



AUTOMATIC DETECTION OF EMOTION THROUGH TEXT COMMANDS AND FACIAL EXPRESSIONS

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Abstract – Sentiment analysis is a concept or a technique which is used to recognize attitudes and feelings of the people towards actions or subjects. Emotion detection is a process of sentiment analysis that predicts the exceptional emotion rather than just stating positive, neutral or negative. Most of the researchers have already previously worked on speech & facial expressions for emotion recognition. Though, emotion detection in text is a complex task as parameters like tonal stress, pitch available with speech those are missing in text. To identify the emotions from the text, several methods have been using natural language processing (NLP) techniques such as the keyword approach, machine learning approach & lexicon-based approach. Yet there are some boundaries with keywords and lexicon-based approaches as they try to focus on the semantic relations. This research work aims to prepare a survey of various ML techniques which help in the detection and analysis of emotion. In this research work, we tend to go with planned hybrid model to identify emotions in text commands as well as facial expressions.

Keywords: Sentiment analysis, Machine learning, Deep learning, Convolutional neural network.

1. Introduction

A software approach called "emotion reputation" enables a program to "examine" the emotions on a person's face by employing cutting-edge photo manipulation. Businesses have been experimenting with a combination of cutting-edge formulation and picture processing techniques that have emerged in the last decade to learn more about what a video or photo of a person's

face can tell us about how they may be feeling. In addition to picking up on the first facial expressions of emotions like joy, sorrow, surprise, anger, etc., emotion detection software can also pick up on what experts refer to as "micro-expressions" or constrained as cues of frame language, which could reveal a person emotions without that person being aware of it.

Additionally, some kind of forms the facial popularity technology & bio-metric-photo identification share the same viewpoint as emotion popularity. These technologies can be used in a variety of safety scenarios. For instance, the government may employ emotion popularity software to supplement its efforts to learn more about a person at some undefined point in future during an interview or interrogation. Emotion detection continues as the advance on par with other advancements, such as natural language processing. These signs and symptoms of development are primarily probably caused by the blending of ever more powerful processors, medical advancement of complex algorithms, & other related based technology.

2. Literature Review

In paper [1], The deep convolutional neural network (CNN) architecture suggested in this study can recognize multimodal emotions from both facial expressions and written commands. It has explained that face detection from text as well face detection has the optimistic result where there is a combination of both the detection.

In paper [2], The authors examine numerous approaches and algorithms for automated emotion detection from facial expressions and analyze the significance of facial expressions in emotion recognition. In this Ekman et al, tried to explain the significance of the various algorithms and methods for the face detection complex. It also explains the adaptability for the algorithms used and

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as well as the capability to detect the detection challenges.

In paper [3], This review article gives a summary of recent developments in automatic emotion recognition, including approaches based on multimodal approaches, textual analysis, and facial expressions. Liu et al, tried to explained the deepness of the Face Detection using multiple approaches according to the problems and maximum parameters. Majorly, this paper tells us about the various atmosphere where face detection is usually possible in many formats.

In paper [4], The paper gives a thorough analysis of methods for machine learning and deep learning-based automatic emotion identification from textual data. This paper states the various techniques used for Emotion Detection with respect to textual data, Deep learning & as well as Machine Learning. Yang et al, basically tried to explain about the techniques usually used for face detection.

In paper [5], This groundbreaking study introduces the idea of affective computing and explores the difficulties and potential uses of automated emotion recognition, including the examination of textual and facial expressions. Picard, researched about the computing where it faces the challenges and problems in automated emotion detection and tries to solve the upcoming challenges as well where it was also including the betterment for the emotion recognition.

In paper [6], Hazarika et al, tried to accurately identify emotions in conversational data, the authors suggest a recurrent neural network (RNN) design that combines textual and audio elements. By using the methods for detection of emotion and by using RNN, author have tried the different method to involve in the emotion detection through face detection. Author also tried to identify the flexibility of the neural network through which it might easier for the emotion detection.

In paper [7], Shan et al, tried to implement thorough examination of numerous facial expression recognition techniques and algorithms, including feature extraction methods and classification models, is provided in this survey study. In this paper, authors main focus is to involve the extraction methods with help of classification models for examining the techniques which will be used for the expression recognition.

