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A Review on Mental Health Tracker using Machine Learning

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Abstract: *The major thing of this study is to use pictorial Machine Learning and Image Processing styles to identify internal health in the mortal body. Our system is an upgraded interpretation of former internal health discovery systems that did n't include live discovery or particular comforting, but this system includes live discovery and periodic analysis of workers, as well as detecting physical and internal health situations in them and furnishing proper internal health operation remedies via a check form. Our system is primarily concentrated on internal health operation and creating healthy and robotic work terrain for workers in order to get the most out of them during working hours.*

Keywords: Facial Expressions, K Nearest Neighbour Classifier, Mental health, Mental Health Prediction

I. INTRODUCTION

In the modern world, mental health is a common phenomenon that influences people's responses to various events, including changes in behaviour and physiology.

However, if we focus on internal wellness for too long, it will affect our bodies. Early detection of internal health helps prevent many of the health conditions linked to it. One can see a pattern when an individual is in good internal condition. A commodity that affects our lives is mental health. There are many factors that put strain on us in our daily lives. A person's internal health may be influenced by their mortal surroundings, such as their home, workplace, or society. Palmer defines mental health as a complex cerebral and behavioural situation in which an individual's.

II. LITERATURE SURVEY

Sr No	Paper Title	Year	Author	Pros	Cons
1	An Emotional Feedback Based on Facial Action Coding System for MOOCs with Computer-Based Assessment	2022	Mohamed Soltani ; Hafed Zarzour ; Mohamed Chaouki Babahenini ; Mahmoud Hammad ; Mohammad	An innovative emotional feedback system based on facial action coding (FACS). The FACS system, which generates emotional feedback, is part of the Face Reader tool. based on a few clearly stated didactic guidelines.	It simply uses facial recognition to evaluate learners' mood and level of interest.
2	Emotion Sense: Real-time Emotional Feedback from the Audience	2021	Andrada-Denisa Farcas ; Anca Marginean	Using a Convolutional Neural Network (CNN) to recognize facial expressions, the accuracy is increased by 71.162% by substituting linear SVM for softmax.	Using a pre-trained model makes it challenging to identify an appropriate parameter combination and a

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					balanced network size.
3	Emotion Detection and Characterization using Facial Features	2021	Charvi Jain ; Kshitij Sawant ; Mohammed Rehman ; Rajesh Kumar	The Support Vector Machine (SVM) method aids in the recognition of essential emotions. The Viola Jones method is used to identify the person's face and other features in the input image.	Using SVM only does not produce as accurate predictions as using a HOG filter prior to classification. Without the HOG transform, this occurs because there are no distinguishing features.
4	Facial emotion recognition	2020	Ma Xiaoxi ; Lin Weise ; Huang Dongyan ; Dong Minghui ; Haizhou Li	Deep Boltzmann Machine (DBM) and Support Vector Machine (SVM) are used to recognize facial emotions. The system's performance is enhanced by applying a straightforward fusion technique $s(t) = \sum_{i=1}^{l} \propto_i * s_i(t)$	Compared to other AUs, some do significantly worse in experiments. Because the dataset distribution is so uneven and the frame samples are chosen at random from every video frame, learning from the entire dataset is not possible.
5	Real-time emotions recognition system	2016	Vinícius Silva ; Filomena Soares ; João S. Esteves ; Joana Figueiredo ; Celina P. Leão	Intel RealSense 3D and SVM are used to create embedded systems and come with libraries that can recognize emotions and facial expressions.	Because of RealSense's progress, some expressions are not available while others are identified with limited accuracy.
6	Facial expression recognition using LBP and LPQ based on Gabor wavelet transform	2016	Borui Zhang;Guangyuan Liu;Guoqiang Xie	Multi-class SVM classifiers using the Japanese female facial expression (JAFFE) database perform the classification. The accuracy of Gabor, LBP, LQ, PCA-LDA, and SVM is 98.57%.	When applied to damaged photos, the suggested strategy significantly lowers both the identification rate and accuracy.

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7	An emotional feedback system based on a regulation process model for happiness improvement	2015	Yu-Heng Hung ; Yang-Yen Ou ; Ta-Wen Kuan ; Chin-Hui Cheng ; Jhing-Fa Wang ;´	By extracting useful information from users' social network content, the IERS evaluates users' emotional variations and semantic reflections on the regulation process model with the goal of providing users with relevant feedback.	Seven-type emotion recognition has a 50% accuracy rate and is limited to facial expression identification. .
8	Online facial expression recognition based on combining texture and geometric information	2014	Ching-Hua Weng;Shang-Hong Lai	This online facial expression recognition system can automatically identify the beginning and the end of a face's emotion from a video by using texture and motion information that have been taken from the video.	In order to apply the algorithm, the experiment always requires a video; live sessions will not work.
9	Automated Alertness and Emotion Detection for Empathic Feedback during e-Learning	2013	S. L. Happy ; Anirban Dasgupta ; Priyadarshi Patnaik ; Aurobinda Routray	Through adequate communication and feedback, the system utilizes oscular parameters like PERCLOS and saccadic parameters to classify the user's emotion and alertness level. It also analyzes facial expressions to determine the user's emotional state.	The technology is insufficient because it can only analyze one face and generate one piece of data in the database at a time.
10	Comprehensive database for facial expression analysis	2000	T. Kanade, J. F. Cohn, and Y. Tian	Comparative studies of facial expression analysis are conducted using the CMU-Pittsburgh AU-Coded Facial Expression Image Database.	It can be tough to determine the accuracy of description, the transitions between expressions, and the differences between intentional and spontaneous expressions.

