International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 7 July 2021, pp: 1855-1864 www.ijaem.net ISSN: 2395-5252

Robust Information Clustering based-Diagnostic System for Spinal Cord Scanning.

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Submitted: 01-07-2021 Revised: 10-07-2021 Accepted: 13-07-2021

ABSTRACT: The Spinal cord is an extension of the human, both brains are just like a computer with more specialized functions; the problems common to the brain are usually associated with hard drugs and accidents. These could be been diagnosed as the cause of many deaths in our society. The causes of spinal cord and brain problems are hard drugs, smoking Indian weeds, accidents, and not having a good identifying machine that could scan and identify these problems fast before they could degenerate to worst-case conditions. This can be overcome by the development of a diagnostic system for brain MRI scanning based on robust information clustering. This is done by designing a membership function that would analyze the symptoms in the brain, designing a rule that enhances the diagnosis of the brain symptoms, training these rules in ANN to enhance the efficiency of the diagnosis, designing an intelligent sensor for brain MRI scanning based on robust information clustering, designing a visual basic for the development of a diagnostic system for brain MRI Scanning based on robust information clustering and designing a Simulink model for the development of a diagnostic system for brain MRI scanning based on robust information clustering. The result obtained shows that using robust information gives faster identification of the problem in the brain than any other conventional one

KEY WORDS: Diagnostic, brain, MRI scanning, robust information clustering, qEEG

I. INTRODUCTION

Magnetic resonance imaging (MRI) is a type of scan that uses strong magnetic fields and radio waves to produce detailed images of the inside of the body. An MRI scanner has a large tube that contains powerful magnets. You lie inside the tube during the scan. Magnetic resonance imaging (MRI) uses a large magnet and radio waves to look at organs and structures inside your body. Health care professionals use MRI scans to diagnose a variety of conditions, from torn ligaments to tumors. MRIs are very useful for examining the brain and spinal cord. **qEEG** (Quantitative Electroencephalogram) is a diagnostic tool that measures electrical activity in the form of **brain** wave patterns. It is sometimes referred to as "**brain mapping**."

The development of a diagnostic system for brain MRI scanning based on robust information clustering is the topic of this project. Brain problem has become a severe threat to human lives due to its prevalence. According to the British brain Society, the estimated number of new cases, for all types of brain problems in the world for the year 2017 is over 2,550,110, and the estimated number of deaths from brain problems is 780,350. In men, brain fake is the most prevalent brain problem which has arisen as a result of smoking Indian hem and taking dangerous drugs. The estimated new cases of men's brain problems are 1, 550, 90, which is the highest number among all types of brain problems (Which is at about 60%.).Alzheimer's Disease[1] (AD) is a neurological disorder that mostly affects people over 65 years old and whose incidence rate grows exponentially with age, almost doubling every 5 years[2]. Although it has been described for the first time more than 100 years ago,[3] that, only in the last 30 years its causes, symptoms, risk factors, and treatment have been intensively investigated. Still, apart from a few exceptions, the factors that trigger the onset of AD remain unknown. It is a progressive disease, meaning that it worsens over time, and for which there is currently no cure, leading eventually to death. The very early stages are often mistakenly confused with the normal process of aging or linked to stress and it is often characterized by episodic losses of short-term memory and difficulty to grasp new ideas. This

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preclinical stage is also known as Mild Cognitive Impairment (MCI). As the brain damage progresses, other cognitive impairments appear and the disease becomes obvious. In the late stages, individuals are completely dependent on caregivers even for the most basic daily tasks such as eating, bathing, or dressing. Moreover, motor skills are affected and patients become more vulnerable to infections. Pneumonia, a lung infection, is one of the most frequent direct causes of death.

Finally, a lot of authors have used different diagnostic approaches on the brain; some of these renowned authors used optimized methods in the computerized diagnostic system for brain MRI scanning based on robust information cluster and could only get 32% achievement [4] used genetic approach in the computerized diagnostic system for brain MRI scanning based on robust information cluster and achieved at about 41% efficiency. [5] used proportional-integral in the same diagnostic system but could only achieve 38%. This inefficiency in the diagnostic approach has led to the death of many innocent Nigerians. This ugly situation that has led to the death of some Nigerians can be overcome by the development of a diagnostic system for brain MRI scanning based on robust information clustering using an intelligent agent.

