IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

Tensor Flow-Based Automatic Personality Recognition used in Asynchronous Video Interviews

Mrs. Anu D[1], Chandana C[2], Chethan R[3], Jeevan BV[4], Krishna V[5]

[1]Assistant Professor ISE Department, East West Institute of Technology, Karnataka

[2345] B.E Students, ISE Department, East West Institute of Technology, Bengaluru, Karnataka

Abstract: In this project, we propose a stress recognition algorithm using face images and face landmarks. In the case of stress recognition using a biological signal or thermal image, which is being studied a lot, a device for acquiring the corresponding information is required. In order to remedy this shortcoming, we proposed an algorithm that can recognize behavior of the person from images of video acquired with a general camera. We also designed a deep neural network that receives facial landmarks as input to take advantage of the fact that eye, mouth, and head movements are different from normal situations when a person is stressed and also we can identify the behavior of the particular candidate attending a online interview, there will conclude that whether the particular candidate is eligible or not. Experimental results show that the proposed algorithm recognizes behavior more effectively.

Keywords: Convolutional Neural Network (CNN), Personality Recognition, TensorFlow, OpenCV, HAAR Cascade

I. INTRODUCTION

Human emotion detection is implemented in many areas requiring additional security or information about the person. It can be seen as a second step to face detection where we may be required to set up a second layer of security, where along with the face, the emotion is also detected. Recently, as modern people suffer from extreme levels of stress, a system is being developed to recognize whether a user is under stress and to give feedback in a direction of reducing stress when under stress. We also proposed a emotion recognition of the student and update to the concerned class teacher. Monitoring about the understanding of classes for the students and time table is being updated to the students.Recently, as modern people suffer from extreme levels of stress, a system is being developed to recognize whether a user is under stress and to give feedback in a direction of reducing stress when under stress. In the field of stress recognition, many methods using bio-signals have been studied. However, in order to measure bio-signals, a user may feel rejection because bio-signal measuring equipment must be attached to the body. Therefore, many studies on stress recognition using thermal images have been conducted, but this also has a disadvantage in that it is difficult to recognize stress easily in daily life because it cannot be recognized without thermal imaging equipment. On the other hand, in the case of stress recognition research using a general image, most of the studies have used a relatively simple feature. In this paper, we propose a method for recognizing stress by extracting high-dimensional features from face images acquired by a general camera. And in order to learn more efficient features, we use the location of facial landmarks that shows a big change when stressed. Monitoring student progress is instrumental to a student's success and keeping them on track to enable them to reach their goals. Results of their progress should be shared with parents or guardians in the form of a formal school report, which gives them context as to what their child is learning and what progress has been made. In the UK, 1 in 5 students comes from aboard and their families barely speak English. Annual reports do not always accommodate to these Black, Asian and Minority Ethnic (BAME) families, as teacher's written reports may not be fully understood by them. Schools are encouraged to write school reports in the student's primary language; however this is not always achievable. There are currently no computer-based methods of translating report data to a qualitative output that considers not just a student's attendance and test scores, but also their attitude. As subject grading is well standardized, achievements may not improve, but a teacher's satisfaction may increase if the student's attitude changes. Typically, there is a positive correlation between students with good attitudes towards their learning and successful exam results; hence, this data should be considered when monitoring a student's performance. In recent years computationally intelligent techniques (CIT) have been applied to a variety of tasks including biological data mining, image analysis, financial forecasting, anomaly detection, disease detection, natural language processing (NLP) and strategic game playing. Following this, the automatic analysis of the written human language can be done through means of NLP, a theory-motivated range of computational techniques. Mining opinions and feelings using CIT is a powerful and effective way of studying the interpretation of narratives. However, it is a difficult task, as the model needs a clear understanding of the rules of explicit

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

and implicit, regular and irregular language, and syntactic and semantic language. Currently, the majority of the existing techniques are based on the syntactic representation of text – a process that relies primarily on levels of word co-occurrence. One of the most commonly used applications of NLP is sentiment analysis, which basic tasks are emotion recognition and polarity detection. While the former emphasizes on collecting a set of emotion labels, the latter discovers the targets on which opinions were expressed in a sentence, and then determines whether the opinions are positive, negative or neutral. In our case, the target is the student, and its attributes are the student's behavior. For example, in the sentence, "John is a cheerful, positive pupil who always gives of her best", the comment is on "John" and the opinion is positive.

