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STUDENT MOOD DETECTION SYSTEM

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ABSTRACT

Depression is a commonly unattended health problem, unbounded by age border, and greatly affecting student's performance in their study. To prevent it, we built a real-time Student facial emotion recognition system, so the admin can monitor student's mood through class activity. Admin will monitor the emotion of the student and then they can notify to faculty about the response and can check the understanding level of student. This will help to improve understanding level of student and affecting subject score.

Keyword. Emotional experiences, emotion recognition, face detection.

1. INTRODUCTION

Human emotion recognition has been the spotlight for many researches to test various theories, algorithms, and new technologies. Emotion recognition discipline of Human–Computer Interaction relies on the algorithmic robustness and hardware sensitivity.

Social anxiety disorder is one of the most common mental health disorders, with approximately 13% of the population meeting diagnostic criteria for Social anxiety disorder during their life. Hence, the need to quickly recognize such anomaly surfaced. If left untreated, Social anxiety disorder typically runs a chronic course and total remission is rare. Though depression is classified as an adult disorder, and depression in very young children is rare, middle to late adolescence is the most common age when depression symptoms first appear or a first major depressive chapter happens. Lewinsohn, Hops, Roberts, Seeley, and Andrews sampled random adolescents within a U.S. community and figured out that the average age of onset of major depression was 14 years old [1].

Though facial expressions obviously does not necessarily convey emotions, in computer vision community, the term of facial expression recognition often refers to the classification of human facial features into one of the seven basic emotions: happiness, neutral, sadness, fear, disgust, surprise and anger and trained around 1500 images to detect each mood [2] [3]. According to National Institute of Mental Health data in 2014, about 2,8 million American teenagers ranged 12-17 years old would at least suffered by one episode of major depression and only 30% of them get a proper treatment [4].

Depression is categorized as mental-emotional disorder in Indonesia and it's prevalence as high as 6% of total population [5]. A number of researches investigate the role some factors to depressive symptom, such as emotion regulation [6]. Illegal drugs usage is proven to be the byproduct of depression and because the bigger prevalence on men, depression and comorbidity affected by gender. Data from particular newspaper in Indonesia shows that 90% of drug users is on large, unattended [7]. Psychological researchers have proved that there are negative effects of depression on student's academic performance [8]. In response to that condition, we proposed a way to monitor student's mood through class activity. The teacher should be able to constantly aware on the fluctuation of their student's mood by using facial emotion recognition system. At this point, the problem only lies on the willingness of the system developer and the educator to collaborate. But here is where the problems lies, Indonesia, where the research will take place upon, is a developing country. As sad as it sounds, 55% of under-15 Indonesian is functionally unable to read [9]. Implementing artificial intelligence to recognize human facial expression can be a complex and difficult task. High quality datasets are hard to found, and there are various pitfalls to avoid when designing such system. It is proved that facial expression could help lecturers to identify the involvement and comprehension of the student [10].

2. SYSTEM DESIGN

Real-time facial emotion recognition, in general, is divided by several phases. The first phases would be detecting general area of human face, this process include tracking system which require the camera to monitor the general movement of facial layout. Second phase would be Facial land marking, which pointing out more accurate facial point to be extracted. Of course, we have to choose the most efficient way to compute and doing facial analysis to prevent computer's memory overload. On the other hand the system still need a feature which is able to extract the subject's facial expression and then further processed it into the emotion as the result.

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We need to be sure that the computer is able to properly do image acquisition, facial extraction, facial land marking, and logic computation to get the emotion from the subject. In short, a working webcam, and sufficient computation power on the subjected computer is crucial. The location of facial features can be represented as landmarks on the face. The image acquisition of human face can be represented as coordinated vector landmark and Action Units (AU). Hence, facial feature offered geometric information of each and overall shape of particular object [11]. Facial expression extraction and localization has become pivotal point among image analyst [12] [13].