3. Purpose

- In graphic user interfaces (GUI), which are shown to users as icons on the screen, elements like buttons, menus, and documents can be manipulated in ways that are comparable to how they are manipulated in a physical workspace.
- Target locating is the first and most important step in using a GUI; visually impaired users can quickly and naturally identify the target object. However, this straightforward task is frequently exceedingly challenging to complete without visual access to the screen.

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- To control, there is a need for applications that use facial expression recognition and emotion detection from text commands.

4. Feasibility Study

A study of the environment and the risks associated with the project's development are both necessary for the feasibility study that was engaged in the project's conception. To ensure prompt component delivery and the creation of a workable solution, proper estimation must be carried out.

- i. Financial viability
- ii. Technical viability
- iii. Litigation viability

1. Financial viability

In comparison to comparable hardware projects, the cost of the software is low.

2. Technical viability

When compared to hardware projects, software projects have a lower risk of failure.

3. Litigation viability

Legal viability exists for Automatic Detection of Emotions using Text Commands and Facial Expression because all components were given legally by the business owners.

5. Proposed System

The system architecture is briefly depicted in the accompanying image. The proposed

system is briefly depicted in the accompanying figure.

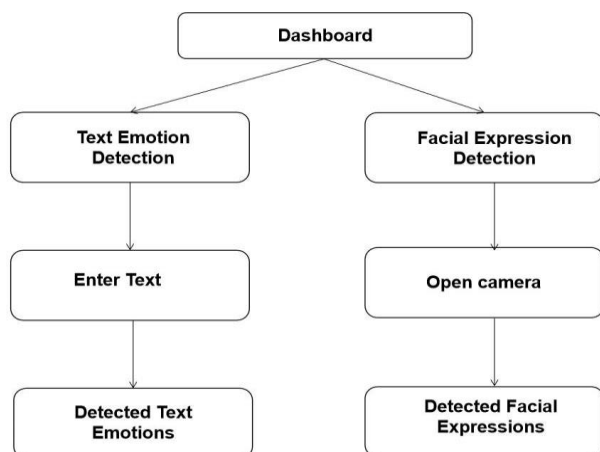


Fig 1. Architecture of Emotion Detection System

Language Processing

The automated method of the text analysis which is actually known as "natural language processing" (NLP) is based on a number of theories & technologies. It focuses on the interactions between human languages and computer systems.

NLP has two major methods of analysis

1. Pattern matching technique or Keyword Analysis.
2. Syntactic parsing technique.

Semantic Analysis

Semantics, understood as the study of meaning, includes the most difficult undertakings, such as: Finding synonyms, separating word meanings, creating a question-and-answer

Section A-Research paper system, translating from one NL to another, and building a knowledge base.

REAL TIME DIAGRAM

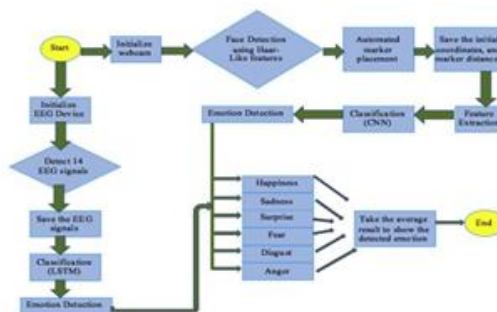


Fig 2. Real time Diagram of Automate Detection of Emotions through Text Commands and Facial Expression.