1.1 Aim of the Study

This study aimed at developing a diagnostic system for brain MRI scanning based on robust information clustering

1.2 The Objectives of Study

The rate at which brain diseases is increasing in young men and women in our society is a thing of concern; therefore, the objectives of these research work would be stated sequentially as follows.

- Design a membership function that would analyze the symptoms in the brain,
- Design a rule that enhances the diagnosization of the brain symptoms
- Train the rules in ANN to enhance the efficiency of the diagnosization,
- Design an intelligent sensor for brain MRI scanning based on robust information clustering
- Design a visual basic for development of diagnostic system for brain MRI Scanning based on robust information clustering.
- Design a Simulink model for development of diagnostic system for brain MRI scanning based on robust information clustering.

II. REVIEWS

2.1 Extent of Past Related works

Autism spectrum disorder (ASD) is a developmental disorder characterized by disturbances in social interactions, verbal and nonverbal communication, emotional, and a restricted range of interests. Increasing rates of prevalence have been reported for ASD [6, 7]. Fombone [8] has reported different prevalence estimates ranging from 2.5 to 72.6 per 10,000 with a median rate of 11.3 per 10,000. Electroencephalography is a noninvasive technique used to diagnose brain-related diseases and symptoms. It helps in diagnosing many neurological and physiological diseases, such as epilepsy [8], Alzheimer's disease [9], effects of anesthetics [10], and brain injury [11]. Although EEG abnormalities and clinical seizures may play a role in ASD, the exact frequency of qEEG abnormalities in the ASD population is unknown [12]. The data on EEG activity in autism are, however, scare and controversial. Rossi et al. [13] reported a high proportion of fast activity in qEEG of patients with autism (3–31 years old). Some researchers reported that delta, alpha3 (11.513 Hz), and beta (13.5–20 Hz) activity is increased in children with autism [14, 15]. On the other hand, in children and adolescents with autism, one could analyze the qEEG of the two groups, the children with ASD and the control children. This study aimed to develop a diagnostic system for brain MRI scanning based on robust information clustering.

III. METHODOLOGY

The methodology requires in this work starts with the design of a membership function that will analyze the symptoms in the brain and finally develop a Simulink model for the diagnosis of the brain MRI scanning. Figure 1 below is the first step in realizing our initial objective.

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3.1 Design of a membership function that would analyze the symptoms in the brain

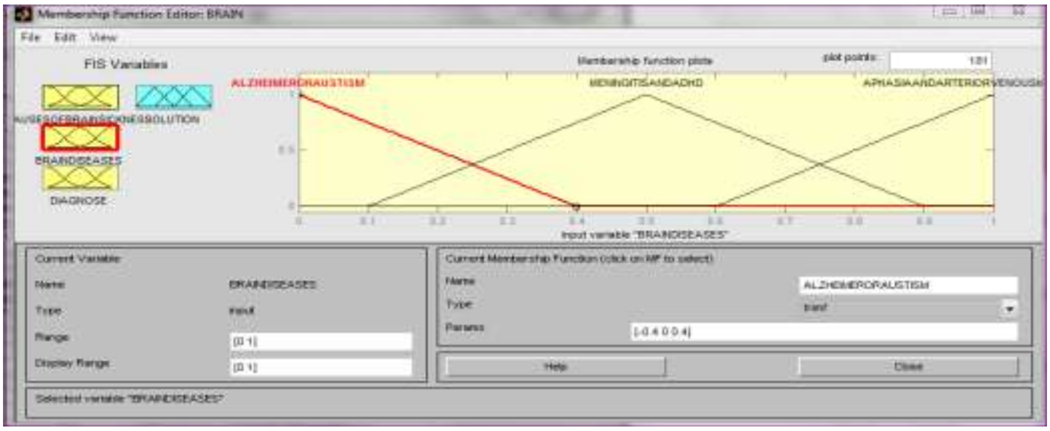

Figure 1. Designed membership function that would analyze the symptoms in the brain

