



Recognition of Facial Expression Using Convolutional Neural Network

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ABSTRACT

Many researchers are interested in improving the learning environment with Face Emotion Recognition (FER). Facial Emotion Recognition System (FERS), which recognizes the emotional states and motivation of students in videoconference type e-learning. The system uses 4 machine learning algorithms (SVM, KNN, Random Forest and Classification & Regression Trees) and the best accuracy rates were obtained using KNN and SVM algorithms. Kim et al. proposed a system which is able of producing real-time recommendation to the teacher in order to enhance the memorability and the quality of their lecture by granting the teacher to make modification in real-time to their non-verbal behavior like body language and facial expressions. The approach uses K-nearest neighbor (KNN) for classification and Uniform Local Gabor Binary Pattern Histogram Sequence (ULGBPHS) for pattern analysis. Savva et al. proposed a web application that performs an analysis of students' emotion who participating in active face-to-face classroom instruction.

Keywords – Student Facial expression, Emotion recognition, convolutional neural networks (CNN)

1. INTRODUCTION

Individual human being [1]. The silence of it conveys a wealth of feeling. Human activity and character traits are reflected in a person's facial expressions, which can be identified using facial expression recognition. Ekman and Friesen [2] of the United States established a set of six universal emotions (anger, fear, disgust, sadness, surprise, and happiness) in the twentieth century. In recent years, facial expression recognition has gained a lot of attention due to its potential applications in clinical practise, social robotics, and education. Multiple studies have pointed to the significance of emotional intelligence in the classroom. As it stands, a teacher's feedback options consist primarily of exams, questionnaires, and classroom observations; however, these traditional methods have a low efficiency rate. To better encourage student learning, teachers can use students' facial expressions to modify their teaching approach and course materials. The goal of this article is to apply Convolutional Neural Network (CNN), a popular deep learning algorithm for image classification, to the task of implementing emotion recognition in the classroom. The system will automatically analyse students' facial expressions. The process involves several steps of image processing to derive feature representations. Each of the seven basic emotions—neutral, anger, fear, sadness, happiness, surprise, and disgust—are covered across our system's three stages: face detection, normalisation, and emotion recognition.

1.1 MOTIVATION

Many researchers are interested in improving the learning environment with Face Emotion Recognition (FER). Tang et al. [3] proposed a system which is able to analyze students' facial expressions in order to evaluate classroom teaching effect. The system is composed of five phases: data acquisition, face detection, face recognition, facial expression recognition and post-processing. The approach uses K-nearest neighbor (KNN) for classification and Uniform Local Gabor Binary Pattern Histogram Sequence (ULGBPHS) for pattern analysis. Savva et al. [4] proposed a web application that performs an analysis of students' emotion who participating in active face-to-face classroom instruction. The application uses webcams that are installed in classrooms to collect live recordings, then they applied machine learning algorithms on its.

1.2 Existing System

the authors proposed a system that identifies and monitors student's emotion and gives feedback in real-time in order to improve the e-learning environment for a greater content delivery. The system uses moving pattern of eyes and head to deduce relevant information to understand students' mood in an e-learning environment. Ayvaz et al. [8] developed a Facial Emotion Recognition System (FERS), which recognizes the emotional states and motivation of students in videoconference type e-learning. The system uses 4 machine learning algorithms (SVM, KNN, Random Forest and Classification & Regression Trees) and the best accuracy rates were obtained using KNN and SVM algorithms. Kim et al. [9] proposed a system which is able of producing real-time recommendation to the teacher in order to enhance the memorability and the quality of their lecture by granting the teacher to make modification in real-time to their non-verbal behavior like body language and facial expressions. The authors in [10] proposed a model that recognizes emotion in virtual learning environment based on facial emotion recognition with Haar Cascades method [14] to identify mouth and eyes on JAFF

database in order to detect emotions. In [11] Chiou et al. used wireless sensor network technology to create an intelligent classroom management system that aids teachers to modify instruction modes rapidly to avert wasting of time

1.2.1 Limitations of existing system

No proper prediction of emotion is not high accuracy

1.3 Objectives

The major objective is **Facial Emotion Recognition of Students using Convolutional Neural Network**

1.4 Outcomes

The proposed model achieved an accuracy rate of 70% on FER 2013 database. Our facial expression recognition system can help the teacher to recognize students' comprehension towards his presentation.

