Prediction of Psychosis using Linguistic Marker

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Abstract: New era of Machine Learning Offers rapid and precise approach in extraction of signs in medical field of Mental Disorder. We demonstrate how the Linguistic characteristic of sematic density will be obtained using the mathematical method of vector unpacking. The conversion to psychosis is signalled by low sematic density and talk about speech. The result give scope to project in which it is analyses automated of every language can used to classify a different range of mental disorder well in early stage.

I. INTRODUCTION

Psychotic disorder is a mental disorder which causes abnormal behavior thinking and perceptions which make the person to lose touch with reality. This may be caused by bipolar disorder of the people. Delusion and hallucinations are main two symptoms of Psychotic disorder. In present medical field there is no cure but detection and intervention in starting stage may help in slow the decline in cognitive functioning. The challenge is how to detect sign of psychosis in starting stage are still subtle and indistinct. Machine learning and Natural Language processing are able to detection possible with some methods applied with it.
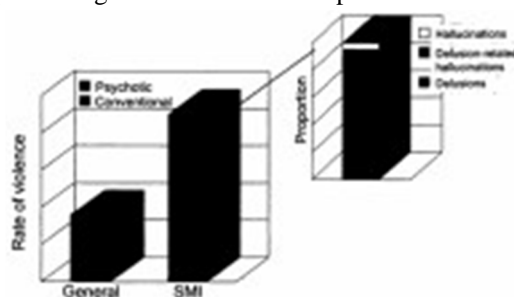
A. History And Causes

From 1845 the concept of psychosis is traced till the present day. Psychiatric disorder has become subsumed under its umbrella heading confusing array of terminology like psychopathy, psychoneurosis and so on. When it was examined it became two distinct from psychopathy and neurosis. In diagnostic, reliability have been primarily improved by focusing on external observation with expression and behaviour. This was principally achieved through differential of subjective experience. Genetic, Environmental factors, life stress, alcohol, some drugs, brain tumors, brain infection, and stroke may play in disorder creation according to the researcher's belief. Science multiple factors may contribute, scientist cannot yet be specific about the cause in individual case. Treatment may depend on the cause of the disorder.

B. Signs and Symptoms

Sudden drop in performance and grades in job are studies. • New troubles clearly thinking or concentration. • Suspiciousness, paranoid ideas, or uneasiness with others. • Withdrawing social, spending much time alone than usual. • Unusual, overly intense new ideas, strange feeling, or no feeling at all. • Decline telling reality from fantasy. • Confused speech or trouble communicating.

C. How is Psychosis Treated

Individual or group psychotherapy: Principles typically based on cognitive behaviour therapy is tailored to every needs of the patient's illness and wellness management, resilience training, building coping skills.

1) Family support and education: Recovery with loved Family members involved by teaching about coping, communicating about psychosis with problem solving skills.
2) Medication management (also called pharmacotherapy): Antipsychotic drugs have risks and benefits to reduce the symptoms of psychosis with medical selection with daily pill or monthly dosing injection without any side effects in their early individual needs.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.177
Volume 8 Issue II Feb 2020- Available at www.ijraset.com

3) Supported employment and education: To help patients to achieve their goals by returning to their work and schools by supporting by co-workers and friends to ensure their success. • Case management: This process helps in offers solution to address practical problems so that they can coordinate social services across multiple needs of area.

4) Brain Stimulation Therapies: Treating certain mental disorders this play a role involved activating or inhibiting brain with direct electricity by which electrodes is implanted in the brain .This can be done by magnetic fields applied to the head but this type is less frequently used than medicine and psychotherapies, where certain mental disorders don't respond to the treatments. Some of the electroconvulsive therapy best studied for brain stimulation are Vagus nerve stimulation (VNS), Repetitive transcranial magnetic stimulation(rTms), Magnetic seizure therapy (MST), Deep brain stimulation. But the common side effects associated with this are headache, upset stomach, muscle aches, memory loss

II.   RELATED RESEARCH

Some of the researchers have observed and demonstrated in several studies like Elvevag et al. observed that similarity of˚ cosine between adjoining term makes from a verbal ease task and sets of term from organized interviews were under with schizophrenia than fit control. Bedi et al. observed that mean of vector where resemblance between adjoining sentences in free speech, along with few other variables (highest number of term per word group and determiners) can be used to determine clinically high risk (CHR) of individuals of conversion of psychosis with accuracy of 100 percentage. Corcoran et al. Got to know that semantic consistency is merged with several other variables (maximum consistency, variance inconsistency, minimum consistency, and possessive pronouns) that can be used to divine the onset of psychosis with two independent category of CHR individuals. Mota et al. observed patterns of interconnected within words as valued by graph-theoretical tools can be used to diagnosis the schizophrenia with individuals in starting episode of psychosis. Mota et al. also observed scatterings in speech as a variable that differentiate schizophrenia from mania The disorder is of widely two types that is positive and negative symptom which plays an useful role in prediction negative occur in earlier and positive during prodromal phase, in which machine learning plays possible to detect in early signs. World and National Health organization have made lot of survey in find the disorder and trying to identify the solution from years but there is no particular cure in final stage. World and National health organization found that the disorder will occurs in teenage or middle age group in commonly and the percentage is also more in occurrence in this group people due to the addiction of Alcohol, love failure, stress etc.

