

AN EFFICIENT TRACKING DEVICE FOR ALZHEIMER PATIENT USING MiWi

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Abstract- Alzheimer's disease (AD) is a serious disease happened to many old people nowadays. Taking care of the patients with AD can be both physically and mentally demanding. At the same time, it is also important to allow the patients to live on an independent life. The most widely recognized sort is Alzheimer's infection, which delete the individual's memory that makes the well known encompassing new for them. Individuals with Alzheimer's malady feels more hard to recall things, think unmistakably, speak with others, or deal with themselves they won't occasion react to their name being called. Dealing with the general population with Alzheimer turns out to be exceptionally troublesome and trying for their family, this infection regularly prompts to Wandering which is a stern sympathy toward numerous families who stress that the patient might be lost or stroll into slippery conditions. This project proposes, a MiWi Device is used, which is connected with the alzheimer Patients all the time. If alzheimer Patient gone out of the Range of the MiWi device immediately the alert message is send to the care taker's mobile number along with latitude and longitude values. Using these values they can search using google map .And also if the device is lost, then the patient's current location is send the care taker mobile number. Caretaker can share the patient details to the Social Network. People can also track using the details and notify to the caretaker if the patient is found.

Keyword: Alzheimer patient tracking, GPS,GSM, MiWi Device, Social Network.

1. INTRODUCTION

Alzheimer's malady (AD), otherwise called Alzheimer's, it is a ceaseless neuro degenerative illness that more often than not begins gradually and deteriorates after some time . It is of 60% to 70% of instances of dementia. The basic early side effect is trouble in recollecting late occasions that is (here and now memory loss).As this malady propels, the manifestations can incorporate issues, for example, dialect, confusion, mind-set swings, loss of inspiration, not dealing with their selfcare, these are a portion of the behavioral issues. As a man's condition decreases, they frequently pull back far from family and society. Steadily, body capacities are lost, at last prompting to death. Despite the fact that the speed of movement can shift, the normal future after analysis is three to nine years.The reason for Alzheimer's infection is inadequately caught on. Alzheimer Disease has real ramifications on patient wellbeing and care. The elderly Alzheimer's patient experiences the danger of losing their memory abilities and can't carry on with an ordinary life. The brief span memory may lead them to meander away and prompts to threat. Subsequently, the Alzheimer's patients are utilized to be observed nearly to guarantee their security. In the existing system an andriod application is developed.Zigbee,GPS are used to monitor the patient. Zigbee device is used which is connected with the dementia patients.The patient module is always paired with the caretaker module via zigbee communication. when the patient goes out of the range, the mobile application will automatically send the patient Id to the Social Network. People can also track using the patient ID in their phone and can notify if the alzheimer patient is found.The Mobile number of the Care Taker is shared along with the message.

1.1 MiWi [Microchip Wireless Technology]

The Microchip created MiWi convention is extremely basic and utilized for separation correspondence. It bolsters low information rate and aides in making minimal effort systems. MiWi is the short type of Microchip Wireless systems administration convention stack.The Microchip MiWi Wireless Protocol is a variety of IEEE 802.15.4, utilizing Microchip's MRF24J40MA 2.4 GHz handset and any Microchip 8, 16 or 32-bit microcontroller with an Inter Integrated Circuit (I2C). The convention gives solid direct remote correspondence by means of a simple to-utilize programming interface. It has a rich list of

capabilities that can be ordered all through the stack to meet an extensive variety of client needs – while limiting the stack impression.

1.2 Microcontroller

The Arduino Uno is a microcontroller board in light of the ATmega328 (datasheet). It has 14 propelled data/yield pins (of which 6 can be used as PWM yields), 6 straightforward data sources, a 16 MHz aesthetic resonator, a USB affiliation, a power jack, an ICSP header, and a reset get. It contains everything anticipated that would reinforce the microcontroller; just interface it to a PC with a USB connection or power it with an AC-to-DC connector or battery to start. The Uno contrasts from each and every going before board in that it doesn't use the FTDI USB-to-serial driver chip. Or maybe, it highlights the Atmega16U2 (Atmega8U2 up to frame R2) altered as a USB-to-serial converter.