III. SYSTEM ARCHITECTURE

The system architecture and flow of the project are shown in the image below. The input is first pre-processed after being processed as text. A feature vector is generated out of that text with the help of a the dictionary. A mental health analysis is then carried out after an image is captured using a camera feed.

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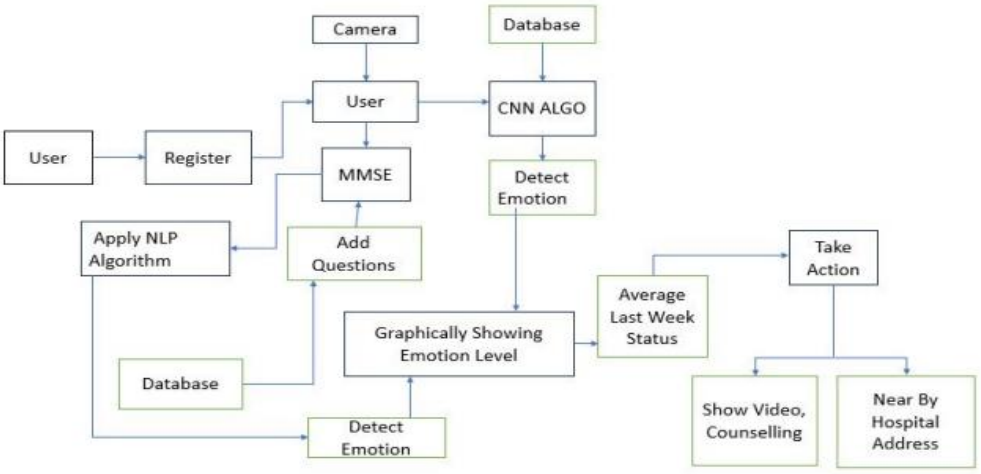

Fig 1. System Architecture

This architecture represents an emotion detection and mental health monitoring system.

- **User Registration:** Users enter their personal information to register for the system, and a database contains their data.
- **Questionnaire (MMSE):** To evaluate cognitive function, users may take the Mini-Mental State Examination (MMSE) upon registration.
- **Camera & CNN-based Emotion Detection:** Convolutional Neural Network (CNN) algorithms are used to analyze user photos taken by a camera in order to identify emotions.
- **NLP Analysis:** User answers to extra questions are examined using Natural Language Processing (NLP).
- **Emotion Detection:** Both CNN and NLP analysis record any emotions that are identified.
- **Graphical Display & Analysis:** An average emotional status over the previous week is computed, and the observed emotion levels are graphically shown.
- **Taking Action:** The system may display counselling videos or give information on local hospital addresses for more assistance, depending on the user's emotional state.

System Modules:

1. Registration:

The user will provide personal data to register such as gender, age, etc.

2. Graphical Representation:

A graphical representation of the data will be shown.

3. Display Result:

The outcome will be shown as a PDF.

4. Suggestions:

Algorithm

1. Raw data set: 4 columns (mental health Y/N) and 40,000 sentences

2. Pre-processing of data: Regular expressions and symbols are eliminated using the're' library. Lemmas are removed (Lexicon Normalization) using NLTK's WordNetLemmatizer. Elimination of multi-letter ambiguities: "noooo" is changed to "no."Eliminatingstop words resulted in a drop in both overall accuracy and the f1-score.

3. Word Dictionary: A dictionary contains a list of words.

4. Vectorization is completed in Word2Vec.

Words are vectorized, with each vector denoting a mental health category.

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5. Training Model: CNN

The system is trained using CNN, after which it makes predictions about mental health.

6. Natural Language Processing (NLP):

Enables computers to comprehend spoken and written human language in order to analyze text, derive meaning, identify patterns, and produce new material.

IV. FUTURE SCOPE

1. Based on the text written on paper, we will introduce a feature that can also determine the user's mental health.
2. An organization can utilize this initiative to determine whether its personnel are happy with their jobs or in good mental health. Colleges can also utilize it to learn about students' mental health.

V. CONCLUSION

The Tension Detection System is safe since it keeps track of approved users' photos to predict their mental health. The photo is automatically taken based on a time interval after the authenticated user checks in. The obtained images are used to assess the user's mental health based on a few standard conversion and image processing procedures. The technology will then examine the mental health levels using machine learning algorithms, producing more effective results.

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