III.   PROPOSED ARCHITECTURE

Our aim is to find the psychosis indication during the prodromal phase. We undergo this detection by analysis of the speech with low level semantic density and increase tendency of talk about semantic density with increased in tendency of talk by which high level of psychosis is predicted 100 accuracy in future.

We do analysis this process in machine learning and natural language process. The process include in which the samples of some of the participants speech are taken and then we extract the content words and we do the vectorized sentence which mean that we will have pre-defined some of the value to the word or terms so we combine those value and make it bundle and then by followed we do the unpack vectors in which we will extract the value and then we calculate the semantic density and then increase the tendency of it by which we will get the result of the value in which we consider that if there is higher value the person can get disorder in future or else person is not effected with the disorder in future.
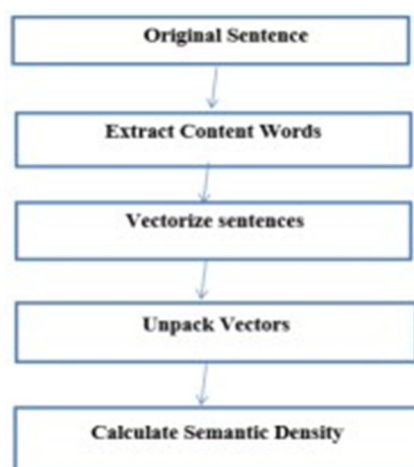
The algorithm is a simple two-layer neural network architecture that can be seen as instantiating where the input layer is of hot encoding to their individual words that is targeted. Where the input level is travels to the hidden level unit during the feedforward phase. Then this hidden unit is travelled to the function of SoftMax where this create the probability distribution and the system is tuned by the algorithm of backpropagation where the words used against training ids maximize the probabilities of the term then this trained word code against the word context are identified by window of the term around the target word


The sentence of each meaning are abstracted by adding the vector associated with each term of the sentence and then normalized by the vector magnitude where the number of meaning component expressed are determined in each sentence where this is achieved by decomposition of the vector technique called vector unpacking

We use some of the formulas like $D_j = m_j/n_j$ where the D_j represent the density of the sematic is calculated by m_j the number of the component meaning of vector that is divided by the n_j the number of content word where the formula is specified And the we calculate the inverse of D that is sum of D_j divied by the vector of sentence S.
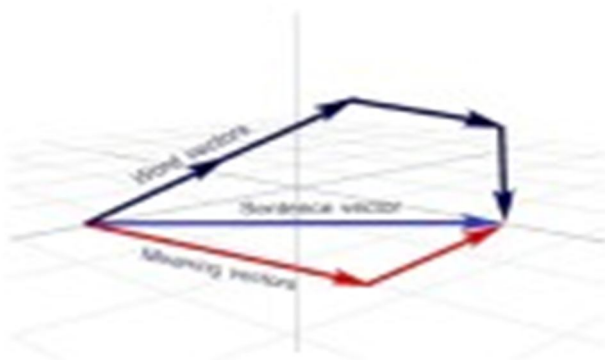
Where we can group some of the content of the word with similar context and value so that then can be packed as the bundled and further that can be unpacked and then we can make the unpacking and categorized and then calculated by training and testing
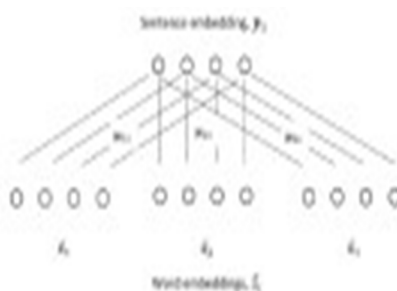
IV. ACKNOWLEDGMENT

We would like to thank Prof. Muquitha Almas Computer Science Department Of Engineering ,Dayananda Sagar College of Engineering in development of the project research and Also Computer science and Engineering Department HOD and Faculty for their support

V. CONCLUSION

The paper has observe different linguistic attribute observation in methods and approaches, of which the semantic substance is consider as the best till date. The paper has also surveyed one possible different to semantic substance with information value, which is based on the mean of the vector length of a term. To test whether detailed value has the likely to predict psychosis, vector lengths were acquired using a particular kind of Word2Vec written to exertion with Tensor flow software library. In closing, examination of the validation dataset confirmed that semantic substance is a powerful predictor of psychosis.

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