II. RELATED WORK

The existing methods of behavior analysis include paper method (self-report), body fluid testing and physiological parameter evaluation. Paper method is performed by providing a multiple choice questionnaire and asking the subjects to answer it, where each choice will have a particular score. Once the subject is done with the questionnaire, the scores of each choice will be summed up to obtain a final score which indicates the behavior level of that person. Body fluid testing such as saliva testing or blood testing is done for the detection of stress hormone, Cortical. Both these methods are not effective for continuous stress monitoring. Monitoring and analysis of physiological parameters can provide a meaningful insight into one's health status

A. Behavior Recognition using Bio-signals

Bio-signals were used in early stress recognition research because they show the body's most sensitive changes, while allowing it to identify changes in the body that are not revealed by face and behavior. In these studies, they extracted and used features that can express stress in bio-signals such as Electrocardiogram, Electrodermal Activity, Respiration, Galvanic Skin Response, and Heart Rate Variability. And many of them used classical classifiers such as Support Vector Machine, Linear Discriminant Analysis, AdaBoost, and K- Nearest Neighbor.

B. Behavior Recognition using Thermal Image

When a person is stressed, the blood flow of the face increases and the temperature of the face increases, so a lot of research has been conducted to detect the change by using the thermal image to detect the change. In these studies, many methods were used to recognize stress by extracting features directly from thermal images or by extracting features such as respiratory rate, number of blinks, skin temperature, and blood flow from thermal images.

C. Behavior Recognition using General Image

When a person is under stress, eye, mouth, and head movements are different from normal situations, and research on stress recognition using general images is also being conducted. In these studies, many methods were used to recognize stress such as extracting hand-crafted features from the eyes, nose, and mouth areas or using eye size, mouth movements, and head movements as features.

III. LITERATURE SURVEY

1. Survey Paper 1

Name: Deep Learning Face Attributes in the Wild
Author: Ziwei Liu; Ping Luo; Xiaogang Wang; Xiaoou Tang
Published in: 2015 IEEE International Conference on Computer Vision (ICCV)
Abstract: Predicting face attributes in the wild is challenging due to complex face variations. We propose a novel deep learning framework for attribute prediction in the wild. It cascades two CNNs, LNet and ANet, which are fine-tuned jointly with attribute tags, but pre-trained differently. LNet is pre-trained by massive general object categories for face localization, while ANet is pre-trained by massive face identities for attribute prediction. This framework not only outperforms the state-of-the-art with a large margin, but also reveals valuable facts on learning face representation. It shows how the performances of face localization (LNet) and attribute prediction (ANet) can be improved by different pre-training strategies. It reveals that although the filters of LNet are fine-tuned only with image-level attribute tags, their response maps over entire images have strong indication of face locations. This fact enables training LNet for face localization with only image-level annotations, but without face bounding boxes or landmarks, which are required by all attribute recognition works. It also demonstrates that the high-level hidden neurons of ANet automatically discover semantic concepts after pre-training with massive face identities, and such concepts are significantly enriched after fine-tuning with attribute tags. Each attribute can be well explained with a sparse linear combination of these concepts.
LIMITATIONS:

- For patch-by-patch scanning needs nearly 80 ms to extract features.

2. Survey Paper 2

Name: Automatic personality assessment: A systematic review

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

Author: S.V. Kedar; D. S. Bormane
Published in: 2015 International Conference on Information Processing (ICIP)
Abstract: Personality Assessment is an emerging research area. In recent years, the interest of the scientific community towards personality assessment has grown incredibly. Personality is a psychological model that can be used to explain the wide variety of human behaviors with the help of individual characteristics. The applications of personality assessment range from behavior analysis to disease diagnosis, counseling, employee recruitment, social network analysis, security systems, mood prediction, and many others. Automatic personality assessment consists of the automatic classification of users' personality traits from the data such as video, speech and text. Despite growing number of works in personality assessment, it is still very difficult to say what the current state-of-the-art is. The objective of this survey paper is to discuss various approaches used for personality assessment and to present current state-of-art related to it. It also provides guidelines for further research.

LIMITATIONS:
- It is not fully automated language independent, and 100% accurate system for personality assessment.
- This system cannot be accessed through online.

3. Survey Paper 3
Name: Human character recognition application based on facial feature using face detection
Author: Ardinintya Diva Setyadi; Tri Harsono; SigitWasista
Published in: 2015 International Electronics Symposium (IES)
Abstract: In the psychology, there are four fundamental personality types of human: sanguine, choleric, melancholic, and phlegmatic. One way to know the human fundamental personality is based on test, and one kind of test is Grapho test (handwriting test). In this study has been conducted detection of the human fundamental personality using combination of some face features: the eyes, lips, and nose (without test). Those features are obtained from facial image. Distance between two corners of the eyes, high of eyes, ratio of the mouth width and nose, the width ratio of two eyes, and thickness of lower lip have been used as feature extractions. By using artificial neural network (backpropagation) and based on such feature extractions, the fundamental personality is detected. Related to the experimental results, system can detect the human fundamental personality for the same input image data with training average 85.5%. The identification result for the different input image data with training is average 42.5%, this condition occurred caused by identification of personality for choleric and phlegmatic was less than 50%.
LIMITATIONS:
Testing accuracy was less than 50% for some features on a few occasions

IV. IMPLEMENTATION

A. PROPOSED ALOGRITHM

In this section, we propose an algorithm to improve stress recognition performance.
Overall Framework: In this proposed algorithm, face image and facial landmark detection is performed first for stress recognition. We use a deep learning algorithm for face detection that detects the position of the face more accurately through three networks in turn. To detect facial landmarks, we use a hand-craft algorithm that use a cascade method of the features extracted by random-fem and the regression tree classifier. The flowchart of the overall framework is shown in figure below.

