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Utility of RFID, Virtual Agent for Supervising the Individuals with Dementia

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Abstract: ***Various update frameworks have been created to help elderly individuals with dementia. The current update frameworks do not have the attention to human setting, the thoughtful human-machine communication, and the adaptability of individual adjustment. To adapt to the constraints, we are as of now concentrate on another update benefit for individuals with dementia. In particular, we misuse a BLE-based indoor situating framework to catch the present area and setting of the patient, instead we use RFID Tags for Indoor position system . We then utilize a virtual operator framework for rich co-operations. we build up a timetable administration framework for customized updates. To coordinate these heterogeneous frameworks, we re-plan and convey the frameworks as three administrations with Web-API: Location Service, Agent Service, and Schedule Service. These administrations are approximately incorporated by Coordinator Service, in view of the administration arranged design, In this paper, we initially show the framework engineering, and after that we talk about the key thought to actualize the administrations. We likewise illustrate "update at the passage" as a handy situation of the proposed administrations.***

Index Terms: Dementia, IPS, GPS, Virtual Agent, Wi-Fi, RFID, Android.

I. INTRODUCTION

Dementia is a general term to depict a gathering of side effects that hindrance human memory, correspondence, and considering. As indicated by a report in 2015[1] , 46.8 million individuals are currently experiencing dementia in everywhere throughout the world. Accordingly, the home tend to individuals with dementia turns out to be more fundamental, keeping in mind the end goal to guarantee the personal satisfaction of the patient. Nonetheless, in some cases the home care could be a weight to the family or guardians in a particular setting . Thus, there are solid requirements for assistive innovations that can bolster the autonomy of patients and diminishing the weight to parental figures. An update framework is an assistive innovation to bolster individuals with dementia. All in all, the framework gives data that helps a patient to remember something in his/her life. Average distributed the memory book, with which a patient can review day by day things and exercises in view of pictures and representations.

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The utilization of ICT (data and correspondence advancements) is as of late a hotly debated issue. The COGKNOW extend misused ICT for home care of dementia. The administration tells a client of the everyday plan (e.g., arrangement of the medicinal center, meeting a visitor, and so forth.). Hallberg et al demonstrated a semi-robotized device to help patients to remember their old great days utilizing pictures and recordings. They additionally executed a media-rich life log device to record and audit their on-going life. These apparatuses plan to build the patient's will to live by demonstrating the past memorable movements [6].

II. RELATED WORK

In [3] exhibited a structure, called Presence Sensor Service Framework (PSSF). A PSD is a physical sensor gadget for distinguishing human developments. The PST is a nearby center point checking contiguous PSDs. A PSA gathers all sensor data produced in house. A PSS is a support of give nearest data to HNS applications. Different HNS applications and machines can acquire nearest data effortlessly through Web-API given by the PSS.

COGKNOW approach [4] is expected to bring an intellectual prosthetic gadget and related administrations for elderly individuals with gentle dementia, with an attention on the genuine needs and needs of clients. This arrangement will help gathering of individuals to explore as the day progressed; enhance freedom and personal satisfaction.

There are numerous products, gadgets and administrations accessible in the market which can make the life of these people less demanding and assist careers and relatives with taking consideration of them. COGKNOW likewise utilizes all the present business measures and accessible advances, which transform it into an answer of awesome potential esteem and help for individuals who endure this affliction [5].

A theory on which memory elements are noteworthy for building life-logs [6]. And have additionally evaluated the confirmation that memory procedures are significant to people with dementia, and the feasibility of making a semi automated device with an easy to-utilize interface for completing memory errands.

A structure [7] that adjusts the inheritance home machines to the rising home system framework. The proposed structure broadly embraced the idea of SOA. We additionally actualized the genuine HNS with multivendor heritage apparatuses, and additionally a few coordinated administrations.

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One intriguing perception from a trial led in lifts gathering attractive field fingerprints inside the auto at each floor and following the area as the auto climbs and down shows 100% exact forecast at each floor.

The examinations were directed in two distinct lifts in two unique structures (one in a four story building, and another in a six story building). This framework was intended to work in an extensive building, however little scale situating is additionally conceivable.

Outcome demonstrates that inside a 2x2x2 m3 cubic territory with 20 distinct areas in the unique mark delineate, framework could separate areas isolated by as meager as 1.6cm. This illustration demonstrates the possibility to not just find individuals in a working at the meter scale, additionally at the centimeter scale too [8].

