BORANG PENGESAHAN STATUS TESIS*

JUDUL : SCHIZOPHRENIA DETECTION SYSTEM using ID3 algorithm implemented for mobile application

SESI PENGAJIAN : 2012 / 2013

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CATATAN: * Tesis dimaksudkan sebagai Laporan Projek Sarjana Muda (PSM).
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SDS
SCHIZOPHRENIA DETECTION SYSTEM Using ID3 algorithm implemented for mobile application

SITI UMAIRAH BINTI ABDUL HALIM

This report is submitted in partial fulfilment of the requirements for the Bachelor of Computer Science (Artificial Intelligence)

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA
2013

DECLARATION

I hereby declare that this project report entitled

SDS
SCHIZOPHRENIA DETECTION SYSTEM Using ID3 algorithm implemented for mobile application

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT: SITI UMAIRAH BINTI ABDUL HALIM Date: 19-August-2013

SUPERVISOR: DR. ABDUL SAMAD BIN SHIBGHATULLAH Date: 19-August-2013

DEDICATION

To my beloved mother and father, brothers and sisters.
To my friends,
and to my supervisor, Dr. Abdul Samad Bin Shibghatullah.
To the lecturers from the Faculty of Information Technology and Communications Universiti Teknikal Malaysia Melaka.

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ABSTRACT

Schizophrenia Detection System is a system that helps peoples to check early detection of schizophrenia. Schizophrenia is a serious brain illness. Many people with mental disorder are disabled by their symptoms. This system will be developed as mobile application based on Personal Knowledge Management (PKM). This is a classification process of development the system to classify the schizophrenia and non schizophrenia. The symptoms to develop this symptom have found from medical assistance and expertise. The symptoms or data will be analyzed by using machine learning technique in artificial intelligence contribution which is ID3 algorithm and expert system technique which is forward chaining to get knowledge in inference engine system. In ID3, it will determine which question should be asked first in the system. In the inference engine, it will have rules has been create by ID3 algorithm. ID3 will calculate the information gain for every attribute. This system will be developed in JAVA platform. The symptoms will be a question in a mobile application expert system. Users will answer the question based on experience in this mental disorder until their get the result at the end of using this application. The result will be schizophrenia or non schizophrenia and what the category of schizophrenia.

ABSTRAK

Sistem Pengesanan Schizophrenia adalah satu sistem yang membantu orang untuk memeriksa pengesanan awal skizofrenia. Skizofrenia adalah penyakit otak yang serius. Ramai orang yang mempunyai masalah mental tidak dapat mengenal pasti gejala itu terhadap diri mereka. Sistem ini akan dibangunkan sebagai aplikasi mudah alih berdasarkan Pengurusan Pengetahuan peribadi (PKM). Ini adalah untuk mengklasifikasikan seseorang itu sama ada ada skizophrenia atau tidak. Maklumat tanda-tanda gangguan minda ini telah didapati dari bantuan perubatan dan kepakaran. Semua simtom ini akan dianalisis dengan menggunakan teknik pembelajaran mesin sumbangan kecerdasan buatan iaitu ID3 algoritma dan teknik *forward chaining* untuk meletakkan aturan ke dalam *inference engine*. Dalam ID3, ia akan menentukan soalan apa yang perlu di Tanya dahulu di dalam sistem. ID3 akan mengira *information gain* untuk setiap simtom. Dalam *inference engine*, ia akan mempunyai peraturan yang telah mencipta oleh ID3 algoritma. Simtom akan menjadi soalan dalam aplikasi. Pengguna akan menjawab soalan berdasarkan pengalaman dalam masalah mental ini sehingga mereka mendapat hasil pada akhir menggunakan aplikasi ini. Hasilnya akan menjadi sama ada seseorang itu ada skizofrenia atau tidak ada schizophrenia.

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LIST OF ABBREVIATIONS

PSM	-	Projek Sarjana Muda
WEKA	-	Waikato environment for Knowledge Analysis
B4A	-	Basic for Android
SDS	-	Schizophrenia Detection System
ID3	-	Iterative Dichotomiser 3
SDK	-	Software Development Kit
LAN	-	Local Area Network
WLAN	-	Wireless Local Area Network
WIFI	-	Wi-Fi
GB	-	Gigabit
CPU	-	Central Processing Unit
RAM	-	Random Access Memory
CLS	-	Concept Learning System

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CHAPTER 1

INTRODUCTION

1.1 Project Background

Most cases of schizophrenia appear in the late teens or early adulthood. However, schizophrenia can appear for the first time in middle age or even later. In rare cases, schizophrenia can even affect young children and adolescents, although the symptoms are slightly different. In general, the earlier schizophrenia develops, the more severe it is. Many friends and family members of people with schizophrenia report knowing early on that something was wrong with their loved one, they just didn't know what. In this early phase, people with schizophrenia often seem eccentric, unmotivated, emotionless, and reclusive. They isolate themselves, start neglecting their appearance, say peculiar things, and show a general indifference to life. They may abandon hobbies and activities, and their performance at work or school deteriorates. Schizophrenia is a mental illness characterized by disordered thinking, delusions, hallucinations, emotional disturbance, and withdrawal from reality. Some experts view schizophrenia as a group of related illnesses with similar characteristics. Although the term, coined in 1911 by Swiss psychologist

Eugene Bleuler (1857–1939), is associated with the idea of a "split" mind, the disorder is different from a "split personality" (dissociative identity disorder), with which it is frequently confused. In the United States, schizophrenics occupy more hospital beds than patients suffering from cancer, heart disease, or diabetes. Early detection of schizophrenia is often very difficult before a person starts actively hallucinating or exhibiting bizarre behavior. It can be very stressful for a patient or a loved one to hear the diagnosis of schizophrenia, particularly when it seems to come out of the blue. In this blog, I will discuss the prodromal phase of schizophrenia. This is the period of illness when symptoms first appear but often aren't recognized. It almost always begins after puberty and is usually followed by a period of increasing symptoms along with a decline in overall functioning.

