing restricted Web services," *IEEE Trans. Syst., Man, Cybern. C, Appl. Rev.*, vol. 42, no. 2, pp. 213–222, Mar. 2012.

[3] N. L. Clarke and S. M. Furnell, "Advanced user authentication for mobile devices," *Computer. Security*, vol. 26, no. 2, pp. 109–119,

[4] C. Vivaracho-Pascual and J. Pascual-Gaspar, "On the use of mobile phones and biometrics for accessing restricted Web services," *IEEE Trans. Syst., Man, Cybern. C, Appl. Rev.*, vol. 42, no. 2, pp. 213–222, Mar. 2012.

[5] P. N. A. Fahmi *et al.*, "Implicit authentication based on ear shape biometrics using smartphone camera during a call," in *Proc. IEEE Int. Conf. Syst. Man Cybern. (SMC)*, Seoul, South Korea, 2012, pp. 2272–2276.

[6] K. M. Kramer, D. S. Hedin, and D. J. Rolkosky, "Smartphone based face recognition tool for the blind," in *Proc. Int. Conf. IEEE Eng. Med. Biol. Soc. (EMBC)*, Buenos Aires, Argentina, 2010 pp. 4538–4541.



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