3.2 Design of a rule that enhances the diagnosization of the brain symptoms

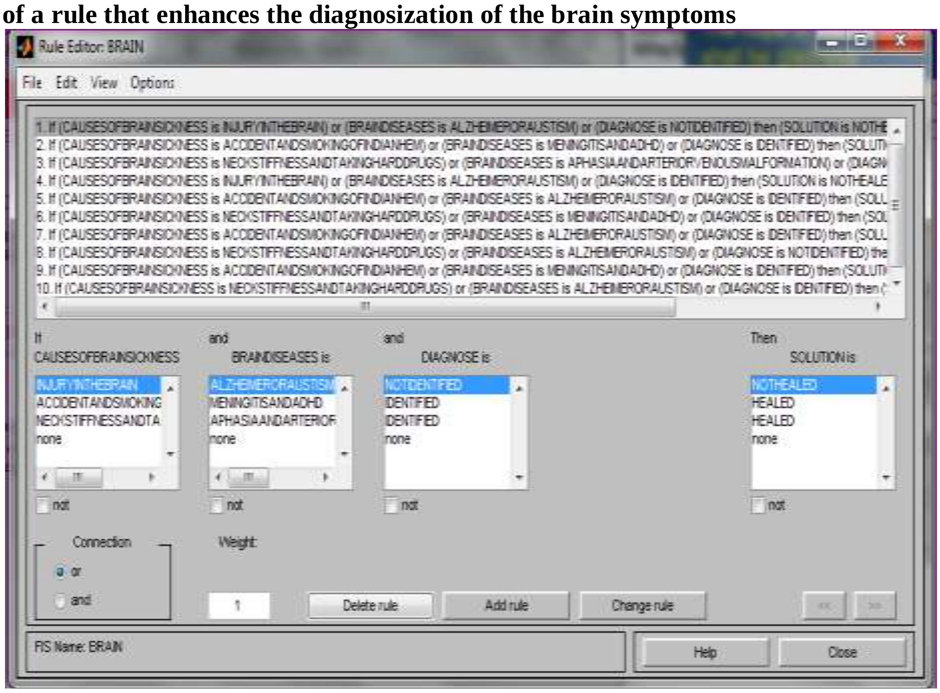

Figure 2. Designed rule that enhances the diagnosization of the brain symptoms

International Journal of Advances in Engineering and Management (IJAEM)
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3.3 Training the rules in ANN to enhance the efficiency of the diagnosization

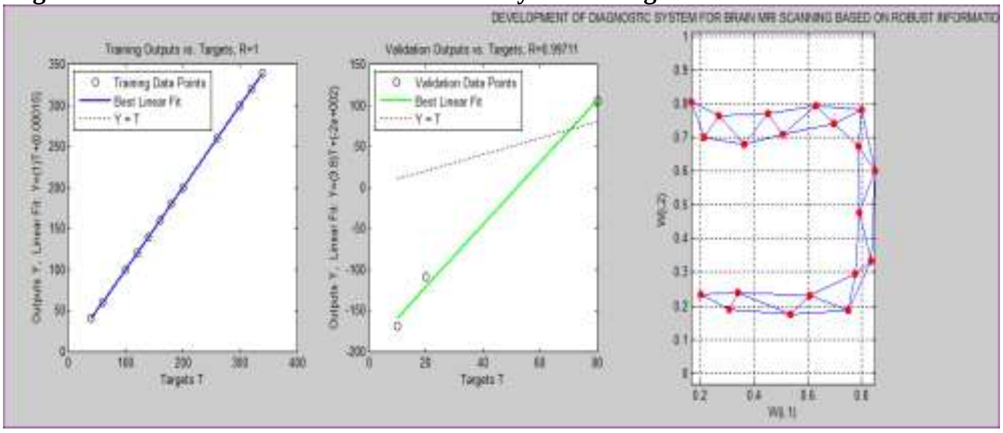

Figure 3. Trained rules in ANN to enhance the efficiency of the diagnosization

3.4 Design of an intelligent sensor for brain MRI scanning based on robust information clustering.

Figure 4.designed intelligent sensor for brain MRI scanning based on robust information clustering

3.5 Design of a visual basic development of diagnostic system for brain MRI Scanning

Fig 5 designed visual basic development of diagnostic system for brain MRI Scanning based on robust information clustering

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Figure 6. Designed visual basic development of diagnostic system for brain MRI Scanning