The prodrome phase usually occurs one to two years before the onset of psychotic symptoms (ex: hallucinations, paranoid delusions) in schizophrenia. The symptoms people usually have during this time aren't very specific. Usually people report symptoms of anxiety, social isolation, difficulty making choices, and problems with concentration and attention. It is late in the prodromal phase that the positive symptoms of schizophrenia begin to emerge. Three kinds of prodromal subgroups have been described. First, the attenuated positive symptom syndrome (APSS) features problems with communication, perception, and unusual thoughts that don't rise to the level of psychosis. These symptoms have to occur at least once weekly for at least one month and become progressively worse over the course of a year. Brief intermittent psychotic syndrome (BIPS) is another prodrome subgroup in which, in addition to problems with communication and perception, the person also experiences intermittent psychotic thoughts.

The person experiences bizarre beliefs or hallucinations for a few minutes daily for at least one month, and for no more than three months. The last prodromal subgroup is the so called 'genetic risk plus functional deterioration' group (G/D). These people are not currently psychotic but have been previously diagnosed with schizotypal personality disorder or they have a parent, sibling, or child that has been diagnosed with a psychotic disorder. They are considered part of this subgroup if in the past year they have had substantial declines in work, school, relationships,

or general functionality in daily life. Many times people see a doctor during the prodrome phase because of some of these disturbing symptoms. The problem is that these symptoms exist in many psychiatric and medical conditions. The situation can be confusing for both patients and doctors. Many people with schizophrenia are diagnosed with something else during the prodrome phase. Social withdrawal, unusual behavior, and frequent reprimands or absences from work and school are all red flags that may signify the beginning of schizophrenia. If you have any of the symptoms described here, it's important to talk to a physician about them, particularly if you have a family member with schizophrenia or another major psychiatric disorder.

A large percentage of people with schizophrenia and their relatives are aware of these early signs of impending relapse (Herz & Melville, 1980). One study found that 63% of patients maintained insight into their deteriorating mental state until the day of their relapse (Heinrichs et al, 1985). Jørgensen (1998) also found that patient self-reports of early warning signs predicted relapse with a sensitivity and a specificity almost equal to those derived from psychiatrists. Literature reviews of this project were research from articles and journals from United States, Canada and the other countries. The general objectives of this expert system to help people to detect early schizophrenia. The project methodologies were being use are questionnaires and observation including flowchart of project activities, Gantt chart of project activities and milestones. The expected outcome of the project is people will know whether they got schizophrenia or not, so they can make treatment quickly.

1.2 Problem Statements

Most people with schizophrenia contend with the illness chronically or episodically throughout their lives, and are often stigmatized by lack of public understanding about the disease. The problem statements are:-

- More appropriate behaviour towards the affected individual, earlier contact with other relatives and earlier treatment would have been possible if the illness had been diagnosed earlier.

- There is currently no physical or lab test that can absolutely diagnose schizophrenia.
- Current research is evaluating possible physical diagnostic tests (such as a blood test for schizophrenia, special IQ tests for identifying schizophrenia, eye-tracking, brain imaging, 'smell tests', etc)

1.3 Objectives

Scientists still do not know the specific causes of schizophrenia, but research has shown that the brains of people with schizophrenia are different from the brains of people without the illness. The objectives of this project are:

- To detect schizophrenia in early detection
- To develop expert system using android application
- To research about personal knowledge management
- To develop expert system using ID3 algorithm

1.4 Scopes

This project, which is code named “SDS”, is categorized in the classification field, which is the subset field of Artificial Intelligence. As mentioned in the problem statement, the project covers the classification problems to get the result and goal. The project’s target will be specialized to classify and detect symptom of schizophrenia into the people and determine what category of schizophrenia there have. This application limited to the positive, negative and cognitive symptoms and overload stress symptoms. Therefore, this application suitable for teenagers and early adulthood. The standard age is suitable for 18 to 27 only because this application is early detection.

1.4 Project Significance

SDS provide the solution for analysis data to system to classify the results in category schizophrenia patient or not. The mobile application allows us detect and get the result automatically based on sysmptom their have. Therefore, it will help people from exposed to severe schizophrenia without can control. That is possible by using entrophy ID3 algorithm techniques to select which question should be ask first means the ranking for every question. The further explanation of how entrophy works will be elaborated in the next chapter.

1.5 Expected Output

The mobile application should be able to detect mental illness or split personality to get the best result. Get the new method and solution to solve the problem of schizophrenia detection. Besides, most of people they do not know actually they are victim of schizophrenia .So that, being develop this expert system by using mobile application they will get the new knowledge about this mental illness and know what to do if they are schizophrenia patient. The mobile application will make decision and decide how far the level of schizophrenia there has.

1.6 Conclusion

SDS is a mobile application which is expected to be the mobile application that detect all the process of answering the question one by one to get the result which is they are patient of schizophrenia or not and inform what category of schizophrenia there have. Finally, the introduction of this project has been elaborated, the literature review is the further process along with the project methodology to explain the algorithm of SDS.