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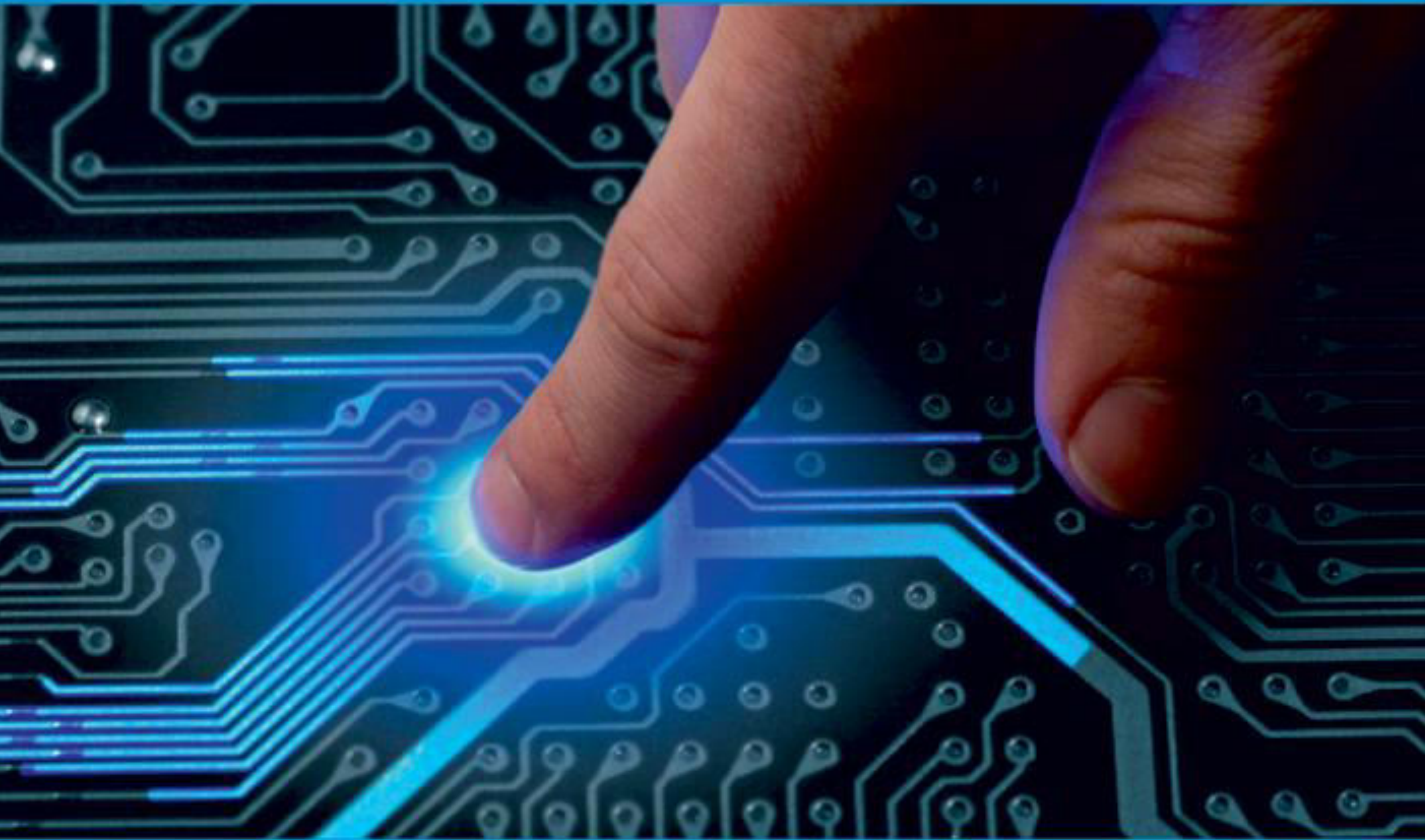

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Analyzing a Range of Adult-Reported Emotions, Including Anxiety and Depression