3.6 Designing a Simulink model for MRI scanning without robust information clustering

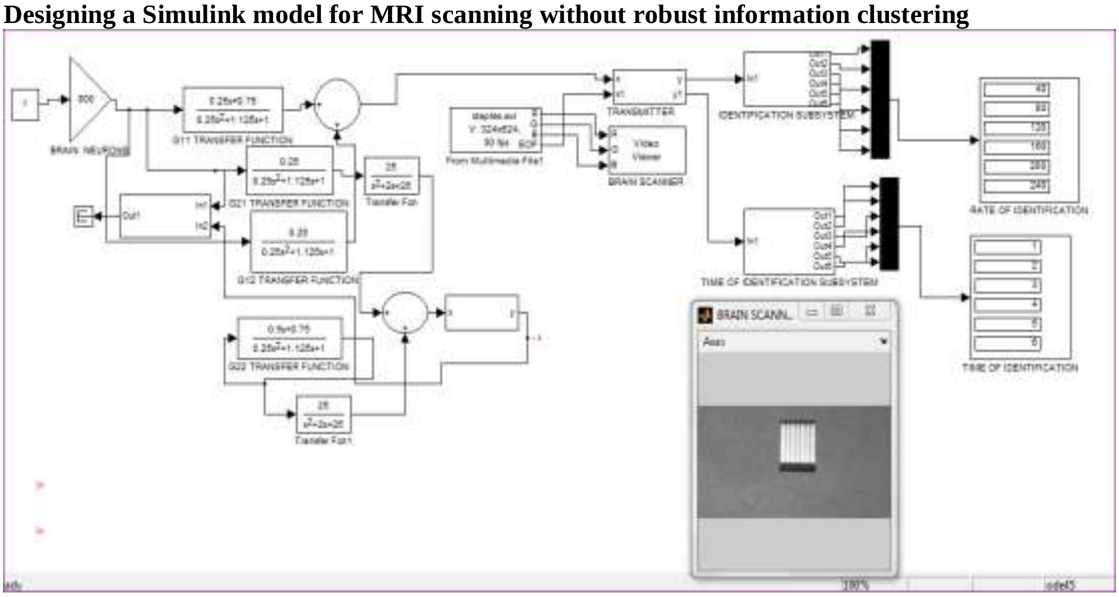

Fig 7 designed Simulink model for development diagnostic system for brain MRI scanning without robust information clustering.

Fig 7 shows designed Simulink model for development diagnostic system for brain MRI scanning without robust information clustering . Table 1 shows the simulated result obtained in designed Simulink model for development diagnostic system for brain MRI scanning without robust information.

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3.7 Designing of a Simulink model for brain MRI scanning based on robust information clustering

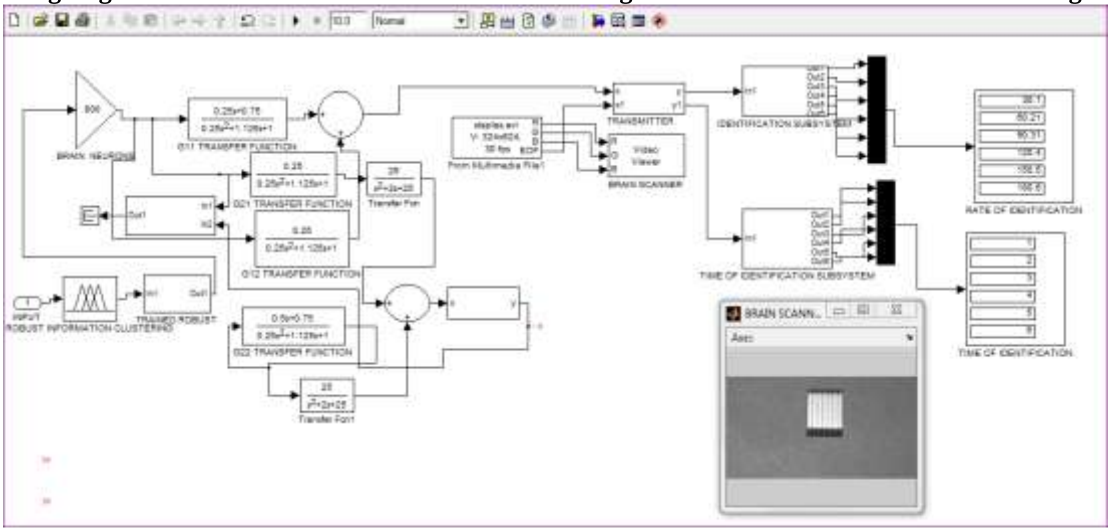

Fig 8 designed Simulink model for development diagnostic system for brain MRI scanning based on robust information clustering