1.3 Heart Beat Sensor

The basic heartbeat sensor consists of a light emitting diode and a detector like a light detecting resistor or a photodiode. The heart beat pulses causes a variation in the flow of blood to different regions of the body. When a tissue is illuminated with the light source, i.e. light emitted by the led, it either reflects (a finger tissue) or transmits the light (earlobe). Some of the light is absorbed by the blood and the transmitted or the reflected light is received by the light detector. The amount of light absorbed depends on the blood volume in that tissue. The detector output is in form of electrical signal and is proportional to the heart beat rate.

2. EXISTING TECHNOLOGIES USED

2.1 Extend Lifesaver

The mission of Project Lifesaver is "to give auspicious reaction to spare lives and lessen potential damage for grown-ups and youngsters who meander because of Alzheimer's, a mental imbalance and other related condition or disarranges." Seniors who are enlisted in Project Lifesaver are given an individual transmitter that they wear around their lower leg. On the off chance that they meander, the guardian calls a nearby Project Lifesaver office and a prepared group will react. Recuperation times normal 30 minutes and numerous who meander are found inside a couple of miles of their home. Notwithstanding the area gadget, Project Lifesaver works with open security organizations to prepare them on the dangers related with meandering.

2.2 Mindme

Mindme offers two lifesaving gadgets, one is an area gadget, the other is an alert. The caution permits the client to alarm a Mindme reaction focus if there should arise an occurrence of a fall or other crisis. The locator gadget is particularly intended for individuals with dementia or other intellectual handicaps. The basic gadget fills in as a pendant that can be placed in a pocket or sack and permits parental figures to track the client online whenever. Guardians can likewise set a span for the client and will be cautioned if the individual goes outside that zone.

2.3 GPS Shoe

In the event that having a friend or family member convey a pendant or wear an additional gadget is troubling to you, the GPS Shoe might be your answer. These GPS beacons backpedal to the times of Get Smart and Agent 99 with a GPS beacon situated in the heel of the correct shoe. The gadget is rechargeable and sends a flag to a focal checking framework with the goal that parental figures can track them through site. Area is refreshed like clockwork on the essential arrangement and like clockwork on the top notch arrange. The shoes should be charged at regular intervals and can be completely charged inside two hours.

2.4 GPS Smart Sole

Like the GPS Shoe and from comparative originators, the GPS Smart Sole fits into most shoes and allows parental figures to track their esteemed one from any propelled cell, tablet or web program. The shoe install is enabled with GPS development

and licenses continuous changing, a point by point report of region history, and grants customers to set up a secured clear for their worshiped one.

2.5 Safe Link

Safe Link is another GPS following framework accessible for individuals with Alzheimer's or dementia. The item guarantees to "increment security for the elderly, advance free living and eventually prompt to a more advantageous way of life." Safe Link is a little gadget conveyed by the individual who may meander. The gadget intermittently sends its geographic directions to focal servers and relatives and parental figures can see the wearer's area by means of site. The gadget should be charged and worn at all circumstances. All gadgets have a SOS catch for crises.

2.6 Global Positioning System

The Global Positioning System (GPS) is a territory structure in perspective of a glorious collection of around 24 satellites surrounding the earth at statures of approximately 11,000 miles. GPS has wound up being a useful instrument in non-military mapping applications moreover. GPS satellites are orbited adequately high to evade the issues related with land based systems, yet can give exact arranging 24 hours a day, wherever on the planet. As GPS units are getting the chance to be unmistakably tinier and less exorbitant, there are a developing number of employments for GPS. In transportation applications, GPS helps pilots and drivers in pinpointing their regions and avoiding crashes. Agriculturists can use GPS to guide equipment and control correct scattering of fertilizers and distinctive chemicals. Recreationally, GPS is used for giving careful zones and as a course instrument for climbers, searchers and boaters.