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ABSTRACT: Older persons or mentally distracted people have a higher risk of developing depression than younger adults do, but the condition still has major repercussions if left untreated. More than half of all cases do not manifest until middle age or later. Suicide rates among the elderly are on the decline, although they remain higher than among younger persons and are more strongly linked to mental illness. Depressed older people are more likely to exhibit cognitive abnormalities, physical symptoms, and loss of interest, but they are less likely to express affective symptoms. Complex interactions between genetic predispositions, cognitive diathesis, age-related neurobiological changes, and life stress are thought to be among the risk factors contributing to the development of depression in later life. Depression in later life is associated with insomnia, which is commonly overlooked as a risk factor. They imply that reducing one's usual activities may be a common route to depression in adults, independent of the relative importance of other risk factors. Depressive symptoms may be exacerbated and maintained by thoughts of self-criticism. Increases in psychological resilience during life help to counteract the effects of the maturation of some risk variables. Having a greater financial status, a higher level of education, participating in meaningful activities, and a religious or spiritual practise are all additional protective factors. Education for people with chronic illnesses, behavioural activation, cognitive restructuring, problem-solving skills training, group support, and life review are just some of the preventative measures that have garnered backing.

KEYWORDS*:* Assistive Device, Renesas board, Depression, Problem solving, Behavioral-Activation

I. INTRODUCTION

Facial expressions allow us to recognise the most basic human emotions. Facial expressions can be used to deduce rules about emotions. Affective interaction-based computer systems may be extensively reliant on in the next generation of computer vision systems. Human-machine interface, entertainment, and security applications can all benefit from face emotion (HMI). Humans may express their feelings with their lips and eyes. Humans typically express themselves through their faces, which also help us understand the intentions and emotions of others. People are very likely to express their emotions. They are essential to our daily lives. Humans spend a lot of effort deciphering the emotional signals of other people, determining what they signify, and then deciding how to respond and handle them. Faster than they predicted a few years ago, facial emotion recognition is impacting us and integrating into our daily lives. There are several uses for face emotion recognition. It can be utilised in intelligent vehicles, which can identify the driver's emotions and alert him if he begins to feel sleepy or drowsy. Facial Emotion Recognition (FER) may tell whether a gamer's experience was pleasurable by looking at his or her facial expressions. It can be employed to track daily tension and anxiety levels as well as to recognise the feelings of senior patients in nursing homes. Recognizing facial expressions is much easier thanks to this tool of people who are autistic or have communication impairments. Facial Emotion Recognition (FER) is another tool investigative organisations can employ to foresee suspects' behavior before interrogation even starts.

II. LITERATURE SURVEY

Other people's viewpoints may be quite significant when deciding between different options or making a decision. When making decisions that require the expenditure of significant resources, people usually rely on the prior experiences of their peers (such as time and money to purchase goods or services). Up until recently, the main information sources were friends and specialised journals or websites. The "social web" now provides new tools for