IV. RESULTS AND DISCUSSION

Fig 1 shows a designed membership function that would analyze the symptoms in the brain. Fig 1 analysis the types of symptoms in the brain. Fig 2 shows designed rules that enhance the diagnosization of the brain symptoms. It helps in the identification of the causes of brain problems. Fig 3 shows trained rules in ANN to enhance the efficiency of the diagnosization. It is trained to stick strictly to the fast identification of brain symptoms at a lower rate. Fig 4 shows a designed intelligent sensor for brain MRI scanning based on robust information clustering. Fig 4 shows that when the sensor indicates green light, it shows that no brain symptom is observed by the sensor. Fig 5 shows the designed visual basic development of a diagnostic system for brain MRI scanning based on robust information clustering. Fig 5 shows the processing of the brain scanning of an accident victim. Fig 5 shows the green light indicator when it is still in the processing stage. Fig 6 shows the designed visual basic development of a diagnostic system for brain MRI scanning based on robust information clustering when the machine has identified some wound in the accident victim and the points of its locations. Fig 7 shows the designed Simulink model for the development diagnostic system for brain MRI scanning without robust information clustering.

Table 1 shows the simulated result obtained in the designed Simulink model for the development diagnostic system for brain MRI scanning without robust information. Fig 8 shows the designed Simulink model for the development diagnostic system for brain MRI scanning based on robust information clustering. Table 2 shows the simulated result gotten when robust information clustering is incorporated into the system. Fig 9 shows the rate of brain identification without robust information (intelligent agent). The highest rate of identification verse time of its identification is (240, 6) while its least rate of identification verse time occurred at (40, 1). Fig 10 shows the rate of brain identification with robust information (intelligent agent). Fig 10 shows that the highest rate of identification verse the time of its identification occurred at (180.6, 6) while the least occurred at (50.1, 1). Fig 11 shows comparing the rate of brain identification with and without robust information (intelligent agent). The result obtained shows that the highest rate of identification verse time when robust information is used is (180.6, 6) while the result obtained when it is not used is (240, 6). This result obtained using robust information identifies brain problems faster than when robust information is not used.

Table 1. Rate of brain identification without intelligent agent

Rate of brain identification without intelligent agent	time(s)
40	1
80	2
120	3
160	4
200	5
240	6

