INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.542

IoT Based Tracking of Activities in Alzheimer Patient Using Machine Learning

Darakshan Badar[1], Shilpa S[2], Sandhya S[3], Sneha KS[4], Veena M[5]

B.E. Students, Dept. of C.S., P.E.S College of Engineering, Mandya, India[1,2,3,4]

Asst. Professor, Department of Computer Science and Engineering, P.E.S College of Engineering, Mandya, India[5]

ABSTRACT: This project addresses the severity and problems faced by the patients suffering from Neurocognitive disorders and suggests a convenient approach to help and monitor the patient's condition. Neurocognitive disorders (NCDs) represent a growing epidemic in the modern world, concomitant with increasing life expectancy. NCDs tend to have comorbid neuropsychiatric symptoms that include depression, anxiety, psychosis, sleep disturbances, and apathy, which may reduce quality of life and accelerate out-of-home care. The caretaker needs to be aware of these potential comorbidities.While past research suggests that technology can be used to support people with dementia,, the use of motion-based and image processing technology has not been thoroughly explored with this population.

I. INTRODUCTION

Neurocognitive disorders are a major cause of disability and mortality in late life and are associated with high costs for health systems and society.

Dementia is one of the neurocognitive disorders. It is a general term for loss of memory and other mental abilities severe enough to interfere with daily life. Alzheimer's is the most common type of dementia, but there are many kinds. Alzheimer's disease accounts for 60% to 70% of cases of dementia. The word dementia describes a set of symptoms that can include memory loss and difficulties with thinking, problem-solving or language. This means that gradually, over time, more parts of the brain are damaged. It affects about 6% of people 65 years and older.

It is expected that the burden of dementia will be increasing in developing countries due to increase in longevity. Dementia impacts personal, family, and societal life. It reduces life span, induces caregiver's strain at family level.

It is estimated that the number of people living with dementia will almost double every 20 years to 42.3 million in 2020 and 81.1 million in 2040. With the increasing number of an ageing population, the rate of dementia is common among the elderly.

There are limited data on the use of Machine Learning methods for monitoring and automating clinical aspects of dementia. Therefore, we intend to explore machine learning algorithms and smartapplication interfaces to monitorDementia using sensors.

Therefore to overcome the above problems to some extent, monitoring system for this issue is proposed which helps to keep track of the activities and motions of the patients, alert the caretakers and also to help the patients live an independent life. This system will assist in their activities of daily living and hence to promote independence and participation in social activities.

II.   RELATED WORK

. Internet of Things (IOT) is a very common term nowadays. It's not a second internet; rather it's a network of devices that are connected to the Internet that is used every day to search Google, upload images and connect with friends. It's a network of products that are connected to the Internet, thus they have their own IP address and can connect to each other to automate simple tasks. However, IOT is still in its infancy. It has not been completely developed and is fragmented. For the IOT to be fully realized all devices need to be able to connect to each other, regardless of what company manufactured the product or which companies have business relationships with each other. In technical terms, the Internet of Things (IOT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network

without requiring human-to-human or human-to-computer interaction. IOT is the future of technology that can make our lives more efficient, starting from the most mundane, everyday events to big, world changing ones.

III. PROPOSED SYSTEM

This system is demonstrated in one particular room of the house. The proposed system consists of IOT model which consists of camera, motion sensor, wet sensor and pressure sensor. Motion sensors are used to track the motions of the Alzheimer patient. When the motion is detected by the motion sensor, camera starts capturing continuous images. Here we are considering on three objects via; medicine box, refrigerator and monitor. The camera will be focused such that the three objects (Medicine box, refrigerator and monitor) in the room are visible. The level of the objects will be placed to the level of the height of the patient to identify which object the patient is using. The object which will be hidden due to the presence of the patient in front of it, will be considered as the object used by the patient. We use tensorflow to detect the objects in the room. The captured images are sent to the Tensorflow module.

