

Detection of Schizophrenia Based on Machine Learning

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Abstract: *Healthcare machine learning analyzes large or complex data sets by simulating human thought processes using machine learning algorithms. A persistent mental condition, schizophrenia affects millions of individuals globally. It is typified by behavioral and cognitive deficits that potentially affect millions of people globally. Cognitive and behavioral deficits that affect the prediction and assessment of existing preventative measures are its defining characteristics.*

I. INTRODUCTION

Schizophrenia is a debilitating mental condition that impacts millions of people worldwide. Its impacts can be severe and distressing for people immediately afflicted, as well as their families and communities. As the condition often results in social isolation, job loss, and interpersonal difficulties, it is imperative to develop effective therapy and support systems. Communities, businesses, and healthcare systems are all significantly impacted by the sickness. Effective therapy and early intervention reduce long-term healthcare costs and support systems in addition to improving individual outcomes.

II. LITERATURE REVIEW

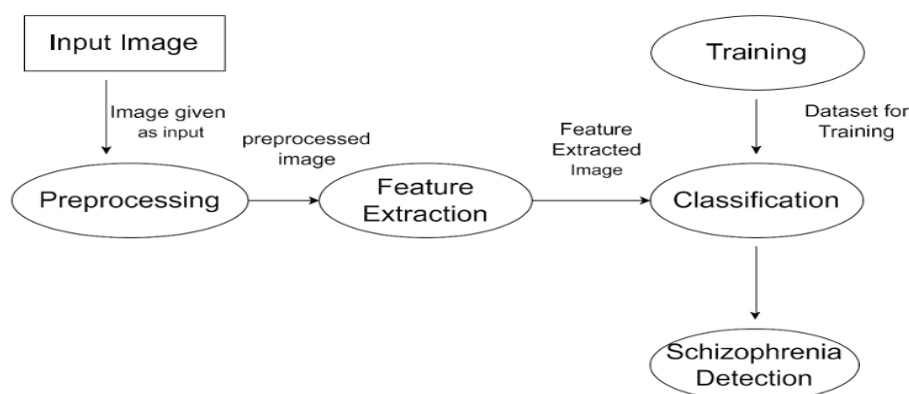
Shim, Midna (2019) Schizophrenia is a severe mental condition that is a major contributor to disability worldwide. However, many schizophrenia cases remain untreated due to social stigma, self-denial, and missing diagnoses. Social media is now used by people with schizophrenia to talk about their mental health problems and find resources for help and therapy.

In addition to linguistic difficulties, schizophrenia is a serious mental illness that presents with both positive (delusions, hallucinations, disordered speech, and confused thinking) and negative (affective flatness, alogia, and avolition) symptoms. Individuals with schizophrenia are more likely to connect with individuals who have experienced comparable circumstances and share their mental health problems because the lifetime suicide rate among persons with the disease is approximately 10%. The signs of schizophrenia, a chronic Schizophrenia is a severe mental condition that is a major contributor to disability worldwide. However, many schizophrenia cases remain untreated due to social stigma, self-denial, and missing diagnoses. Social media is now used by people with schizophrenia to talk about their mental health problems and find resources for help and therapy.

III. PROBLEM STATEMENT

About 24 million people globally, or 1 in 300 persons (0.32%), suffer from schizophrenia. Among adults, this prevalence is 1 in 222, or 0.45%. There isn't a physical or laboratory test for schizophrenia now. A psychiatrist often makes the diagnosis based on clinical symptoms over a six-month period (with one month of active symptoms). It will be easier to combat the issue if we can automate the detection of schizophrenia. Using machine learning techniques to teach a system to learn and then function on its own is one quick method. With this initiative, we hope to increase the detection accuracy and classify patients with schizophrenia more quickly than is now possible.

IV. METHODOLOGY



To distinguish between individuals with and without schizophrenia, this dataset is then utilized to train machine learning models, often supervised learning algorithms. To assess the data and produce predictions, machine learning algorithms such as Support Vector Machine (SVM), Random Forest Classifier (RFC), and XGBoost are commonly employed in schizophrenia detection. These algorithms are particularly useful for handling complex, high-dimensional data, such as clinical, neuroimaging, or speech data.

The most popular machine learning language is due to its ease of use and extensive support for data science and machine learning libraries. Data manipulation, model building, evaluation, and training are all done with Python. For the examination and alteration of data. Managing datasets in machine learning projects requires it because, in order to assess the data and produce predictions, machine learning algorithms such as Support Vector Machine (SVM), Random Forest Classifier (RFC), and XGBoost are commonly employed in schizophrenia detection. These algorithms are particularly useful for handling complex, high-dimensional data, such as clinical, neuroimaging, or speech data.

V. IMPLEMENTATION

When diagnosing schizophrenia with machine learning techniques like Support Vector Machine (SVM), Random Forest Classifier (RFC), and XGBoost, the initial step is to collect and preprocess the dataset. This collection often includes behavioral data (e.g., speech patterns or cognitive tests), clinical data, and neuroimaging aspects (e.g., MRI scans). The data is cleaned, normalized, and relevant features are retrieved before the model is trained.

The dataset is then separated into training and testing sets to evaluate the model's performance. The machine learning models you select for the training phase are SVM, RFC, and XGBoost, and you train each one with the training set. If handling non-linear separations calls for a kernel trick, the optimum hyperplane to separate the schizophrenia from the healthy control. This collection often includes behavioral data (e.g., speech patterns or

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VI. APPLICATIONS

- 1) By evaluating clinical data, neuroimaging features, and behavioral data, machine learning models can help physicians diagnose schizophrenia early and treat patients more quickly.
- 2) These models can offer earlier and more precise diagnoses, enabling prompt action, by identifying small abnormalities in brain scans, speech, or cognitive tests.
- 3) Machine learning models forecast potential changes in the symptoms of schizophrenia over time.
- 4) Gives medical practitioners data-driven insights to enhance diagnosis and care.

VII. FUTURE SCOPE

Future machine learning for diagnosing schizophrenia aims to improve diagnostic accuracy by leveraging multiple data sources, such as neuroimaging and behavioral patterns. Advances in real-time monitoring, explainable AI, and tailored treatment plans will enhance early detection and care. As models develop, more reliable, accessible, and personalized methods of treating schizophrenia will be available.

With the expansion of datasets and algorithms, machine learning models may become more accurate in identifying minor symptoms, predicting the progression of the disease, and finding novel biomarkers for the ailment. Adding multi-modal data (genetic, neuroimaging, and behavioral data) may also enhance model performance and give patients more thorough and individualized treatment.

VIII. CONCLUSION

This endeavor highlights the significance of machine learning (ML) in improving the detection and classification of schizophrenia (SCZ). The combination of recent studies and the application of various machine learning algorithms makes it clear that ML may enhance early diagnosis and speed up the diagnostic process in clinical settings. According to the findings, machine learning (ML) can provide mental health professionals with more accurate, reliable, and efficient tools by demonstrating the advancements in algorithms and data processing approaches.

IX. REFERENCES

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