Comparative Study of Feature Extraction Implemented On Lip Movement for User Validation

[1]Dolly Shah, [2]Upendra Dwivedi
[1,2]Dept. of Computer Science and Engineering, SVITS, Indore, MP, India

Abstract
As technology grows the security issues are constantly increasing, so for this we expect new type of ideas or thoughts for security system techniques or we just need to upgrade an existing system. As we utilize the innovation from all over the place as a part of over day by day life there is a test comes with respect to information security or data avoiding the external world and for this the person is continually helping us to words this issue. The human body is constantly an interesting issue for the analysts for their exploration. Many researcher had explore their idea and did many of research on area field like The DNA investigation, Eye and finger impression examination be generally use for the security issues. With this arrangement we are utilizing the Lips for our exploration. As a commitment we are proposing a Lip based security framework for this we have to utilize the blend of a few free strategies like outward appearance examination, talk investigation and content investigation by utilizing these things we will be give another verification thought to the world towards information security or framework authentication. To this end, the greater part of us ought to exist any feature configuration relating to comprehension method for a genuine strategy. Our trial impacts demonstrate how the proposed technique does advantageously contrasted and the best in class methodology.

Keywords
DNA, Facial Expression, Protection, User Validation

I. Introduction

Face procurement is a handling stage to naturally discover the face locale for the data pictures or successions. It can be a locator to identify face for every edge or simply distinguish confronts in the main casing and after that track the face in the rest of the feature grouping. To handle substantial head movement, the head discoverer, head following, and posture estimation can be connected to a facial expression examination framework. After the face is found, the following step is to concentrate and speak to the facial changes brought on by outward appearances. In facial component extraction for expression examination, there are mostly two sorts of methodologies: geometric element based techniques and appearance-based strategies [4].

The geometric facial elements show the shape and areas of facial parts (counting mouth, eyes, foreheads, and nose). The facial segments or facial element focuses are removed to shape an element vector that speaks to the face geometry. With appearance-based routines, picture channels, for example, Gabor wavelets are connected to either the entire face or particular areas in a face picture to concentrate an element vector. Contingent upon the distinctive facial component extraction routines, the impacts of in-plane head revolution and diverse sizes of the appearances can be disposed of by face standardization before the component extraction or by highlight representation before the progression of expression acknowledgment. Outward appearance acknowledgment is the last phase of AFEA frameworks. The facial changes can be recognized as facial activity units or prototypic passionate expressions. In the event that the worldly data is utilized, in this part we grouped the acknowledgment approaches as casing based or arrangement based [5].

We propose a man confirmation system in view of facial developments. Given that every client makes an outward appearance in different way, which would be difficult for frauds to break into the framework by singularly imitating the client's characteristic facial practices. Regardless of the fact that facial developments are caught, it would be hard to reproduce the moving process as in the caricaturing assault [6].

Aside from security concerns, our methodology additionally advantages facial acknowledgment: by using profundity information, it expands exactness, also, is invariant to changes in light, scale, interpretation and little pivots by a procedure of standardization. Facial developments are characterized by the Facial Action Coding Framework (FACS) which orders facial practices by 46 activity units (AUs), each of which is anatomically identified with a particular set of facial muscles

Each AU normally exists in the scope of -1 to +1, e.g. for the lip stretcher, -1 is deciphered as completely adjusted, 0 speaks to nonpartisan, though +1 methods completely extended. Accordingly the issue of face acknowledgment is decreased to coordinating two time arrangement – model and test – for each AU obtained in a period interval [7].

In a lip reading system lip tracking has an important role. A local region based approach to lip tracking mainly consist of two stage firstly for lip frame lip contour extraction is done and then in next stage tracking of lip is done on the bases of lip frames. For the lip contour extraction 16-point deformable model with geometric constraint is used. Then in the next stage dynamic selection of radius is done from the lip contour extraction of previous frame for lip tracking. This approach is robust against teeth, tongue and black hole [10].

For the speech recognition system speaker lip motion is the important linguistically visual feature. For providing lip data for the lip detecting system, Lip detection and tracking is one of the important steps. The new approach in which primitive Haar- like features and variance constraint are used for getting new feature. The variance based Haar like Features and kalman filter both methods combine together for lip tracking and detecting [11].