3. RESEARCH METHOD

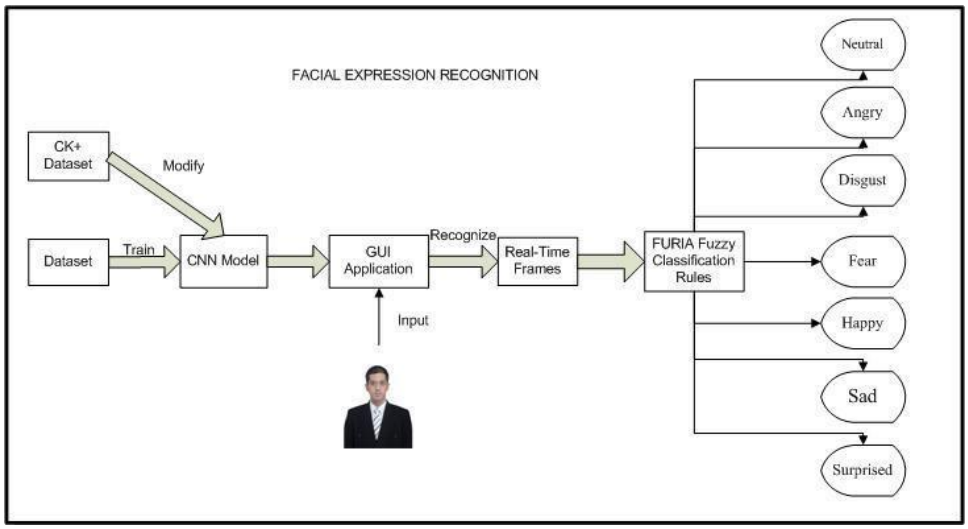

Figure 1. System Design.

The system produced systematical processes which allowed the teacher to monitor their student's mood through the class activity by using computer's webcam to acquire the image real-time. The system will use a pre-made library to acquire images from webcam. The process to determine facial feature from the acquired image will utilize pre-trained dataset .which is trained using convolutional neural network model. While trying some method to recognize facial feature. we stumbled at some problems such as:

1. Difficulty to combine the metric with powerful image recognition technique such as SVM, LDA, PPA, etc is particularly high.
2. The measurement computation is very complicated.
3. The distance does not obey triangle inequality. So sometime two similar images can be both similar to a completely unknown object.

With these points all covered, the system simplify the Euclidean Distance computation. The system uses Standardizing Transform to do domain smoothing . This directly relates image to smoothing and indicates that smoothing noiseless images can still increase image recognition rate.

4. SYSTEM IMPLEMENTATION

In this system we are trained around 1500 images include JAFFE image set to detect each mood JAFFE image set consisted of 213 images of Japanese female frontal facial pictures, classified by 7 basic emotions just like the classification used by the system. We will compare the result gotten from analyzing each of these 1500 images using the system, with the default classification from JAFFE image set. In figure 2, we run the system to see how the emotion recognition system could detect facial features. The system proved to be able distinct emotion features of human expressions; this will be further tested using a specific expert-arranged image set.

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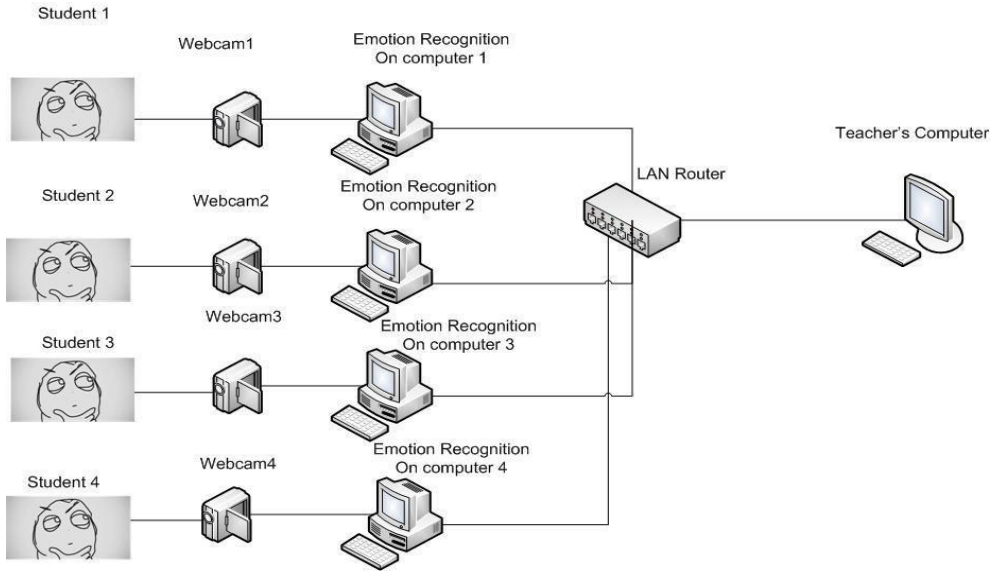