3. RELATED WORKS

Kahtan Aziz, Saed Tarapiah, Salah Haj Ismail et al [1] Smart Real-Time Healthcare Monitoring and Tracking System utilizing GSM/GPS Technologies: This paper is utilized for wellbeing checking frameworks that are quickly developed, and savvy frameworks have been utilized to screen the patient current wellbeing conditions. It likewise concentrate on observing the patient's circulatory strain, and his body temperature. It proposes a framework design for keen social insurance in view of GSM and GPS technologies. It will screen the patients and dealing with their wellbeing regardless of crisis a (SMS) sent to the Doctor's versatile number through GSM module. GPS gives the position of the patient. The constraint here is Heartbeat, Temperature and heartbeat sensor cost high.

Vasilios Protopappas, Konstantinos Tsiouris, Maria Chondrogiorgi et al [2] ALZCARE: Information System for Screening, Management and Tracking of Demented Patients: This paper it goes for torment from dementia, their family and prosperity specialists in the dementia mind by giving an organized ICT-enabled information System. The structure involves a flexible stage for screening people at peril, a Clinical Information System and a satellite-based patient after system. The structure was made in light out of the following. It involve the customer essential collection and examination arrange. This was performed through gatherings and overviews with patients, gatekeepers, GPs and neurologists. It is presented on tablet PCs and contains brief tests and surveys to be used adjacent even by non-specialist prosperity professionals. Based on the test results, nationals may be suggested a neurologist for standard clinical examination. The Clinical Information System is indented to be used by neurologists in clinical settings for enlisting new or starting at now broke down patients

Aklyne Popli Divya Upadhyay et al [3] Comparative Analysis of the Software Techniques available for Protecting Alzheimer Patient: This paper it point focuses on the issue that comes when the alzheimer calm leaves home without a watchman. Distinctive techniques have been gotten to shield the patient from winding. In this paper a comparable examination is performed on the available programming frameworks for their security. Most of the techniques are not inflicted significant damage powerful and hard to install. The key weight is a substantial segment of the methods are exorbitant.

Souvik Tewary, Rahul Majumder et al [4] proposes Novel Approach towards arranging a Wearable Smart Health Monitoring System measuring the Vital Parameters and Emergency conditions in Real-Time and giving the fundamental Medical Care through Telemedicine: This paper hopes to motorize tolerant checking endeavors. In the present survey we have arranged and developed a GSM (Global System for Mobile) based sharp wearable structure with 3-center point Accelerometer, 3-lead ECG recording system and progressing NIBP examination system. The contraption is prepared for recognizing sudden fall

conditions, cardiovascular peculiarities and hyper/hypotension; in this way rendering it sensible for consistent watching, self-conclusion and remote investigation purposes.

Jin-Hee Lee, Sang Hyuk Son et al [5] describes the WiP Abstract: RemCare-Remote Caregiver using Integrated Framework for People with Cognitive Disability: This paper runs for people with subjective cripple has extended rapidly. The development of them altogether impacts the family and society that interface with the mentally disabled person. Kids with developmental inadequacy or patients with dementia need to screen and track their practices for their security. We arrangement clever after structure which effectively can take after their range and to screen their activities.

Kam-Yiu Lam, Nelson Wai-Hung Tsang, Song Han, Joseph Kee-Yin Ng, Sze-Wei Tam Ajit Nath et al [6] SmartMind: Activity Tracking and Monitoring for Patients with Alzheimer's Disease: This paper goes for an activity taking after and checking system to help Alzheimer's illnesses (AD) patients to live openly inside their parlors while giving rising help and support when critical. The step by step activities of a patient got from SmartMind can similarly fill in as imperative pointers to depict his/her standard living penchant (NLH). By checking with NLH, the patient's available prosperity status can be surveyed each day. To help the AD patients, we have composed and built up a social insurance instrument called SmartMind, to give assistance to the patients to critical exercises and report development circumstances to their relatives as well as parental figures quickly. This can limit the potential dangers on the clients and appropriate moves can be made immediately. By checking the movement list followed in SmartMind, we can survey the self-minding capacities of the clients and their ordinary action propensity (NAH).