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efficiently creating and disseminating ideas among Internet users. The exchange of helpful information is supported via social networks, blogs, forums, and content-sharing websites. The commercial sector and the scientific community are paying more attention to getting the public's perspective on social occasions, political movements, business plans, marketing initiatives, and product preferences. However, because it was created for human use, this information is unstructured and not "machine processable" (for the remarkable marketing fallouts and for possible financial market prediction). As a result, new fields like sentiment analysis and opinion mining have evolved.[1]Between the creation of the Internet and 2003, when social networks like When sites like Myspace, Delicious, LinkedIn, and Facebook originally launched, there were only a few hundred gigabytes of information available online. In the present day, the same quantity of data is generated each week. With the advent of the social web, users have access to novel content sharing platforms, allowing them to efficiently and cheaply reach an audience of millions with their own original ideas, opinions, and content creations. This massive volume of information is, however, largely unstructured (because to its intended use for human consumption) and hence cannot be handled by machines all at once. Robots will need a lot more time before they can master natural language to allow for fully automated text analysis. Historically, online information retrieval, aggregation, and processing have relied heavily on algorithms that primarily made use of textual representations of webpages.These algorithms perform admirably when tasked with collecting texts, segmenting them, validating their spelling, and tallying the amount of words contained within. However, it is well-known that current systems' abilities are limited when it comes to sentence analysis and extracting significant information because they continue to rely on the topological display of text, a method that is primarily oriented on word co-occurrence patterns. The ability to analyse texts automatically calls for a deep comprehension of language by robots., it is not till a very distant future. Historically, online information retrieval, aggregation, and processing have relied heavily on algorithms that primarily made use of textual representations of webpages. These algorithms perform admirably when tasked with collecting texts, segmenting them, validating their spelling, and tallying the amount of words contained within. However, it is well recognised that the skills of most existing systems are quite constrained when it comes to analysing sentences and extracting significant information because they still rely on the topological display of text, a method that is largely focused on word co-occurrence patterns..[2]Communication between people is greatly aided by the use of feelings. In many contexts, emotional intelligence is more important than IQ for a successful engagement. In addition, studies have shown that human emotions can influence cognitive processes like learning. For this reason, AI3 and related fields of study cannot progress without the incorporation of affective computing and sentiment analysis. Additionally, they are useful in a wide variety of settings and enterprises, both large and small, that employ emotion and sentiment analysis to achieve their goals. Sentiment-mining algorithms may be used in the development and upkeep of automated review and opinion aggregation websites, which collect opinionated text and videos from around the Web and are not limited to product reviews. to more general matters, including political issues and the public's impression of brands.[3Predicting future interest in a certain subject requires first modelling how that subject will spread over the internet. We introduce a time-varying hot topic diffusion model in a bulletin board system (BBS) and blog network discussion scenario. This model is based on the collective behaviour of users in different social groups on these platforms. This approach accounts for the reality that chats in virtual communities can happen whenever participants feel like it. In order to pinpoint the instant at which the trajectory of the most-discussed topic online begins to shift, we test the reliability of our model's alignment. Based on the data, we may make some broad statements about two theorems, which demonstrate two conditions under which the trend of the popular online subject will either die out or remain continuously weakly persistent.[4]Facial expressions are one of the most distinctive aspects of a person, and they can be analysed to reveal information about the person's present emotional state. In this paper, we create an algorithm for identifying facial expressions using a combination of Convolutional Neural Networks and Deep Neural Networks. The seven emotions recognised by this framework are shock, fear, anger, disgust, happiness, and neutrality.[5]

Different types of nonverbal communication exist, and facial expressions are just one of them. Numerous studies have been undertaken to determine how best to categorise these varying expressions on the face. Eight emotions, including happiness, sadness, anger, contempt, disgust, fear, and surprise, have been empirically demonstrated to be expressed universally in facial expressions. Happy neutral, sad, furious, disdainful, disgusted, fearful, and surprised are listed first. Given the breadth of applications in areas like computer vision and artificial intelligence, emotion recognition in faces is crucial. Here's an example: As an example: Emotional facial expression research is being done in these fields for the purpose of automatically identifying people's emotions. Robotics can benefit from emotion classification since it helps to create more natural interactions between humans and robots. Due to advancements in artificial intelligence, robots can now interpret and act upon human feedback. For the objectives of this work, emotion detection has been performed in both real-time video and still images. For this analysis, we used the Cohn-Kanade Database (CK) and the Extended Cohn-Kanade Database (CK+). The real-time images were captured using a camera, and both databases feature a sizable amount of archived photographs with a 640 by 400 pixel resolution. The datasets have been