Figure 2. System Testing on Real Time Feed via Webcam

This suggests that an automated system can do just as a good job, if not better as a naive human observer and suffer from the same confusions due to the perceived ambiguity between subtle emotions. However, human observer ratings need to be performed on the CK+ database and automated results need to be conducted on the JAFFE database to test out the validity of these claims. Our tools also provide desirable result on the scanning and image analysis. Which could detect, locate, tracking, and analyze human expression that contained in captured image. This contributes greatly on this research mainly because this research is quite focused on the accuracy of the system.we have to measure the system's accuracy. The system uses JAFFE image set, which already classified based on specific emotions by expert.we will compare the measurement brought by our system, with the classification from the image set in a posed expression database; the database will display different basic emotional expressions simultaneously, while in spontaneous expression database, the expressions are natural. Spontaneous expressions are differed from posed ones remarkably in term of intensities, configurations, and durations. Apart from this, syntheses of some AUs are just barely achievable without the need of undergoing on associated emotional state. Therefore, at most cases, the posed expressions by human participants are exaggerated, while the spontaneous ones are quite subtle and differed in appearances.

The emotion annotation can be simply done in discrete emotion labels or on a continuous scale. Most of databases are usually based on the basic emotions theory proposed by Paul Ekman and Armindo Freitas-Magalhaes which assumes the existence of seven discrete basic emotions (happiness, neutral, sadness, fear, disgust, surprise and anger) in this system we trained data to detect multiple mood in one frame.

5. ACCURACY

Many recent paper in the domain of emotion recognition and sentimental analyses were studied in this paper.it is observed that emotion recognition system are high in demand to serve application of artificial intelligence and internet of things . There is scope to build robust and reliable automatic recognition system. Therefore to improve the accuracy of the emotion recognition system we are trained and Test the model as sown in figure 3 System Training on Real Time Feed for the desire output.

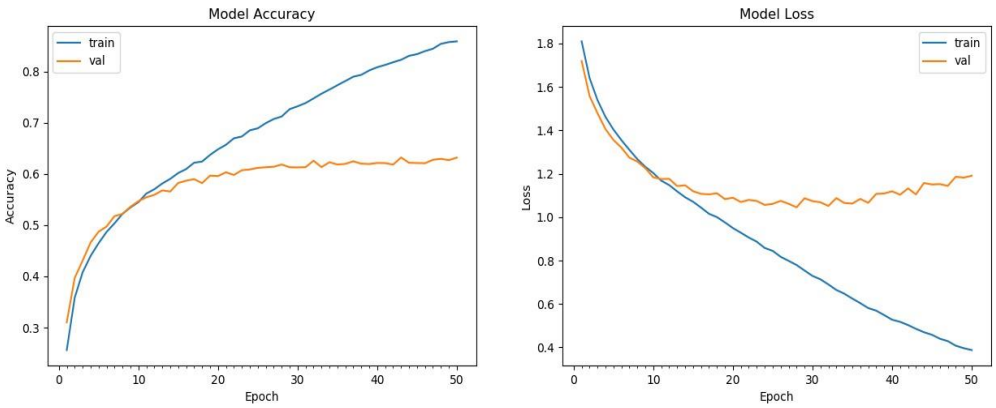

Figure 3. System Training on Real Time Feed

6. CONCLUSION

The Facial Expression recognition tools provided desirable results on the scanning and image analysis. The system also successfully implemented Euclidian Distance formula and FURIA fuzzy rules to extract necessary information from the acquired image or image sequence into one of 7 basic human emotions. It can be seen that when used in a classroom activity, the system could make a significant difference to student's mood. This result could greatly vary from school to school, not to mention when used on different grades. Because there will be many other external variable that could affected the state of the students. However, from this research, the writer concluded that it is possible to have a scientific measurement toward student's stress level by using a system which could detect human emotions.

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