

## AN EMPIRICAL SYSTEM FOR RISK ASSESSMENT OF MENTAL ILLNESS DISORDERS USING NEURAL NETWORK DIAGNOSTIC

Ayushi Rajshekhar\*<sup>1</sup>, Himanshika Purwar\*<sup>2</sup>

\*<sup>1</sup>Electrical And Electronics Engineering, National Institute Of Technology Mizoram, Mizoram, India.

\*<sup>2</sup>Computer Science And Engineering, National Institute Of Technology Mizoram, Mizoram, India.

### ABSTRACT

Mental Disorder is a psychological factor that is displayed through a person's behaviour, it affects a person's normal development of personality. It is not restricted to one country or region, in today's world where life is equal to stress and problems, mental disorder is very common and is found in all countries and regions. Personality disorder emerge in a person's childhood and occurs for a short period of time and are resolved in short period of time, it has its connection to the brain and nervous system of a person. In the 5-year study that was conducted from 2005 to 2010, it was shown that mood-disorder was the most common mental disorder followed by behavioural disorder to become the next major mental disorder. Counselling and regular healthy exercise might be the ways to improve and prevent mental disorders. The effort everyone can make is to open clinics and help centres with helpline numbers to aid such people and help them to a healthy life because healthy body comes only with a healthy mind and with a healthy mind and behaviour anyone could achieve anything he or she wants. Finally, the main aim of the paper is to find the best optimal solution among the neural networks and the best case turned out to be CNN among DNN, ANN and CNN.

**Keywords:** CNN, Mental Illness Disorder, Deep Learning Techniques, Neural Network Diagnostic.

### I. INTRODUCTION

Mental illness is becoming one of the major public health problems in today's world. With the boom of internet and networking social media platforms where people can express their emotions and feelings, have become large sources to gather data and information to further research on the topic. Because the era of social media has only just begun, the future holds a lot of promise for mental health research. Researchers will be able to study mental health using physical symptoms and physical movements via smart devices, such as smartphones, which may be able to record heart patterns, sleep activity, and movements via social media platforms. They concluded that mental disorders are increasing every year and this is a very concerning topic and problem since in today's era where the youth is very important part of the society, if they have such common mental disorders which hinders their personality and behaviour the question arises how can they lead the country and society when the kingdom comes.

### II. LITERATURE OVERVIEW

The social media platforms have taken over the world in the last few years and in today's world everyone has these social platforms in their phones or PCs. People can create their profile, update their status, upload pictures or videos in these social media platforms. They can also interact with other people too and these interactions with other people results in expression of their emotions and feelings making these social media platforms a perfect resource to gather data for research on mental health disorders. The main purpose of this research was to extract information on how to deal with the mental health disorders in today world. The major part of this study goes to text-analysis and minor goes to image/video-analysis using machine-learning and various predictive models. The future holds so much on mental health disorder because the era of social media has just started and in future the researchers could research on mental health using physical symptoms and physical movements using smart devices, mobile phones which might be able to record heart pattern, sleep activity, movements through social media platforms. The researchers are paying special attention to mental health disorders and related topics through social media, but they should also keep in concern the ethical rules regarding data privacy of users[1].The purpose of this research is to get the mental well-being of university students using bibliometric methods. The major finding researchers got from this study is that the mental instability between students has grown in last decade especially since 2010.The entrance in college or university marks a new beginning in a student's life. They get to experience new environment, they take

independent decisions about their life, they become more mature on how to interact with wide diversity of other people, many of them leave their hometown for the first time and distance themselves from the support pillars of their life i.e., their parents. All these changes in addition with completely new environment and new responsibilities sometimes may result in affecting their mental health. Bad mental health may interrupt their studies and although the mental health decrease eventually as their studies goes on but it rarely ever returns to their pre-university levels. When we talk about mental health of university students how can we forget the word 'depression', as it is one of the most common words in this era especially regarding the students as they often get trapped in the dark web of depression, the poor mental health has gotten prevalent in the last decade making university students one of the most vulnerable populations. Studies show that the poor mental health peaks at age 25 in students and may result in disruption in performance in academic and corporate life. This study shows several issues that are hindering student's performance in their academic life and how to deal with it. The study also shows what experience university students go through and how they deal with it keeping their academic activities in-check simultaneously.

### III. METHODOLOGY

#### a. DATA PREPARATION

For starters, the data for research comes from an online social site. Twitter, in this idea, is a massive data storage facility where data is evaluated. The information retrieved from Twitter is categorized into smaller portions for study, and the nature of the tweet is understood and an analysis is performed on it. To figure it out, mental problems are taken into consideration based on the postings of the people's mental emotions on different category posts.

#### b. DATA PREPROCESSING

To extract significant information, levels of mental health obtained by surveys and postings will be aggregated. After that, statistical analysis will be run to find significant connections between levels and traits, which will be used to create prediction models. Predictive models will be trained using deep learning techniques to identify consumers with poor mental health. This sophisticated prediction model will enable us to identify people with poor mental health and present them with interventions (such as health information links and health services) via social media platforms.

#### c. PROPOSED METHOD

While scanning the input  $I$  in terms of its dimensions, the convolution layer (CONV) employs filters that execute convolution operations. The filter size  $FF$  and stride  $SS$  are two of its hyperparameters. The  $OO$  output is known as a feature map or an activation map. The pooling layer (POOL) is a downsampling process that is commonly used after a spatial invariance convolution layer. Max and average pooling, in particular, are specific types of pooling that take the maximum and average value, respectively. The fully connected layer (FC) works with a flattened input, which means that each input is coupled to every neuron. FC layers are frequently found at the end of CNN designs and may be utilized to optimize goals like as class scores if they are present. Deep learning (DL) is revolutionizing industry as deep neural networks (DNNs) trained on real-world data automate decision-making processes. Such tools are increasingly being investigated for challenges in scientific computing, given to the fast growing literature on DNN approximation theory, which shows they can approximate a wide range of functions. Despite this, unlike typical methods in this sector, nothing is known about DNNs from numerical analytic principles. Artificial neural networks (ANN) are computer systems that are based on biological neural networks seen in animal brains. These systems "learn" to execute tasks by looking at examples, rather than being coded with task-specific rules. They may learn to recognize photographs that include cats, for example, by studying sample images that have been manually labelled as "cat" or "no cat" and then using the findings to detect cats in additional images.

### II. EXPERIMENTAL RESULTS

Finally, after executing all the processes, that is utilized to acquire the accuracy of deep learning models that have been employed in the provided procedure. So the authors acquire an accuracy of 90 percent for the artificial neural network, along with a Deep Neural Network with a recall and precision of 92 percent. While

with convolution neural network performed the best amongst all the neural network techniques. The findings may be seen in the image below.

Model Name	Author's Accuracy
ANN	90%
DNN	92%
CNN	95%

**Figure 1:** Accuracy Table

### III. CONCLUSION

After a detailed go throughn the modelling by using the deep learning models such as the artificial neural network, deep neural network and convolutional neural network. After performing each of the models with a epoch of 50 the accuracies have been received and the best accuracy amongst that is of convolutional neural network which outperforms the other two.

### IV. FUTURE WORK

There is a lot of scope for improvement as this can be used by different therapists and the people to get to know if they are facing the problem of mental disorders which can include anxiety, depression etc. Different datasets can be used and tried with different models to prove which model performs the best in the given problem statement.

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