Care of dementia patients is extortionate. Where the cost increases with more sever stages of dementia. The average lifetime cost of care for a single person is greater than 174,000 US Dollars(USD) [9]. That is 11,210,733,00 in Indian Rupees(INR). Caregiving may also have a negative impact on health, employment, income and financial security.

In this paper the principle target is to give assistive innovations that can bolster the freedom of patients and abatement the burden to parental figures. An update framework is an assistive innovation to bolster individuals with dementia. All in all, the framework gives data that helps a patient to remember something in his/her life.

The home care could sometimes become a burden to the family or parental figures in a particular setting. Subsequently, there are solid requirements for assistive innovations that can bolster the freedom of patients and abatement the weight to guardians. Existing frameworks did not number situational data (i.e., setting) of the patient. For instance, an update machine may discharge an update in a planned time, notwithstanding when the patient is not in the room. Frameworks give just mechanical responses just, which incorporate content, voice message, pictures, and email. Existing update frameworks don't enable clients to adjust progressively what and how to remind.

Our exploration gathering is right now creating pertinent frameworks that can be utilized to the new update benefit. In the first place, we abuse an indoor situating framework in view of BLE (Bluetooth Low Energy) innovation . This recognizes the present area of the patient in the house, which can be utilized for the context(location)- mindful updates, where we use RFID tags. We then utilize a virtual specialist framework for the thoughtful communications. The virtual operator (virtual agent) is an energized visit boot program with the discourse acknowledgment and blend advancements. A client works the framework by means of the specialist in a screen, as though the client converses with a human administrator. At last, we build up an individual calendar and reminder system and assets administration framework, where singular clients can make and execute claim custom updates, powerfully. In this paper, we attempt to coordinate the above frameworks to accomplish the new update benefit, called Remote patient Monitoring RFID (Memory-help benefit with Personalization, Agent, and Location advancements). To incorporate the heterogeneous frameworks, we re-plan and send the above frameworks as administrations with RESTful Web API: Location Service, Agent Service, and Schedule Service. These administrations are incorporated by Coordinator Service in light of the administration situated engineering (SOA).

III. METHODOLOGY

In this section, we describe the distinctive frameworks and guidelines for the end-customer or patient. The framework configuration develops general structure building outline. The *design consideration* is perhaps the most essential segment affecting the way of the item and note worthily affects the later stages, particularly testing and upkeep. *System architecture* delineates all the huge data structure, report game plan, yield and genuine modules in the system and their Specification is picked.

A. System Architecture:

The "Remote Patient Monitoring RFID" detector helps in detecting the RFID tags placed at different location in Home network. Additionally, the careers can keep a eye on the patient. Also a "Virtual_Agent" guides and helps patients in doing their work (like reminding the patient regarding medicine and the dosages). And the proposed design also involves a "Reminder system" which is designed for helping the patients in reminding things such as finding the location for a meeting or finding a way to the clinic, this is achieved via GPS. The proposed design for this framework is given beneath.

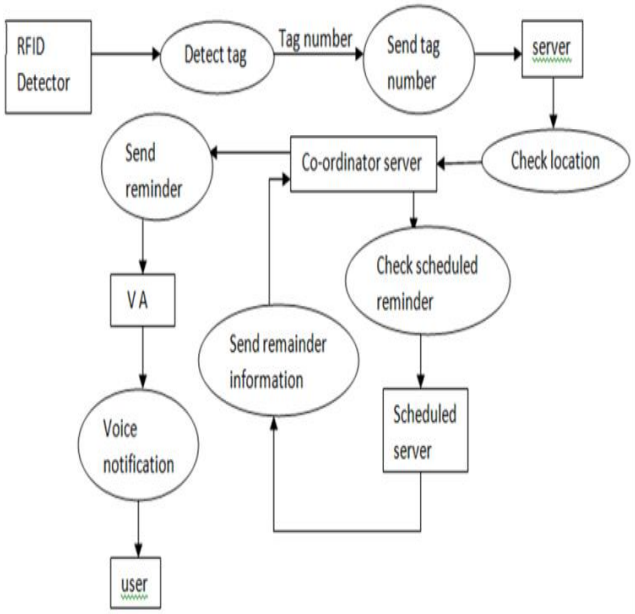

Figure 1: Framework of RFID, VA, Reminder System.

It incorporates perceiving the genuine parts of the structure and exchanges between these fragments. The starting design technique of perceiving these subsystems and working up a structure for subsystem control and correspondence is called development demonstrating plot and the yield of this framework method is a depiction of the item basic arranging.