BLOCK DIAGRAM

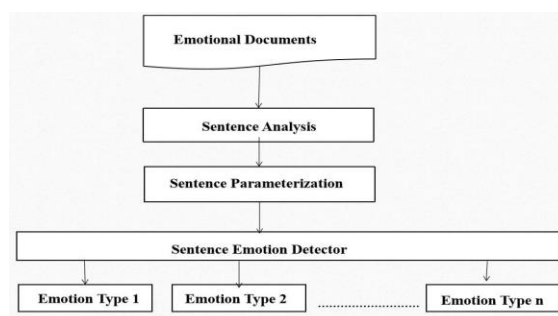


Fig. 3 Block Diagram of Emotion Detection Through Text

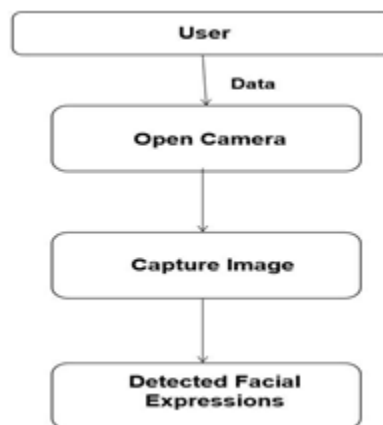
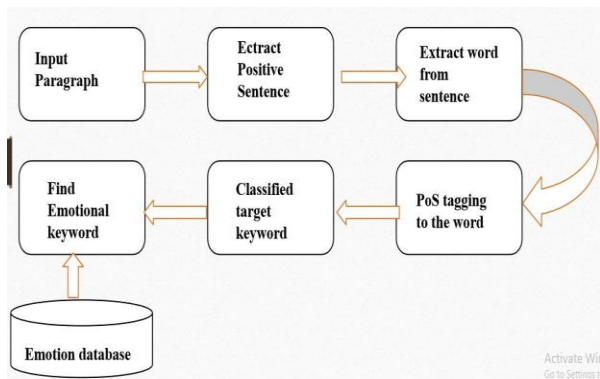


Fig. 4 Block Diagram of Emotion Detection Through Facial expression



Emotion Estimation

Emotion detection is modeled such as the classification problem where only one or more than one nominal labels are assigned to a sentence from a particular proof of target emotion labels.

Our emotions detection framework which contains to mail models.

- i. Word- processing model
- ii. Sentence Analysis

1. Word Processing Model

Word processing is the name given to the process of using a computer to create, edit, save, and print documents. To carry out word processing, specialized software, often

Section A-Research paper known as a word processor, is necessary.

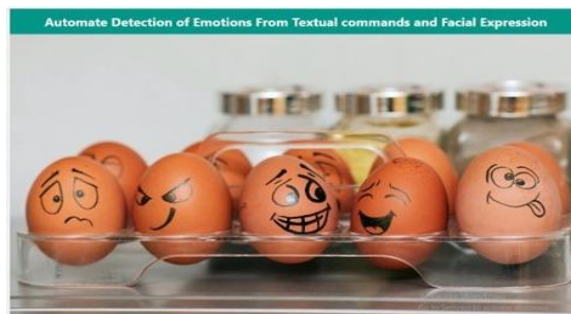


Fig. 5 Word Processing Model

2. Sentence Analysis

In this sentence analysis module, the main aim is to detect the emotion from a particular sentence where it don't have any emotional keyword in the sentence. For third purpose, we examine different categories of sentence.

Algorithm:

CNN-Algorithm
(Convolutional-Neural Network):

It is a particular type of network design for deep learning algorithms that is utilized for tasks like image recognition and deep data processing. Although there are different kinds of neural networks in deep learning, CNNs are the referred network architecture for recognizing and recognizing objects.

NLP-Algorithm
(Natural-Language-Processing):

Machine learning algorithms are frequently the foundation of NLP algorithms. NLP can use machine learning to automatically learn these rules by analyzing a group of samples

and drawing a static based conclusion, rather than manually coding sets of rules.

7. Results

Fig. 5 Home Page

Fig. 6 User Details to be filled



Fig. 7 Face Detection of emotion

8. Conclusion

This research work offers significant insight on artificial intelligence-based live

Section A-Research paper approaches to emotion discovery that are anchored in textbooks. It also symbolizes the datasets that are currently accessible in this exploring sphere. The research serve as a significant foundation for it. This paper will assist experimenters in learning about the most common authors, the sources of publications, the most widely referenced publications, etc. The experimenters' ability

to choose future destinations in the exploration sphere will be aided by keyword situation. The difficulties and directions for the future have mostly been discussed. New datasets are needed for more delicate emotion finding tasks. To address specialized conditions, sphere adaptation techniques are required, much like a big quantum of labelled data.