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thoroughly FACS coded, and the emotion labels have been verified and validated (Facial action coding system). Because of this, we will first use OpenCV's HAAR filter to detect faces in either still images or moving videos before we can move on to the emotion recognition phase. In order to have a better look at the facial features, the image might be cropped and manipulated once the face has been recognised. After the datasets have been trained with the machine learning technique known as Support Vector Machine, they are then sorted into the eight distinct emotional states. Facial landmarks are used to do this. About 93.7% accuracy was achieved using SVM..[7]Recent years have seen a rise in studies aimed at improving our ability to recognise facial expressions in real time. In this study, we built and tested an autonomous system for analysing facial expressions in real time. After the system and model were designed and tested in MATLAB, a MATLAB Simulink environment was used for further development. This environment runs on a desktop PC and can detect continuous facial emotions at a frame rate of 1 per second. They have been experimentally validated on a publicly available dataset, with promising outcomes. This study used a dataset and labels derived from two recordings made by each of five subjects as they watched the same film. Second, in order to build the face expression recognition system in real time at a faster frame rate, it was built on a field-programmable gate array. The goal was to maximise the effectiveness of the system, thus we did this (FPGA). The camera sensor in this investigation was a DigilentVmodCAM (stereo camera module). While building the prototype, we relied on the AtlysTM Spartan-6 FPGA development board. It can detect a person's mood every 30 frames, continually. In order to show the participant's video in real time while also offering two-dimensional predict labels of the emotion, a graphical user interface was created..[10Facial expressions are the outward manifestation of inner mental and emotional states. Social cues such as attention, intention, motivation, and emotion are communicated to the observer. It's generally accepted as a reliable means of secret communication. The study of these phenomena gives researchers a far deeper insight into human behaviour. [Needs clarification] It's unclear what you mean here. Artificial intelligence (AI) based facial expression recognition (FER) has become a hot topic in the scientific community as of late due to its wide range of potential uses in fields as diverse as dynamic analysis, pattern detection, interpersonal interaction, mental health monitoring, and many others. The rapid growth of the COVID-19 epidemic, however, has necessitated the development of a novel FER analytic framework to harness the ever-increasing volume of visual data produced by videos and images. In addition, the worldwide trend toward online mediums has increased demand for this service. Furthermore, the FER studies need to account for the fact that children, adults, and the elderly all have distinctively different emotional expressions on their faces. Considerable research has been done in this area. Conversely, it does not supply a comprehensive review of the literature that shows the work done in the past and explains the converged future directions. This paper's authors have offered a thorough analysis of existing artificial intelligence (AI)-based FER approaches. Evaluated are datasets, feature extraction methods, algorithms, and current advances in the field of face emotion recognition. To the author's knowledge, this is the only review paper that comprehensively describes all aspects of FER across all age groups; hence, it will have far-reaching consequences for the research community in the years to come.[11]

III. METHODOLOGY

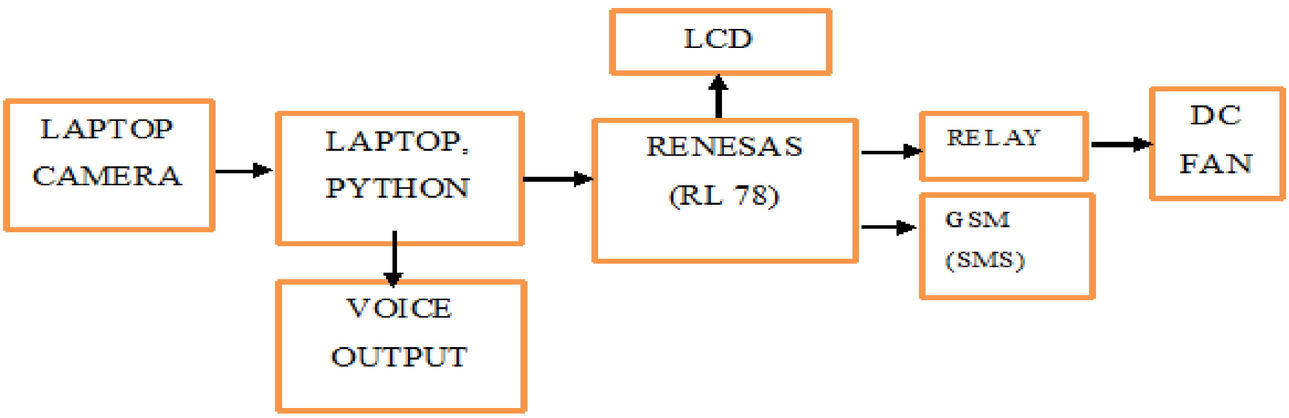

Fig: 3.1 System architecture

Step 1: - Images are captured through the camera continuously
Step 2: - Based on the expression of the person the code analyzes the face and starts sending the output to the monitor

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Step 3: - Once the respective parameter is met,the code will execute appropriate condition based on the continuous expression
Step 4: - The machine learning algorithm decides what action to be taken for every respective condition
Step 5: - The similar condition is executed through the Renesas board for every possibility of the persons Expression
Step 6: - Based on the person expression the condition is executed through the board and the other peripherals

Fear Module

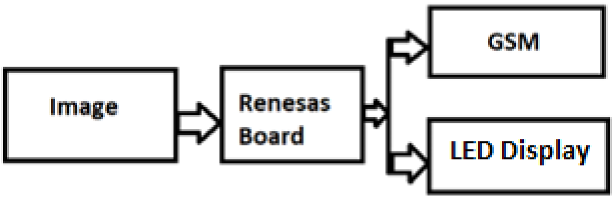

Fig 3.2: - Fear Module

Implementation Steps for Fear Module

Step 1: - Images are captured through the camera continuously
Step 2: - Based on the expression of the person the code analyzes the face and starts sending the output to the monitor
Step 3: - Once the respective parameter is met, the code will execute appropriate condition based on the continuous expression
Step 4: - The machine learning algorithm decides the person is in fear based on the expression of the person and the software send the signal to that Renesas board will t send a coded message to the respective attendant of the person and the board will initiate the message on the display which is connected to the board