Lip print qualities have been broadly utilized as a part of legal sciences by specialists and by the law for human ID. While analyzing human lips attributes the anatomical examples on the lips are considered. Studies have demonstrated that the furrows in the human lips are exceptional to every individual, and henceforth can be utilized as a part of human recognizable proof.

ISSN : 0976-8491 (Online) | ISSN : 2229-4333 (Print)

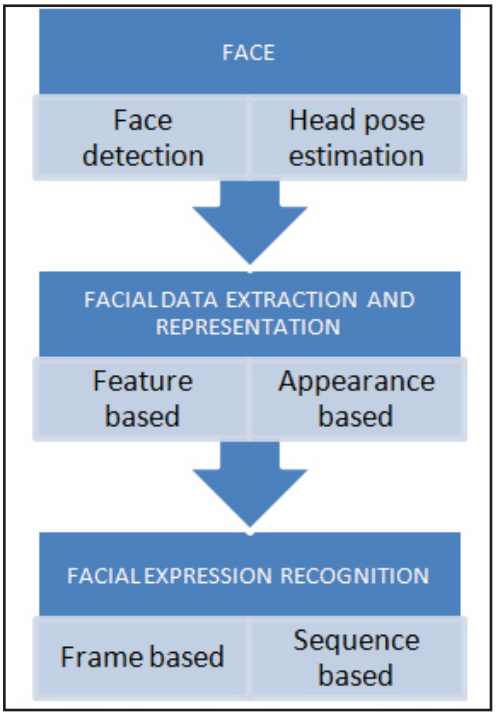

Fig. 1: Basic structure of Facial Expression Analysis Systems

II. Literature Survey

The investigation of Chieloscopy has increased much unmistakable quality as of late, the thought was proposed in 1968 by Yasuo Tsuchihasi and Kazuo Suzuki at Tokyo University. They mulled over the lip prints of individuals of all ages and reasoned that lip attributes are remarkable and stable for an individual. Much as of late, it has been contemplated that lip prints can likewise be utilized to focus the sex of an individual [8].

The pioneer of Chieloscopy, Professor J. Kasprzak, broke down 23 novel lip designs [9-10] for discovering elements of individuals. Such examples (lines, bifurcations, spans, pentagons, spots, lakes, intersections, triangles and so on.) are fundamentally the same to unique mark, iris or palm print designs. The measurable attributes components separated from the lip prints additionally represent interesting distinguishing proof.

Michal Choras has re-avowed the faith in his late studies that the lip can be utilized as an essential biometric methodology for fruitful distinguishing proof purposes. He has demonstrated that geometrical investigation of the anatomical parameters of the human lip can be checked for effective recognizable proof. Lukasz Smacki has additionally done huge examination contemplating the score designs in the human lips for individual ID [11]. He has additionally proposed a system for lip print recognizable proof utilizing DTW calculation [12].

According to Chao Sui, Mohammed Bennamoun, Roberto Togneri and Serajul Haque had proposed new architecture which combine both global region-based Active Contour Model (ACM) and localized region-based ACM. According to this framework we do not need to specify the initial contour before extracting the lips because an incorrect initial contour is eliminated [5].

According to Usman Saeed lip features have been used in speech recognition but now it can be used as biometric identifier. He analyzed a designed database and extracted behavioral lip features for person recognition [9].

According to E.S.Selvakumar and S.Shanmuga Priya in human computer interaction system Automatic Speech Recognition is an important component. They reduced the noise in video lectures using bio-modal feature extraction. Due to the problem of large amount of acoustic noise some additional sources should be enhanced in Audio signal features. They mainly work on reducing the noise in video lectures [1].

According to Bouchra Abboud and Gerard Chollet The problems occurring in lip tracking and cloning are sort out by using appearance model. This is done by using combination of an active appearance model and by a statistical lip color detector. MPEG-4 compatible feature points are also automatically placed on the correct position of an static image and then this image is then animated to reproduce the lip motion to perform lip motion cloning [6].