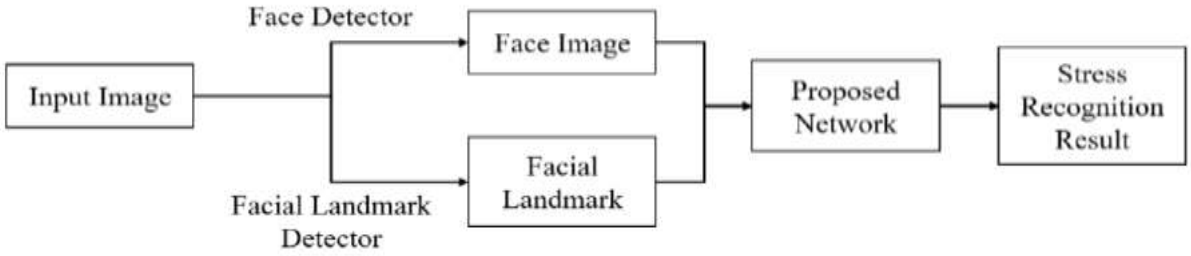


Fig.1 Block Diagram

In the proposed network, the face images and face landmarks detected earlier are inputted to output stress recognition results. The structure of the proposed network is shown as fig. In the proposed network, we use shortcut mapping and bottleneck architecture to optimize neural network structure. By applying the shortcut mapping to the neural network structure deepened due to the numerous layers, it is possible to simplify the learning process and determine the direction

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

of the learning. This makes it possible to easily optimize the deep neural network and improve the accuracy due to the increased depth. By applying the bottleneck architecture, the number of internal parameters can be reduced while increasing the number of feature maps, which increases the performance and reduces the amount of computation.

B. INPUT / OUTPUT DESIGN

The facial expression recognition system is trained using supervised learning approach in which it takes images of different facial expressions. The system includes the training and testing phase followed by image acquisition, face detection, image preprocessing, feature extraction and classification.

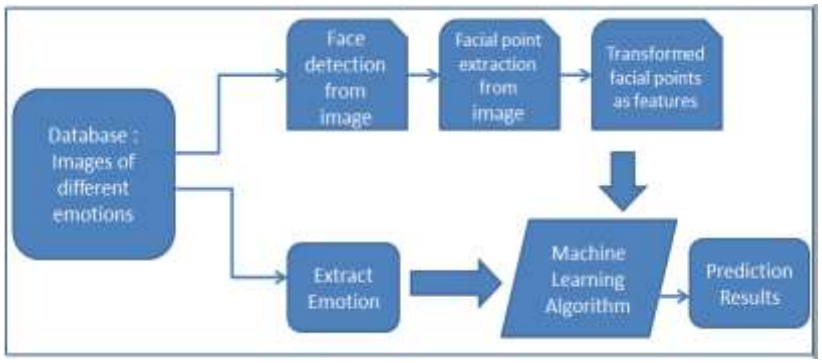


Fig.2 Phases in Facial Expression Recognition

Face detection and feature extraction are carried out from face images and then classified into six classes belonging to six basic expressions which are outlined below:

Image Acquisition

Images used for facial expression recognition are static images or image sequences. Images of face can be captured using camera.

Face Detection

Face Detection is useful in detection of facial image. Face Detection is carried out in training dataset using Haar classifier called Voila-Jones face detector and implemented through Opencv. Haar like features encodes the difference in average intensity in different parts of the image and consists of black and white connected rectangles in which the value of the feature is the difference of sum of pixel values in black and white regions.

Image Pre-processing

Image pre-processing includes the removal of noise and normalization against the variation of pixel position or brightness.

a) Color Normalization

b) Histogram Normalization

Feature Extraction

Selection of the feature vector is the most important part in a pattern classification problem. The image of face after pre-processing is then used for extracting the important features. The inherent problems related to image classification include the scale, pose, translation and variations in illumination level.

Classification

The dimensionality of data obtained from the feature extraction method is very high so it is reduced using classification. Features should take different values for object belonging to different class so classification will be done using convolutional neural network algorithm.