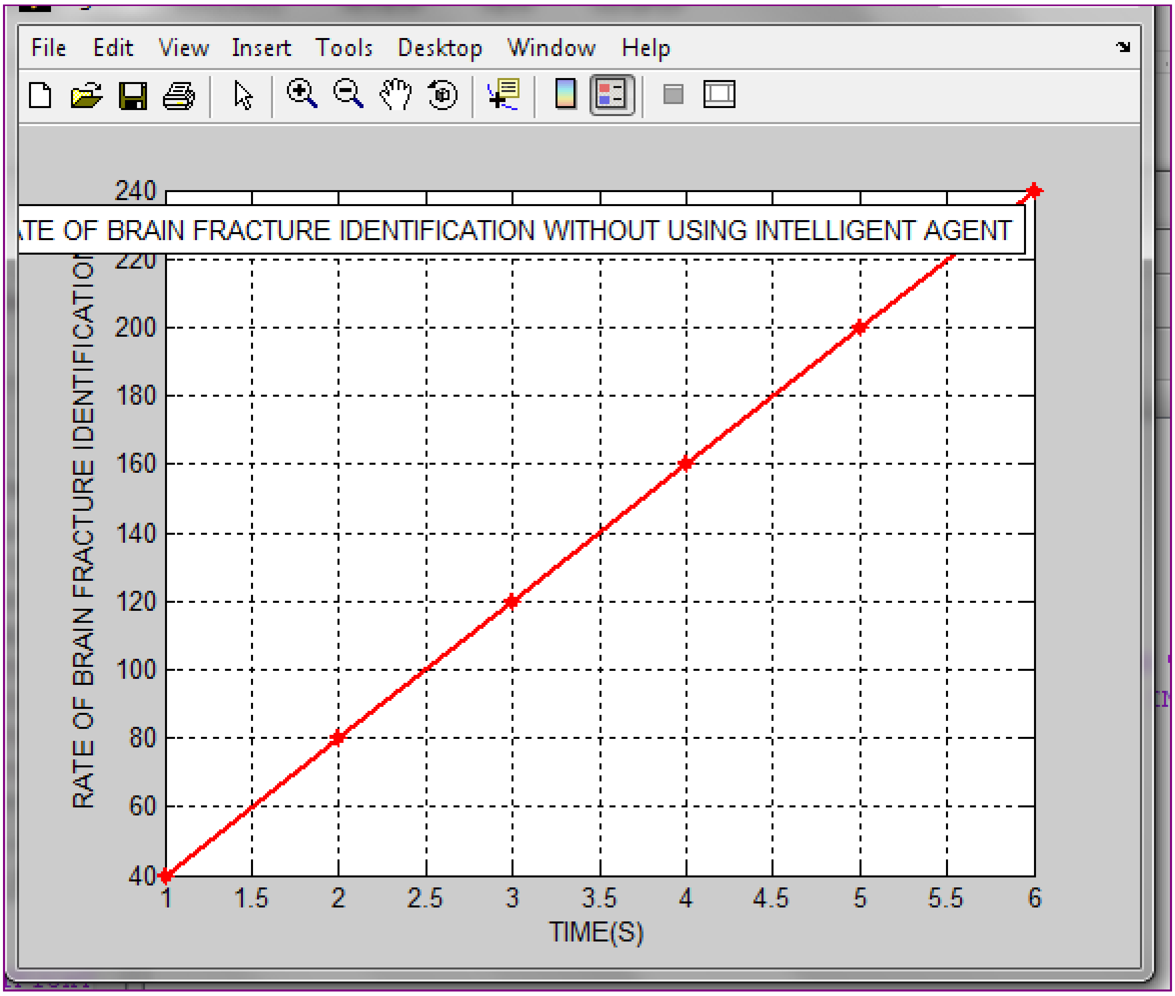

Fig 9 rate of brain identification without robust information (intelligent agent)

Table 2. Rate of brain identification with intelligent agent

Rate of brain identification with intelligent agent	Time(S)
30.1	1
60.21	2
90.31	3
120.4	4
150.5	5
180.6	6

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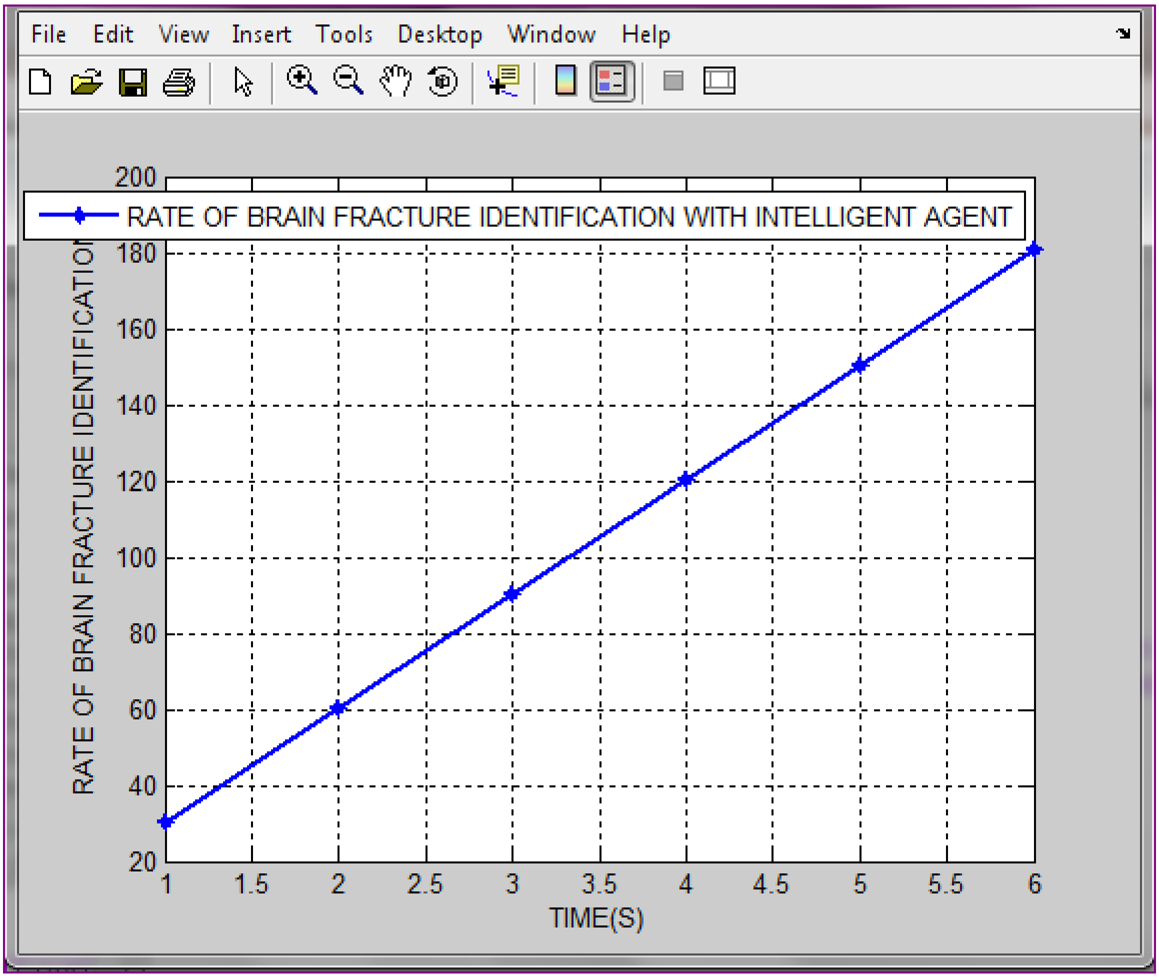