Jamal MHAMDI Safae EL ABKARI et al [7] Contriving a RFID structure for Alzheimer patients tracking: This paper goes for those distress from Alzheimer infirmity. In indoor the serious methodology is to limit RFID (Radio Frequency Identification) marks passed on by people, yet in outside we can without quite a bit of an extend use GPS (Global Positioning System) for its exactness. combining the two advances that enables getting informations about the position of Alzheimer patient from the adroit tag, in like manner alert about his absence. And moreover ZigBee framework to make it usable in more broad fields and applications.

Yunus Ozen, Oguzhan Ozdemir, Necla Bandirmali et al [8] Android Based Energy Aware Real-time Location Tracking System: This paper used for continuous zone taking after is perpetually checking a vehicle or a man by using got orchestrates with GPS, Wi-Fi or Cell-Id. Considering that the client singular uses PDA with web on it, zone taking after ought to be conceivable with an adaptable application. In this manner, using GPS sensor encounters speedy energy consumption. This paper presents diagram and execution of an android based essentialness careful consistent range taking after system (EWAREL) using GPS sensor. It is intended to screen Alzheimer's kin persistently and averts them being lost with its notice module. EWAREL is prepared to be summed up for other observing applications, for example, directing field staff and wellbeing checking applications.

4. SYSTEM DESCRIPTION

4.1 System Architecture

To overview our system, present an architecture of the system is as shown in the Figure 1. The system shows how to track alzheimer patient using MiWi device. The main aim of the project is to find alzheimer patients who are mild cognitive impaired patients when they are out of the range. The proposed system has patient module, guardian module, notification and social network. The patient module is a hardware device. It is provided with alzheimer's persons. MiWi, GSM and GPS enabled hardware is mainly fixed into patient's module. The patient module is always paired with the guardian module with the help of Miwi device. All the nearby location of the patient are stored in the device. If the patient goes out of any range, immediately the latitude and longitude values are sent to the caretaker module. To check whether the patient is wearing the device or not, heartbeat sensor is attached with the device. If the device is not active then current location values are send to the caretaker's mobile number. Then the caretaker can share the information to the social network.