Angry Module

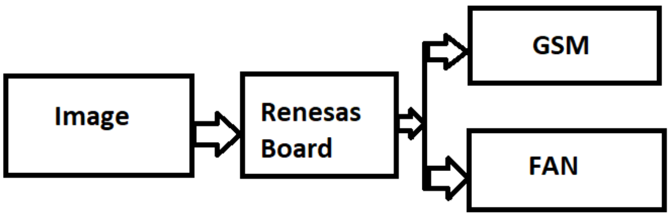

Fig 3.3: -Angry Module

Implementation Steps for Angry Module

Step 1: - Images are captured through the camera continuously
Step 2: - Based on the expression of the person the code analyzes the face and starts sending the output to the monitor
Step 3: - Once the respective parameter is met, the code will execute appropriate condition based on the continuous expression
Step 4: - The machine learning algorithm decides the person is in fear based on the expression of the person and the software send the signal to that Renesas board will trigger relay to switch on the fan which is connected to the board & send a coded message to the respective attendant of the person stating the person is in angry mode and the board will also initiate the message on the display which is connected to the board

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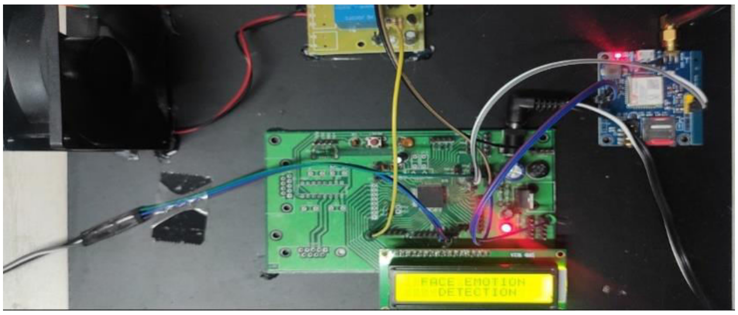
Happy Module

Fig 3.4: - Happy Module

Implementation Steps for Happy Module

Step 1: - Images are captured through the camera continuously
Step 2: - Based on the expression of the person the code analyzes the face and starts sending the output to the monitor
Step 3: - Once the respective parameter is met, the code will execute appropriate condition based on the continuous expression
Step 4: - The machine learning algorithm decides the person is in fear based on the expression of the person and the software send the signal to that Renesas board and will automatically switch on the speaker and initiates an audio message stating the person is in happy mode.

IV. IMPLEMENTATION



- Camera which is used in this model is a simple laptop camera which basically takes the images of the person who is sitting in front of the camera and starts analysing the expression of the person
- The project is carried out using the R5F100LEA, a 16-bit microcontroller from the Renesas RL78 series, which is shown in the picture. The project's system-governing 16-bit microcontroller acts as the lifeblood of the whole thing. It features an ADC with a 10-bit resolution, 58 GPIOs, 3 UARTs, an on-chip oscillator that is self-programmable, 28 interrupt sources, and support for ISP programming, among other features. In addition, it has 4 KB of RAM, 64 KB of flash ROM, and 4 KB of data flash.
- The LCD display in the example is 16*2. LCD represents for liquid crystal display. On the LCD, every output is visible. The LCD doesn't know what commands or data are being sent to its data bus. It is the user's responsibility to specify whether the content at its data pins is intended to be instructions or data.
- A relay may be thought of as a switch that is electrically operated. A magnetic field is produced when current is sent through the coil of the relay, which causes a lever to move and causes the switch contacts to change. Since the coil current can be either one or the other, as shown in the diagram, relays typically contain double throw (changeover) switch contacts and have two access points. This is because double throw switches provide for more flexibility.Through the use of relays, one circuit may control another, or even a totally independent circuit. A relay, for example, might switch a 230-volt-alternating-current (AC) mains circuit in a low-voltage battery circuit. The mechanical and magnetic interface of the relay is what creates the link between the two circuits; there is no direct electrical connection between the two circuits.
- The GSM Module Can Be Seen. It Receives Information from The Main Circuit and Transmits It to The