Fig 10 rate of brain identification with robust information (intelligent agent)

Table 3. Comparison of the rate of brain identification with and without intelligent agent

Rate of brain identification without intelligent agent	Rate of brain identification with intelligent agent	Time(s)
40	30.1	1
80	60.21	2
120	90.31	3
160	120.4	4
200	150.5	5
240	180.6	6

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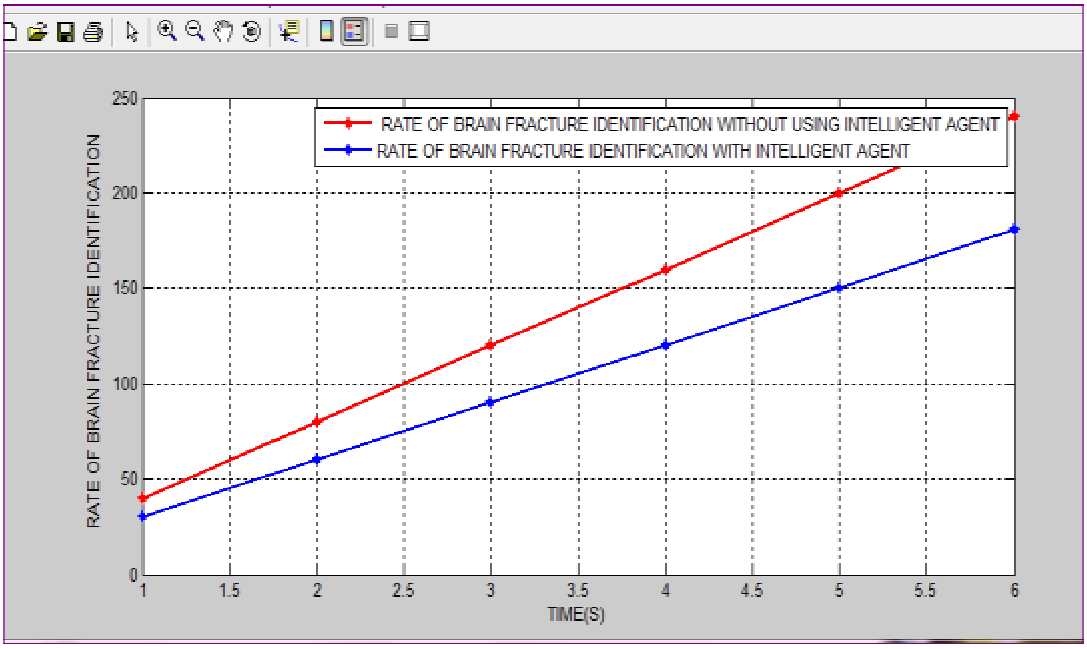

Fig 11 comparing rate of brain identification with and without intelligent agent

V. CONCLUSION

When a problem that has to do with the brain is not detected in time,it usually led to the dying of some innocent souls in our country Nigeria. This unfortunate incidence can be overcome by development of diagnostic system for brain MRI scanning based on robust information clustering. This is done by designing a membership function that would analyze the symptoms in the brain, designing a rule that enhances the diagnosization of the brain symptoms, training these rules in ANN to enhance the efficiency of the diagnosization, designing an intelligent sensor for brain MRI scanning based on robust information clustering, designing a visual basic for development of diagnostic system for brain MRI Scanning based on robust information clustering and designing a Simulink model for development of diagnostic system for brain MRI scanning based on robust information cluster

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