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B. B. Flow Chart:

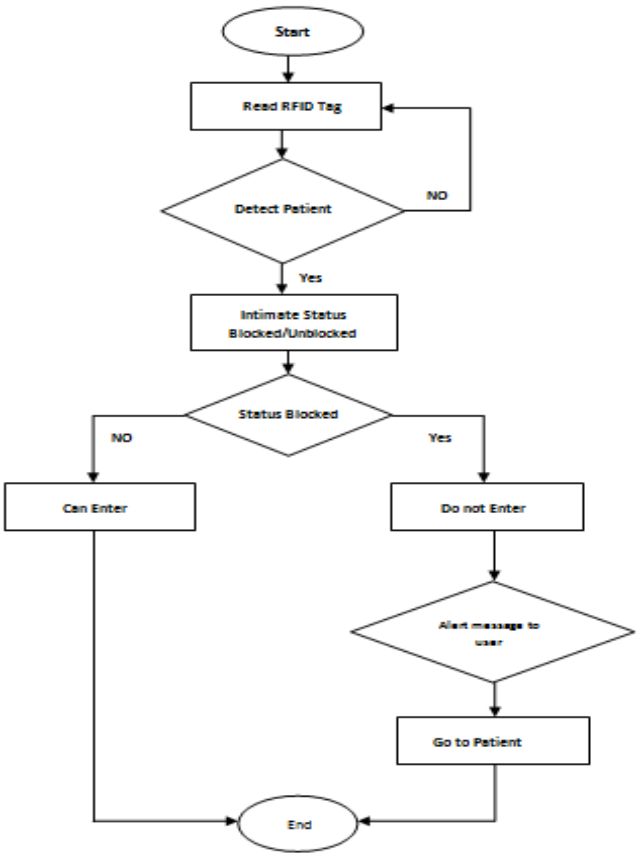

Figure 2: Flowchart for Home care system using RFID.

C. Area Service: Area were the patient is present inside home is a helpful data which mirrors the present circumstance of dementia patient. Likewise, What the sufferer/patient needs to recall intensely relies on upon the area. To accomplish such area mindful update activities, we misuse the IPS, BluePin. We expect that a patient conveys a cell phone with RFID and that RFID detector detects the RFID tags that are set on different places at home (e.g., entrance, living, kitchen). At the point when the patient draws near to a guide module, the cell phone identifies the area and transfers the area mark to the careers cell phone.

Save Tag Details:
Input : location, tag number
Output : tag details
Step 1: User add the tag number.
`json.put("tag_num", tag);`
Step 2: User add the location name and description
`URL url = new URL(Global.url + "get_tag_status");`
Step 3: Save the details into the database
`Tag(0007880708) Location(Rest room)Description (place to take bath)Status(Unblocked)`
Step 4: Stop.

D. Plan Service: Plan Service directs the calendar administration for individuals with dementia. A parental figure (or even a patient) enlists every day occasions and things for the update. To accomplish customized update, the composition of a calendar database- called Schedule DB, which oversees individual timetables and effects.

Add Reminder:
Input: location, date, time, meeting details
Output: reminder as voice
Step 1: User add the meeting details
Step 2: User set the meeting date and time
Step 3: Patient's GPS location is updated to the server
`locationManager = (LocationManager) mContext.getSystemService(LOCATION_SERVICE);`
Step 4: Location server checks the reminder at the current location
`locationManager.requestLocationUpdates(LocationManager.GPS_PROVIDER, MIN_TIME_BW_UPDATES, MIN_DISTANCE_CHANGE_FOR_UPDATES, this);`
Step 5: coordination server sends the reminder
Step 6: Mobile app converts the text into speech
Step 7: Stop.

E. Operator Service: Operator Service gives human-PC communications to individuals suffering from dementia. This service comprises of two sorts of UIs. The one is Virtual Agent (VA) and speech recognition context . The Virtual Agent is a animated human-like 3D chatbot program (See the Figure 12). Utilizing the discourse totext & content to-discourse advancements, the VA can perceive the human voice and can talk a given sentence.

Interacting with VA:
Input : indoor location, tag number
Output : speech conversation
Step 1: RFID detector detects the tag
Step 2: Mobile app sends the tag number to server
Step 3: Server checks user's location and VA's location
URL url = **new** URL(Global.***url*** + **"check_msg_va"**);
json.put(**"va"**,**"msg"**);
Step 4: if same then starts interaction
Step 5: Stop.