Table 1: Comparison of existing work

Lip Recognition	Techniques used	Work /limitation
Person Identification using Behavioral feature from lip motion.	Edge based detection and segmentation based detection	It works on extracted behavioral feature which include static feature.
Appearance based lip tracking and cloning on speaking face.	Active appearance model	This method consists in lack of precision of the AAM lip tracker when the face globally moves in addition to the local lip motion.
Lip localization and Viseme Classifications for speech Recognition	Automatic localization lip feature points Extraction (ALiFE).	It is not too much efficient for lip reading system. Efficient only for French vowels
Robust lip tracking using rigid flocks of selected linear predictors	Linear predictor and Rigid flocks.	Tracking of only lip shape and not in motion.
Facial expression analysis based on feature extraction for developing biometric system for user authentication	Three techniques Kalman filter, block based motion,camshift algorithm.	Lip tracking calculation utilizing restricted color dynamic form algorithm. It is versatile against the presence of tongue and teeth also. It is a lip tracking password

III. Approach for Feature Extraction

The content based secret key validation is the best strategy for counteracting unauthorization of information availability frame the unapproved individual or gatecrashers which are not the piece of the framework. Yet, every framework or a technique has its own constraints for example; the content based security can be effectively broken by a straight forward by power assault. So we need to enhance this system. We are going to help mystery word organization structure for the standard substance based security through picture based or development based recognizer. We can do this using either from a component record or from live spilling. The key believed is that we focus on the lip advancement for a farthest point regard. By knowing the contrivance representation of outside lip structure and interior mouth attributes we will prepare to make a mystery key [13].

Towards the Facial outpouring examination based security system the Lips will expect a vital part in contrivance extraction for adding to a biometric certifiable structure for customer affirmation. Thus the first motivation of our work was to locate the behavioral contrivance of face recognition by using lip development. We acknowledge that the verbal correspondence blueprint is a unique behavioral nature of individual that is obtain as time goes on, which will be used as a biometric identifier to words mystery key acceptance for the customers in approaching circumstance. We are going to help mystery watchword association framework for the standard substance based security through picture based or improvement based recognizer. We can do this utilizing either from a contrivance record or from live spouting. The key believed is that we concentrate on the lip progression for edge respect. Towards the Facial verbalization examination based security structure the Lips will acknowledge a tremendous part in trap extraction for making a biometric honest framework for client check. Fittingly the first begin of our work was to find the behavioral characteristic of face revamp by utilizing lip improvement. We recognize that the verbal correspondence plan is an extraordinary behavioral nature of person that is gets after in the end, which will be utilized as a biometric identifier to words watchword attestation for the clients in expected condition [14].

A. Techniques Will Be Used

There are so many techniques available for the motion detection. We will use some basic techniques such as Block based motion estimation technique, Kalman Filter and Camshift algorithm.

B. Block Based Motion Estimation Technique

For reducing temporal redundancies in motion predictive coding motion estimation technique has been applied. It refers to the class of nonlinear predictive coding technique. A good representation of motion is one of the main issues to reach high performance in video coding. This technique provides good prediction but it have low computational load. The purpose of this technique is to minimize the sum of these two terms. Though this technique is not an optimal, so it is used universally in interframe motion compensated predictive coding because its computational complexity is lower than optical flow and percussive method. In this technique the image is divided into blocks and same displacement vector is assigned to all pixel in the block. The motion model assumes that an image is composed of rigid objects in translational motion. But translation motion has been considered to be one of the major drawback when image is zoom as compare to this block based motion technique can estimate the closely zoom motion. And this technique gives good result in the motion fields for representing the true motion in motion scene.

C. Kalman Filter

It is the group of mathematical equations which gives a good computational means to calculate the state of process to minimize the mean squared error. This filter can calculate the past, present and future states and it can work when the perfect nature of modeled system in not known.

It can examine a process by using a feedback control: the filter examine the process state for some time and then obtains feedback in the form of (noisy) measurements. The Kalman filter categorized into two groups: time update equations and measurement update equations. To obtain the a priori estimates for the next time step the main work of time update equations are for projecting forward the current state and error estimates. For incorporating a new measurement into the a priori estimate to obtain an improved a posteriori estimate the measurement update equations is used for the feedback

C. Camshift Algorithm

For video tracking camshift algorithm is a widely used real time algorithm. In camshift algorithm the key factor is searching window. The bigger and smaller size of search window both will decrease the real time feature of camshift. Accelerated camshift with the combination of adaptive search window as proposed. At first the mean shift process and computational cost were modeled and then the relationship between the size of searching window and computational cost is find out. And then the optimized size of searching window is deduced which further used in algorithm.