To improve the validity of being systems, deep literacy and collaborative approaches must be applied. The exploration research should eventually incorporate new techniques to reduce computing expenses and boost performance. Artificial intelligence used to uncover emotions that are anchored in textbooks must continue to be a topic of interest and draw more research, leading to the publication of more research papers that will improve our comprehension of this material and facilitate its application for global operatio

9. References

1. Deep Convolutional Neural Networks for facial expression recognition
DOI:10.1109/INISTA.2017.8001188 Conference: 2017 IEEE International Conference on INISTA, by Ayşegül Uçar (July 2017).
2. The Applications of Facial Expression Recognition in Human-computer Interaction
DOI:10.1109/AMCON.2018.8614755 Conference: 2018 IEEE International Conference on Advanced Manufacturing (ICAM), by Huan-Huan Wang (November 2018).
3. Emotion Recognition in the Wild: A Survey by Liu et al. (2019) A Survey on Automatic Multimodal Emotion Recognition in the Wild DOI:10.1007/978-3-030-51870-7_3 by Garima Sharma (January 2021).
4. Emotion Recognition from Text Based on Automatically Generated RulesConference: Proceedings of the 4th IEEE ICDM workshop on Sentiment Elicitation from Natural Text for Information Retrieval and Extraction (SENTIRE 2014)At: Shenzhen, China by Wassim El-Hajj (December 2014).
5. Affective Computing: A Review by Tao, J., Tan, T., Picard, R.W. (eds) Affective Computing and Intelligent Interaction. ACII 2005. (2005).
6. Emotion Recognition in Conversations with Recurrent Neural Networks by Hazarika et al. (2018) Conversational Memory Network for Emotion Recognition in Dyadic Dialogue Videos by Devamanyu Hazarika, Soujanya Poria, Amir Zadeh, Erik Cambria, Louis-Philippe Morency, and Roger Zimmermann. (2018).
7. Facial Expression Recognition: A Survey : Wang College of Computer, National University of Defense Technology, Changsha 410073, China Published: 20 September 2019 by Yunxin HuangORCID,Fei Chen,Shaohe Lv andXiaodong (2019).
8. A Survey of Multimodal Sentiment Analysis by Mohammad Soleymani, David Garcia, Brendan Jou, Björn Schuller, Shih-Fu Chang, Maja Pantic, (2017).
9. Text-based emotion detection: Developments, Issues, and Possibilities, Henry Nunoo-Mensah, Acheampong, Chen Wenyu, Francisca Adoma Citations: 20 First published: May 28, 2020.
10. <https://towardsdatascience.com/text2emotion-python-package-to-detect-emotions-from-textual-data-b2e7b7ce1153>
11. Facial expression and emotion. American Psychologist, 48(4), 384–392. <https://doi.org/10.1037/0003-066X.48.4.384> by Ekman, P. (1993).

12. Rachael E. Jack, Oliver G.B. Garrod, and Philippe G. Schyns, "Dynamic Facial Expressions of Emotion Transmit an Evolving Hierarchy of Signals over Time." *Current Biology*, January 20, 2014, Volume 24, Issue 2, pages 187–192.
13. *Sentiment Analysis Algorithms and Applications: A Survey*, by Walaa Medhat, Ahmed Hassan, and Hoda Korashy. 2014, p. 1093–1113, *Ain Shams Engineering Journal*, number 5.
14. Text-based emotion recognition article cited as: V V Ramalingam et al 2018 *J. Phys.: Conf. Ser.* 1000 012027
15. N. Fragopanagos and J.G. Taylor, Emotion recognition in human-computer interaction, Department Mathematics, King's College, Strand, London, WC2 R2LS, UK *Neural Networks* 18 (2005) 389–405 March 2005.
16. Z. Teng, F. Ren, and S. Kuroiwa, "Recognition of Emotion with SVMs," in *Lecture Notes of Artificial Intelligence* 4114, D.-S. Huang, K. Li, and G. W. Irwin, Eds. Springer, Berlin Heidelberg, 2006, pp. 701-710, doi: 10.1007/11816171_87.
17. <https://medium.com/@ParallelDots/emotion-detection-using-machine-learning-706ddcea1>