IV. RESULT AND DISCUSSION

The *"Remote Patient Monitoring RFID"* is the proposed application where the user or careers can register their name and mobile number with patient name and mobile number. Different RFID tags are setup for different location at home network (Figure 2)that is our "Indoor positioning system"(such as, one tag is placed in the hall, other at the kitchen entrance and so as). This proposed system also allows the patient to communicate through text speech (Figure 4). Also there is a "Virtual_Agent" application (Figure 5) where the agent guides and helps patients in doing their work (like reminding the patient regarding medicine and the dosages). And there is also a "Journey_Reminder" application which is the proposed Reminder system for the patient, which helps them outside home network via GPS. The application should be updated with the details regarding-meetings with place name and also with date and time by the user or careers (Figure 7).

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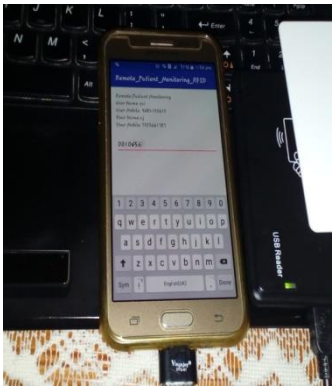

Figure 3: RFID Detector detecting RFID Tags with one tag placed in hall.

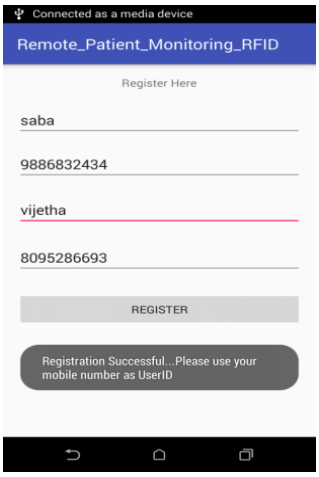

Figure 4: Registration of Patient with mobile number as user-id.

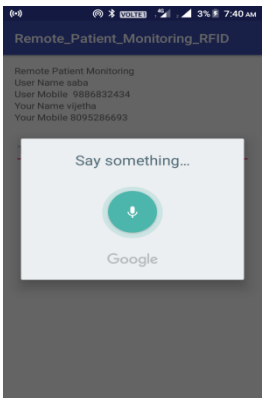

Figure 5: Recognize speech, and help patient what they are in a need off.

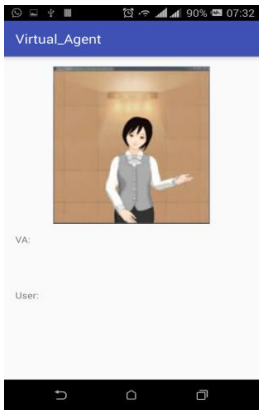

Figure 6: Virtual Agent interacting with patient.

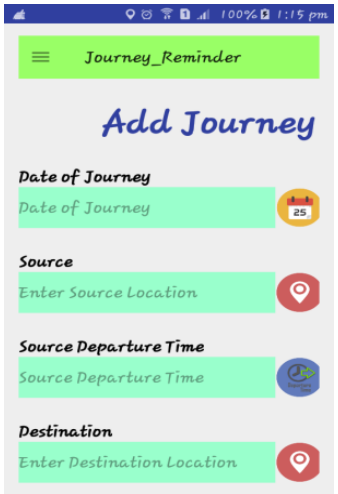

Figure 7: Reminder system application.

V. CONCLUSION

The mindful and customized update benefit, called Remote Patient Monitoring RFID application helps the individuals with dementia. The Remote Patient Monitoring RFID detector helps in detecting the RFID tags placed at different location in Home network. Additionally, the careers can keep a eye on the patient via this application. We have actualized a model of Remote Patient Monitoring RFID that plays out a useful case: Reminder at Entrance/Hall/Kitchen. Also the implementation of reminder system "Journey Reminder" application helps the patient in locating the places where they want to go via GPS. At long last, we have directed a preparatory assessment particularly to see the ease of use and practicality of the specialist benefit.

Our future work is to enhance and experiment the execution of Remote Patient Monitoring RFID in view with patients of Alzheimer's and Parkinson too. Also, we need to assess down the achievability of the entire Remote Patient Monitoring RFID, through longer-term explores different avenues regarding real individuals with dementia and also Alzheimer's and Parkinson patients.

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