In the detected object data got from this, it will be continuously updated, such a way that at this particular time the patient used this particular object. This process will be done only when the motion sensor gets activated, i.e., when the patient enters the particular room. The images taken by the camera are sent to the tensorflow library to identify the object. The information from the label of the objects (Medicine box, refrigerator and monitor) will be uploaded to the cloud and will be sent to the caretakers/doctors through the app.

The pressure sensors will be installed in the beds of the patients which will be used to detect the sleeping behaviour of the patient. Certain abnormal activities can be detected at the night when a patient is found to be woken up for a long, reasonable amount of time. These abnormalities can be sent as an alert to the caretaker through the app. Similarly, wet sensor can be used for the sanitary purpose and an alert can be sent to the caretaker if in case the patient has wet him/her also, the routine data is uploaded to a personal cloud which is sent to the family member to avail notifications if any untimely activity is detected or attention is needed. The periodic data is compared with a Master Schedule to analyze the patient's behaviour.
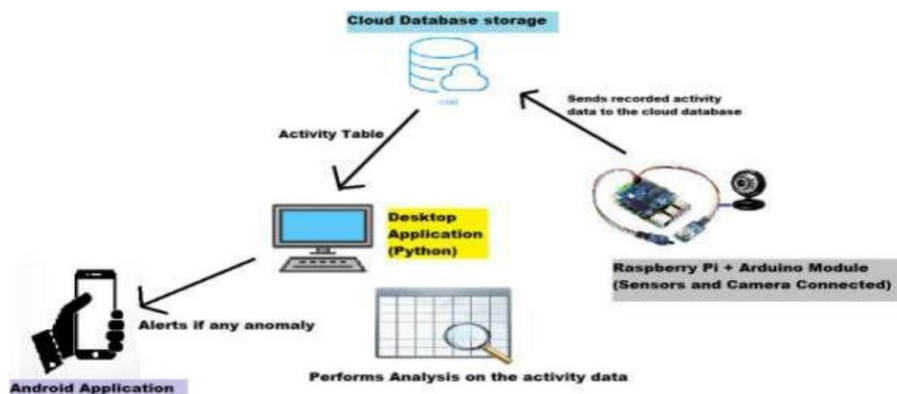
I Also, the routine data is uploaded to a personal cloud which is sent to the family member to avail notifications if any untimely activity is detected or attention is needed. The periodic data is compared with a Master Schedule to analyze the patient's behaviour.


FIG.1   ARCHITECTURAL DIAGRAM

IV.ALGORITHM

The algorithm works as follows:
•First we initialize k points, called means, randomly.
• We categorize each item to its closest mean and we update the mean's coordinates, which are the averages of the items categorized in that mean so far
• We repeat the process for a given number of iterations and at the end, we have our clusters.
The ―points‖ mentioned above are called means, because they hold the mean values of the items categorized in it. To initialize these means, we have a lot of options. An intuitive method is to initialize the means at random items in the

data set. Another method is to initialize the means at random values between the boundaries of the data set (if for a feature x the items have values in [0,3] we will initialize the means with values for x at [0,3]).
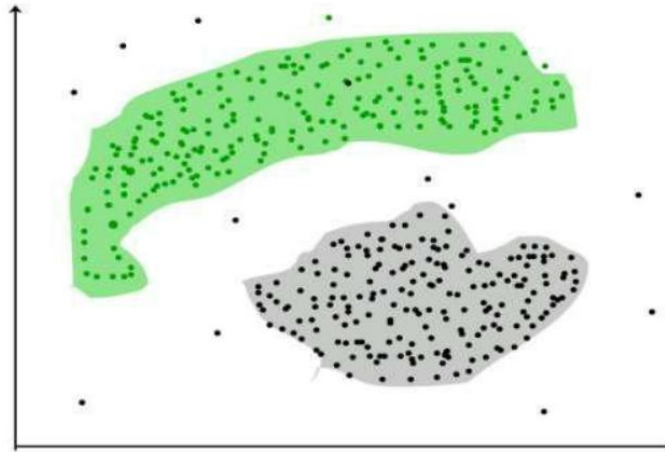
FIG.2   K-means Clustering