1.5 Applications

In colleges and other institutions can use this application

2. RELATED WORK

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3. IMPLEMENTATION

The Implementation is Phase where we endeavor to give the practical output of the work done in designing stage and most of Coding in Business logic lay comes into action in this stage its main and crucial part of the project

REQUISITES ACCUMULATING AND ANALYSIS

It's the first and foremost stage of the any project as our is a an academic leave for requisites amassing we followed of IEEE Journals and Amassed so many IEEE Relegated papers and final culled a Paper designated "Individual web revisitation by setting and substance importance input and for analysis stage we took referees from the paper and did literature survey of some papers and amassed all the Requisites of the project in this stage

SYSTEM DESIGN

In System Design has divided into three types like GUI Designing, UML Designing with avails in development of project in facile way with different actor and its utilizer case by utilizer case diagram, flow of the project utilizing sequence, Class diagram gives information about different class in the project with methods that have to be utilized in the project if comes to our project our UML Will utilizable in this way The third and post import for the project in system design is Data base design where we endeavor to design data base predicated on the number of modules in our project

IMPLEMENTATION

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1.6.4 TESTING UNIT TESTING

It is done by the developer itself in every stage of the project and fine-tuning the bug and module predicated additionally done by the developer only here we are going to solve all the runtime errors

MANUAL TESTING

As our Project is academic Leave, we can do any automatic testing so we follow manual testing by endeavor and error methods

DEPLOYMENT OF SYSTEM AND MAINTENANCE

Once the project is total yare, we will come to deployment of client system in genuinely world as its academic leave we did deployment i our college lab only with all need Software's with having Windows OS .

The Maintenance of our Project is one-time process only

4. LIST OF MODULES

Tensor flow:

Open-source dataflow and differentiable programming framework TensorFlow is available for a wide range of activities.

Numpy:

A general-purpose array-processing toolkit, Numpy is available. High-performance multidimensional array objects and tools for interacting with these arrays are provided

Pandas:

Pandas is an open-source Python library that provides strong data structures for data manipulation and analysis. Python was primarily utilised for data manipulation and prepping. It made a tiny dent in the data analysis process. This was a problem that Pandas solved. Data processing and analysis typically involves five steps: load, prepare, modify, model, and analyse, all of which may be accomplished with Pandas. Python and Pandas are widely utilised in a variety of sectors, including finance, economics, statistics, and analytic applications..

Matplotlib:

Mathematica's Matplotlib is a Python 2D plotting toolkit that produces publication-quality figures in a wide range of hardcopy formats and interactive settings across platforms.

Scikit – learn:

Scikit-learn provides a standard Python interface for a variety of supervised and unsupervised learning techniques

5. Existing System

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6. PROPOSED SYSTEM

Uing Convolutional Neural Network (CNN) architecture, we describe our proposed system to analyse students' facial expressions. The system first extracts faces from the input image, which are then cropped and normalised to a 48x48 pixel resolution. The facial photos are then fed into a convolutional neural network. After all of this processing, the results of facial expression recognition are output (anger, happiness, sadness, disgust, surprise or neutral).

7. RESULTS AND DISCUSSIONS



Facial emotion recognition

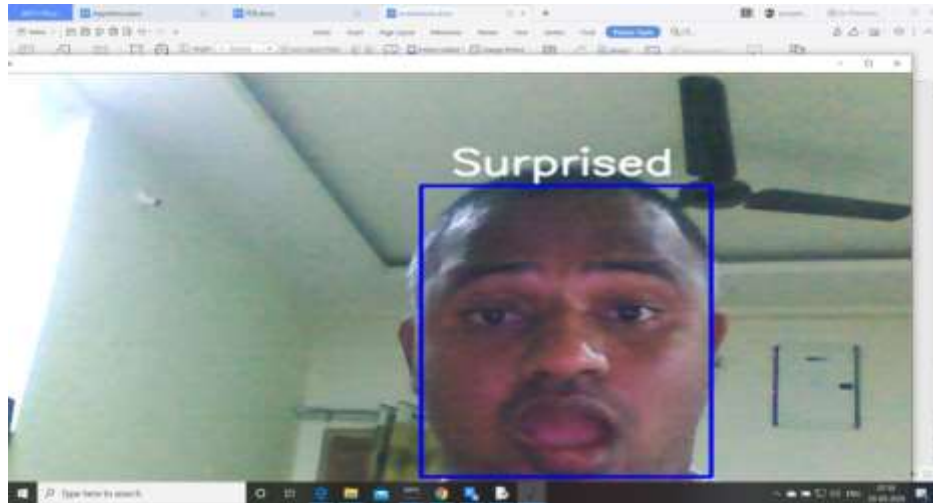
Facial expression detection

Above screen will be opened.

Now click on facial Expression detection

Which will open live capture using opencv





8. CONCLUSION

Here, we introduced a Convolutional Neural Network model for identifying students' emotions from their faces. Four convolutional layers, four max pooling layers, and two fully connected layers make up the proposed model. Images taken by students are fed into a system that uses a Haar-like detector to identify faces and assigns one of seven possible emotions to each one: surprise, fear, disgust, sadness, happiness, anger, or neutral. On the FER 2013 database, the proposed model attained an accuracy of 70%. A teacher's ability to gauge his or her students' level of engagement with a topic or topic area is greatly enhanced by our facial expression recognition system.

Therefore, the Convolutional Neural Network model will be central to our future efforts.

9. REFERENCES

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