IJIREEICE

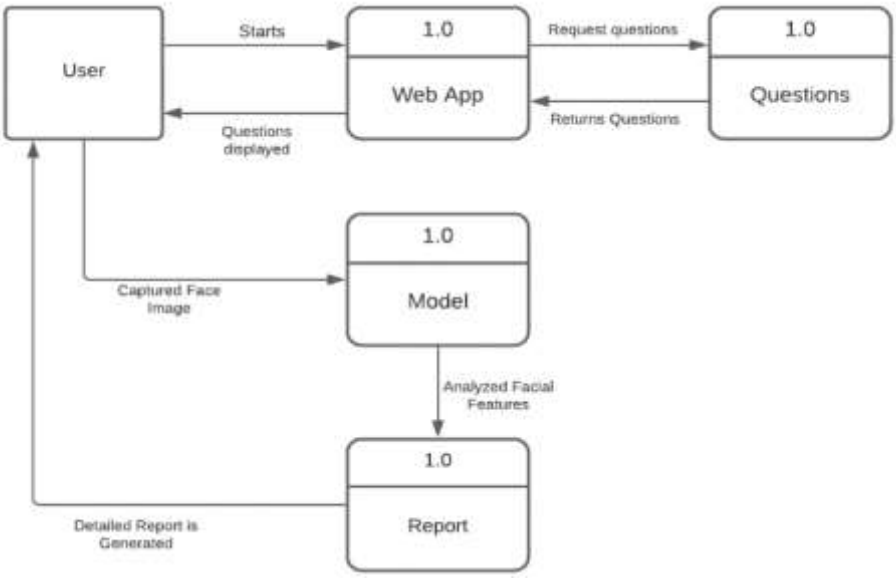
ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

C. Data flow diagram



V. REQUIREMENTS

A. Functional requirements

The functional requirements for a system describe what the system should do. Those requirements depend on the type of software being developed, the expected users of the software.

- Creation of Web Application for Trait analysis.
- Preparation of questions for analysis and displaying it to user in sequence.
- Facial images capturing when questions are answered.
- Analyzing traits from those images.
- Displaying detailed assessment report.

B. Non-Functional requirements:

Nonfunctional requirements are requirements that are not directly concerned with the specified function delivered by the system. They may relate to emergent system properties such as reliability, response time and store occupancy.

C. HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE

- System : intel i3/i5 2.4 GHz.
- Hard Disk : 500 GB
- Ram : 4/8 GB

SOFTWARE

- Operating system : Windows XP / Above
- Software Tool : Open CV Python
- Coding Language : Python

VI. RESULT

The main objective of this project is to design an efficient and accurate algorithm that would detect behavior analysis of the interview attending candidate, behavior detection of the candidate. Helps for the candidates who are unable to attend the interview on the company location. It saves the man power and time of the interviewer. For the face detection to work efficiently, we need to provide an input image which should not be blur or printed. We have used algorithm that is used for face detection and facial feature extraction. The system automatically generates the questionnaire when person present in front of the computer and it will detect the personality of the person based on the way of answering of the questions by the person. Feedback will be generated automatically and sent to the interviewer's mail. Real time analysis and probability representation of data.

IJIREEICE

ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

International Journal of Innovative Research in
Electrical, Electronics, Instrumentation and Control Engineering

Vol. 9, Issue 7, July 2021

DOI 10.17148/IJIREEICE.2021.9713

VII. CONCLUSION

We propose a stress recognition algorithm using face images and face landmarks. As a result of the experiment, we confirmed that the stress recognition performance was further improved when using facial landmarks. Facial landmarks are better at perceiving stress because they allow you to better understand eye, mouth, and head movements. We also found that the performance was improved by better identifying stress-related information when using a gray face image of the appropriate size.

Future research plans are to improve the performance of stress recognition by using eye, mouth and head motion information from the time axis.

REFERENCES

[1]. Sriramprakash S., Prasanna, V. D., & Murthy, O. R. (2017). Stress detection in working people. Procedia computer science, 115, 359-366.
[2]. Mohd, M. N. H., Kashima, M., Sato, K., & Watanabe, M. (2015). Mental stress recognition based on non-invasive and non-contact measurement from stereo thermal and visible sensors. International Journal of Affective Engineering, 14(1), 9-17.
[3]. Prasetio, B. H., Tamura, H., &Tanno, K. (2018, May). Support Vector Slant Binary Tree Architecture for Facial Stress Recognition Based on Gabor and HOG Feature. In 2018 International Workshop on Big Data and Information Security (IWBIS) (pp. 63-68). IEEE.
[4]. Zhang, K., Zhang, Z., Li, Z., &Qiao, Y. (2016). Joint face detection and alignment using multitask cascaded convolutional networks. IEEE Signal Processing Letters, 23(10), 1499-1503.
[5]. Kazemi, V., & Sullivan, J. (2014). One millisecond face alignment with an ensemble of regression trees. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 1867-1874).