V.RESULTS

- ➢ To create a smart ambiance at Dementia Patients' home by installing Sensors and Cameras
- ➢ Monitor the patient's routine by capturing his daily activities
- ➢ Develop an application which would be provided to the family member and the doctor
- ➢ Send notifications and real time alerts to family member if there is a need for attention.
- ➢ Generate reports using data analytics based on the day to day routine which would be assessed by the doctor
- ➢ Additionally, a display panel would remind the caretakers about the activity. It tracks the movement, abnormal sleeping activity and disease of patient through sensors equipped with IoT.
- ➢ It records the patient's activities; this can be used as a report for further medication purposes by the doctor.
- ➢ Eliminates the need of presence of caretaker being present 24/7 with the patient.
- ➢ Eliminates the need for image processing working 24/7 by triggering tensor flow only when needed.
- ➢ A more reliable system which combines the IOT and Machine Learning techniques to monitor the Patient's Activity
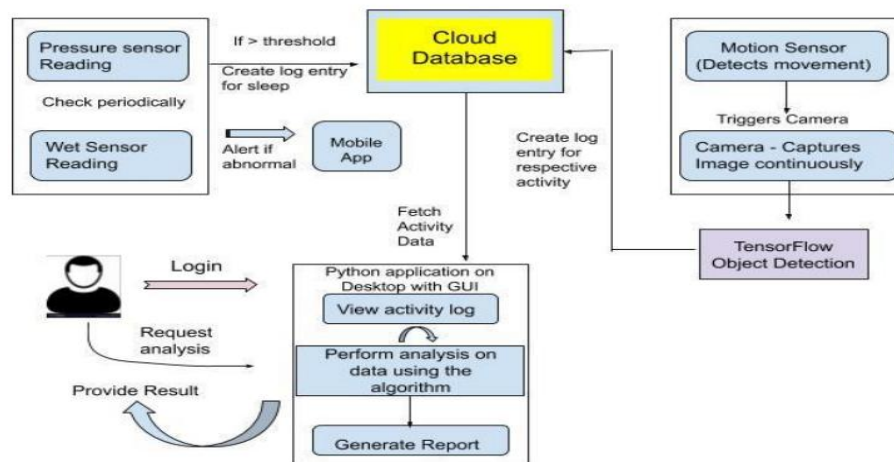
FIG.3   Control Flow Diagram

V.CONCLUSION AND FUTURE WORK

● The proposed system for monitoring elderly patients has been successfully implemented in a smaller scale considering physical constraints

● The combination of technologies including IOT using sensors, Cloud Database (SQL),image detection and push notification through FCM have been demonstrated to simulate the monitoring of activities

● An analysis algorithm calculating average time deviation of activities is performedon the dataset and report generated.

● The system eradicates the need of manual monitoring.

REFERENCES

1. B. Xu, L. D. Xu, H. Cai, C. Xie, J. Hu, and F. Bu, ''Ubiquitous dataaccessing method in IoT-based information system for emergency medi-cal services,'' IEEE Trans. Ind. Informat., vol. 10, no. 2, pp. 1578–1586,May 2014

2. Sawand, S. Djahel, Z. Zhang, and F. Na. "Multidisciplinary Approaches to Achieving Efficient and Trustworthy eHealth Monitoring Systems. Commun." China (ICCC), 2014 IEEE/CIC Int. Conf., pp. 187-192; 2014.

3. Clifton, D. Wong, L. Clifton, S. Wilson, R. Way, R. Pullinger, and L. Tarassenko. "A large-scale clinical validation of an integrated monitoring system in the Emergency Department." IEEE J. Biomed. Heal. Informatics vol. 17, no. 4, pp. 835-842; 2013

4. S. M. Riazul Islam, Daehan Kwak, MD. Humaun Kabir , Mahmud Hossain and Kyung-Sup
Kwak, "The Internet of Things for Health Care": A Comprehensive Survey, https://ieeexplore.ieee.org/document/7113786 2015.

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

📱 **9940 572 462** 🟢 **6381 907 438** ✉ **ijircce@gmail.com**

Scan to save the contact details