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Analysing the White Matter Changes in Schizophrenia Using Neuroimaging and Machine Learning

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Abstract

Background: Schizophrenia is a severe chronic mental disorder. Millions of people are affected by it around the globe. Disturbance in the level of neurotransmitters is the foremost cause of schizophrenia [1]. There are relevant studies that focus on the functional and structural changes in the human brain regarding the volumetric reduction of grey matter. Recently, white matter tractography has gained significant importance [2]. Characterization of white matter tract (WMT) can compensate for neuron navigation inaccuracies using preoperative brain imaging [3]. Schizophrenia abnormalities can be traced by changes in white matter tracts.

Objective: Starting from changes in the trajectory of grey matter to changes in white matter, many studies have focused on brain changes happening during schizophrenia [4]. Still, the disease course remains unclear. This study aimed to quantify and characterize WMT. This study focuses on finding and demonstrating the different tracts and changes in them during the course of schizophrenia.

Methodology: We assessed the brain volumes of 32 healthy controls and 28 patients with schizophrenia using a magnetic resonance imaging study [5]. The MRI data used in this study was obtained from the Functional Biomedical Informatics Research Network (FBIRN) Phase II dataset. This was a multi-site neuroimaging dataset acquired across different centers. With the help of machine learning algorithms and computational analysis, we will be demonstrating the results.

Result and Discussion: Currently, this study is in progress, and we aim to find significant white matter changes in the frontal, parietal, occipital, and temporal lobes. Along with a critical literature survey, we aim to bring more significant tracts affected during schizophrenia.

Future Work: Our study will demonstrate multiple potential untapped areas concerning white matter tractography and affected brain regions, which will further help overcome clinical challenges faced during schizophrenia.

References

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