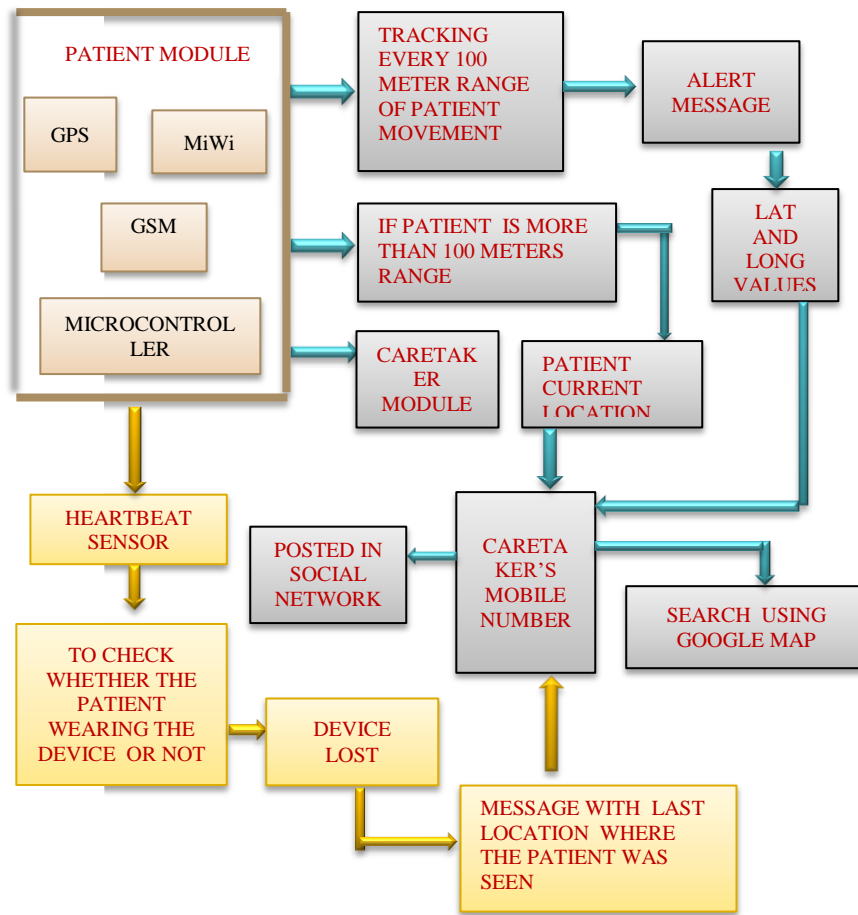


Fig-1:Architecture diagram

5. IMPLEMENTATION

5.1 Modules Used

5.1.1 Patient Module

This module consist of MiWi transmitter, GPS,GSM and heartbeat sensor. If the Alzheimer patient goes out of each 100 meters range, immediately the latitude and longitude values are sent to the caretaker's mobile number. The distance of patient and caretaker is measured by the RSSI value of the RF module. Microcontroller is used to control all the devices in the patient node, the embedded C language is used to program the microcontroller. The MiWi Device is used to establish the wireless communication between the patient node and caretaker node. Heartbeat sensor is used to monitor the patient module, it is used to check whether the patient is wearing the device or not

5.1.2 Caretaker Module

This module consist of MiWi receiver, microcontroller, LCD Display. The MiWi receiver will receive the signal if the patient is out of range. The caretaker will receive the latitude longitude values, if the patient is within any of the 100 meter range. The caretaker will search using the google map. And also if the patient is not wearing the device or the device missed, then current longitude and longitude values are sent to the caretaker's mobile number

5.1.3 Notification

Storing all the nearby place details of the patient within 100 meters range in the microcontroller, an Alert message with the current location is sent to the caretaker mobile number. If the patient is more than 100 meters range then the patient’s current location is sent to the caretaker mobile number.

5.1.4 Social Network

The caretaker will post the Alzheimer patient details such as patient’s current location, caretaker mobile number in the social network. The person whom so ever is getting the information from social website would be able to immediately search through google map and also shares. People can also track using the values and can notify if the alzheimer Patient is found. If patient is found, then the person can communicate with the care taker.

5.2 Algorithm used

RSSI Localisation Algorithm:

The RSSI method depends on the got flag quality pointer to appraise the separation between neighboring hubs.

This is the recipe for figuring the RSSI limitation

$$P(d) = \frac{p_0 - 10 n_p \lg(d)}{d_0}$$

P(d) is the flag quality at separation d ; n_p is the way misfortune calculate, p_0 is flag remove between the modules d_0 (dbm).

Advantages:

RSSI-based localization algorithm has the following

- Due to its low cost,
- no additional hardware support,
- easy-understanding,
- Becomes the mainstream localization algorithm.

6. RESULTS AND DISCUSSION

Overall performance of the project is finding out by comparing our MiWi with existing systems. In an existing system zigbee is used. This chart shows the performance comparison of the proposed System

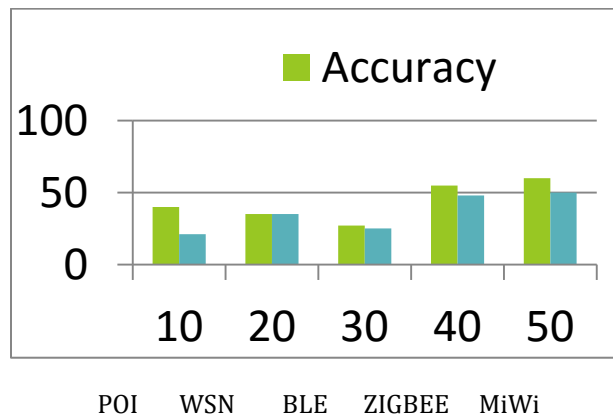


Chart-1: Performance of MiWi

7. CONCLUSION

The main aim of this analysis performed in this paper is proved a better and easily adaptable technology to help the care tacker's of Alzheimer patients. As discussed above the available technologies are either costly or not very easy to install and maintain. In the end it is concluded that still there is a lot of scope available in order to protect our dear and near ones who are suffering from this deceases. In future a new technology will be developed based on the properties such as: Cost efficient, easy to install, easy to main

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