We have proposed the Lip tracking calculation utilizing restricted color dynamic form algorithm. It is versatile against the presence of tongue and teeth also. It is a lip tracking password

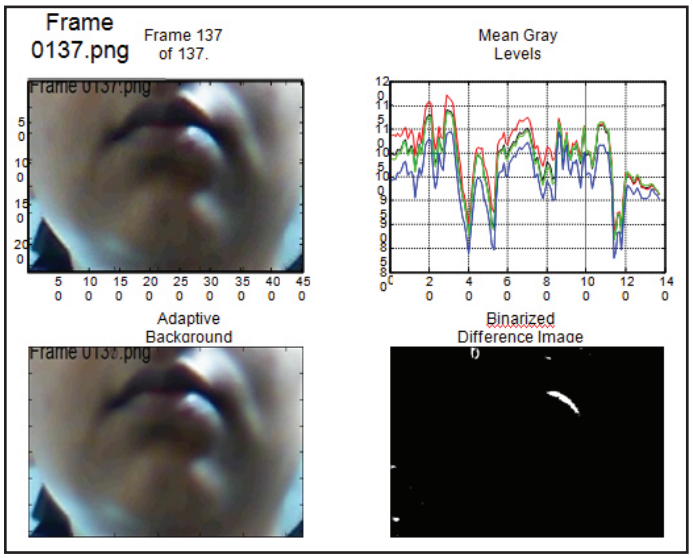

Fig. 2: Image of Frame of Lip Movement and Mean Grey Graph

IV. Conclusion and Future Enhancement

In this paper, we proposed a nifty gritty technique and methodology for the lip movement for user authentication. Towards the Facial expression examination based security framework the Lips will play a significant part in highlight extraction for adding to a biometric honest to goodness framework for client validation. In this manner the first motivation of our work was to find the behavioral component of face acknowledgment by utilizing lip movement. We accept that the verbal correspondence outline is an exceptional behavioral property of person that is procure after some time, which will be utilized as a biometric identifier to words secret word confirmation for the clients in up and coming situation. The lip acknowledgment framework has been actualized what's more, tried effectively utilizing Matlab. At the point when incomplete part of face is accessible, this strategy serves as a valuable one for acknowledgment.

V. Acknowledgments

This exploration work is self financed yet prescribed from the organization in order to enhance the security circumstances and breaks with current systems. Subsequently, the creators thank the mysterious analysts for their important remarks, which reinforced

the paper. The creators additionally wish to recognize organization for their backing & inspiration amid this exploration. They additionally like to offer gratitude to Mr. Upendra Dwivedi for examination in regards to the situational mindfulness framework & for creating the methodology adjusted for this paper.

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Dolly Shah has received BE degree in Information Technology, from BM college of Technology Indore (M.P) in 2012 and doing ME from Shri Vaishnav Institute of Technology and Science.Her research is about "Facial Expression Analysis Based On Feature Extraction For Devloping A Biometric Genuine System For User Authentication" and one research paper " Study of Facial Expression Analysis of Feature Extraction Based on Lip Movement for User Authentication" had published on "International Journal of Computer Applications".

Upendra Dwivdi had received Ph.D in Computer Engineering, Shri Jagdish Prasad Jhabarmal Tibrewala University, Jhunjhunu (India). Since April-2011. M.Tech. in Computer Science , School of Computer Science, Devi Ahilya University, Indore (India) -May 2010. B.Tech. in Computer Science and Engineering with, Academy of Business & Engineering Sciences(U.P.T.U.), Ghaziabad -June 2008.He is an Assistant Professor in Computer Science Dept., Shri Vaishnav Institute of Technology & Science, Indore Since August – 2010. And he had worked as Teaching Assistant in Computer Science Dept Devi Ahilya University, Indore, 2009-2010.He has done many research work such as "Characterize An Approach To Improve Performance Of Multimedia Services Over Vehicular Ad-Hoc Network". He had Presented a paper on National Conference titled "Collaborative Filtering and Association Rule Used web Personalization in Business".