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Operator. There Is an Application of Time Division Multiple Access (TDMA) (TDMA). The Transmission of Messages and Communication Between Individuals and The Relevant Organisations Are The Two Primary Functions Served By GSM. A Computer and A GSM System Are Able to Communicate With One Another Thanks To The GSM Module

- Speaker can be of any type but in the project, I will be using a normal laptop speaker for the output of the scenario

V. RESULTS

Once the camera starts taking the picture continuously before going through all the process it needs to take minimum of 15 same expression before it decides what is the expression of the person. Here the no 15 is to state that the expression will be continuously changing so to get the accurate facial expression will be difficult and it wont be accurate enough to decide the expression so multiple iteration of the same expression will get the better accurate result

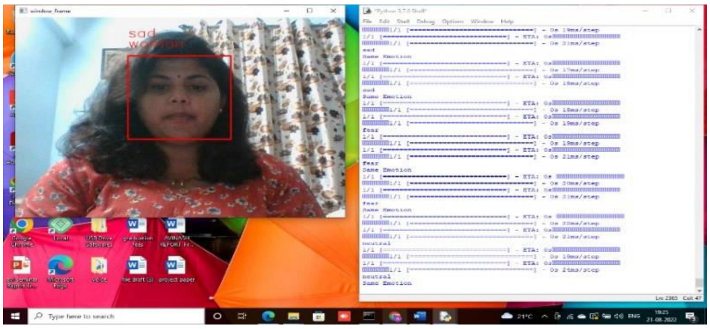

Fig:5.1

As a result, we can see a woman who facing the camera, the camera starts recording every expression the women are expressing once the same facial expression is recorded for more than 15 times it starts sending the states of the expression in the screen as well as with the other peripherals and it also indicates the same expression the window as well so that expression is getting recorded each and every movement based on the facial expression

Of each person it can be iterated and can be effectively and accurately the person can analyze the situation of his\her behavior.

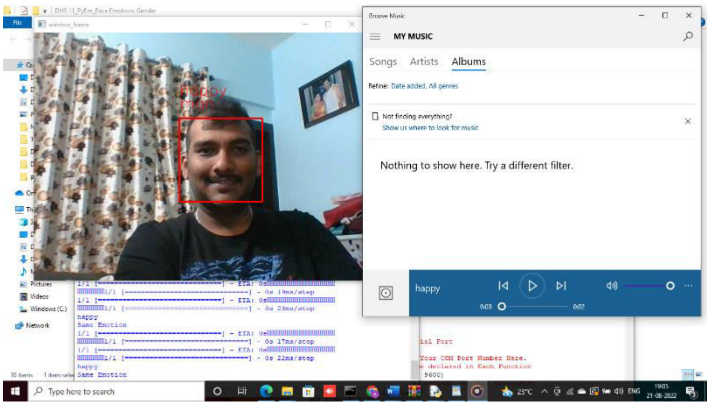

Fig:5.2

As a result, we can see a man who facing the camera, the camera starts recording every expression the men are expressing once the same facial expression is recorded for more than 15 times it starts sending the states of the expression in the screen as well as with the other peripherals and it also indicates the same expression the window as well so that expression is getting recorded each and every movement based on the facial expression

Of each person it can be iterated and can be effectively and accurately the person can analyze the situation of his\her behavior. As a result the man expression is happy so the speaker on the laptop starts playing a happy message tone .

VI. CONCLUSIONS

The geometrical features that have been recreated as the basis comparison template for the recognition system are connected with the physical characteristics of the human facial emotions associated with happiness, Sad, fear, angry, surprise, and contempt. This connection was made possible by the recognition system. The face emotion detection system developed for this project work provides an adaptable platform that is based on a face recognition model linking

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behavioral qualities to physical sensitive authentication information. As we can see the results of any expression is taken only when the facial expression is repeated for 15 or more times the iteration can be increased or decreased based on the accuracy required. but as the normal human being can give multiple expression with little time in front of the camera. To capture those expression the iteration can be reduced but the accuracy also reduces with less iteration prediction of emotion will also will be difficult so accuracy will be in the declined value.

VII. ACKNOWLEDGMENT

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