Project Proposal: Ultimate Senior Reminder Device

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Super Reminder Device for Seniors

PROBLEM DESCRIPTION:

Older individuals often face a great deal of common challenges, encompassing issues such as dementia, memory loss, difficulties with physical mobility, health concerns, and cognitive limitations. These age-related struggles can significantly impact their overall well-being and daily functioning. Additionally, the ageing process may bring about various other hurdles that necessitate attention and care.

Within this initiative, our team is dedicated to addressing the challenges of seniors who live alone and have **memory loss, cognitive function, and the technological barriers** often encountered by seniors. Hence, as part of our solution, we are developing a user-friendly physical device specifically tailored for seniors, aiming to bridge the gap between their abilities and modern technologies. This innovative device not only simplifies technology use but also serves as a reliable reminder system, assisting seniors in **managing and accomplishing various tasks** as well as **knowing the environment such as temperature**.

EXISTING PROJECTS

1. **Amazon Echo, Google Home, Apple Homdpod**

   Major corporations like Amazon, Google, and Apple have advanced technology significantly by creating these innovative AI assistants such as Alexa, Google, and Siri. These devices are designed to respond to voice commands, which offer a wide range of functionalities such as answering queries, providing task reminders, and keeping users informed about the weather, temperature, and more. (as highlighted by alzheimers.ca). These AI-powered assistants can extend to assisting seniors in managing their daily routines, including medication reminders. Additionally, users can use these devices to make phone calls and send text messages. What makes these technologies so useful is that they are easy to use and don't require an advanced user interface and simply respond to voice commands. That feature alone makes them such a useful piece of technology for seniors to use.

2. **Motion Sensors**

   Memory & Company invented motion sensor technology that can be installed at homes, enabling detection of movement as anyone enters the range of detection. Once an action is detected, a following response can take place. This technology has been used in addressing challenges associated with senior memory loss or cognitive

disability. For instance, when a senior enters their home, the motion sensors can detect the action and turn on the lights, enhancing convenience for seniors who forgot where the switch is or simply forgot to turn on the light. Furthermore, this intelligent system can contribute to preventing potential hazards by automatically turning off stoves when no one is detected in the area for a specified period.

3. **GPS tracker**

   There are several GPS trackers that have been designed that can be useful to old people. Some of the more prevalent ones include angel sense gps tracker, Elderly GPS Smart Watch Real-Time Tracking SOS, racki gps, and many more. They have become a popular way of ensuring the safety of elderly when they may have habits of wandering or getting lost. The use of GPS trackers has become very important in providing support for seniors that deal with memory loss and cognitive impairments. This technology is especially useful for caregivers and families. That is because it offers a reliable way to monitor the location of these old people, particularly in situations where wandering or getting lost may pose a concern. Therefore a GPS tracker for old people enhances the safety and security of seniors and makes their caregivers feel at ease. By having real-time tracking, GPS offers quick responses in case a senior's whereabouts become uncertain.

USER STUDY

As adults grow older, there tends to be a pattern of **memory loss, cognitive function, and the technological barriers** that affect old people. That is why we have decided that our target users will be those struggling in any one or more of those categories.

Memory loss is our first area of study. Almost 40% (alzheimers, 2020) of people will experience some sort of memory loss after the age of 65. This kind of memory loss can range from age associated memory impairment, mild cognitive impairment, and then in the extreme cases dementia. This impaired memory is especially dangerous when it comes to things like taking medication as "the Department of Health and Human Services reports that as many as 55% of seniors are non compliant with their medication (seniorhelpers, 2023)". This problem is so big because old people take the most amount of medications and are also the most prescribed category of people who actually take medications. Failure to comply with medication is extremely dangerous and can even lead to death.

Cognitive decline is also an area within elderly people we are trying to adhere to. Approximately 2 out of 3 (Hale et al., 2020) elderly people over the age of 65 experience

some cognitive decline. This cognitive decline is similar to memory loss but also encompasses things like mental processing and attention.

Our last target user is those who struggle with technology. There are several reasons for this such as the difficulty adapting to new things, cognitive related reasons, or problems such as leathery fingers(nsisolation, 2023) that make learning and even maintaining to use technology very difficult.

PROJECT DESCRIPTION

What is it?

Essentially, this is an ultimate reminder device that mainly reminds seniors to take pills, do certain tasks, weather, temperature (inside & outside the house), and humidity. In addition, it also has an emergency button, that once pushed, will send messages to family members or caregivers in case they need assistance

How does it solve the problem?

As mentioned, seniors may have trouble remembering things for example:

1. Taking pills and taking what pills.
2. Buying groceries, guests coming
3. Bringing an umbrella, wearing more clothes

As well as having trouble with some cognitive functions such as

1. Noticing the sudden temperature change
2. Noticing raining/windy/snowy weather

Hence, our devices will remind seniors who live alone to take pills or do a task at a certain preset time. It will periodically check the weather outside the house and inside the house. If there are sudden temperature drops inside, the devices will remind the senior to add more clothes. If there is bad weather outside of the house, the devices will remind seniors to either not go outside or bring an umbrella, add more clothes, or wear snow shoes, etc. There is also an extra function of the device, an emergency button that once pushed, will inform caregivers or family members that there is an emergency that requires assistance.

How is it different from any existing projects/products/services/solutions?

This senior serving device combines many functions together as a centralised system that we don't see in the senior device market. To be more specific, the ultimate device combines various software we see on smartphones, and transforms them into a physical, senior-friendly device that serves the same purpose. And it is

packaged into one beautiful box. Hence the name "super reminder device". In essence our device stands out from other products or projects, because we not only preserved the functionalities of the reminder applications on smart devices such as phones, amazon Alexa, they are also translated into a more physically interactive box that seniors find easy and intuitive to use.

Why is it practical and useful?

1. We are aware that all of the tasks can be performed by smartphone, however, seniors, especially seniors with not-at-all sharp minds will have great trouble using it. Our device is not only composed of physical buttons, indicators, and large text on the screen which is very intuitive but also uses many flashing lights and sounds that strengthen the reminding ability in the case of seniors who have hearing loss or poor vision, including a speaker that speaks the text out loud in case senior is not be able to read.

2. The device is plugged in with power so that the device will always be turned on, as opposed to a smartphone that needs to be charged which adds more trouble to the seniors.

3. Our devices are also connected to Wi-Fi, so that caregivers or family members can use our web application to alter the settings on these devices remotely, such as changing the pill-taking time, reminding seniors that a plumber is coming to visit, etc. We will also have a fully functioning web server for the device that periodically sends real-time weather data to the device.

4. The reminder device also records whether the senior has taken the pill or not. It is achieved by flashing the light between one reminder event and the next one. If a completion button is pushed, the light goes off, and the device will record that the senior has taken the pill. If the button is not pushed before the next reminder events, the previous reminder event will be marked unfinished. In conclusion, this functionality keeps track of the completion status of pill taking, the data will be sent back to the server, and will be displayed on the web application for caregivers or families to see.

ELECTRONIC COMPONENTS AND TECHNOLOGIES

Require components:

ESP32	NPN Transistor
LCD Display	Speaker
Servo	Audio Converter & Amplifier
LEDs, RGB LEDs	4-digits 7-segment Display
Resistors	General Board
Big Push Buttons	Jumpers
Buzzers	Pin Header
Temperature and humidity Sensor	Batteries
Serial to Parallel Chips	

Technologies:

Physical Computing, MicroPython, Full-stack Developments, APIs, HTML5, CSS, JavaScript, Node.js, Wi-Fi.