

Digital Cure for Dementia-Axon

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Abstract—More than 55 million people worldwide already live with dementia, and an estimated 10 million new cases occur each year. Our research strives to assist these patients. “Axon” project is software that has been created to make it easier for dementia patients to use applications that can help them occasionally remember things by displaying old photos that their family members have donated and jogging their memories. We try to assist the patients. In addition to a three-way video conference capability between the patient, the doctor, and the patient's family members to discuss the patient's condition, Axon offers music, games, and jokes to lighten the patient's mood. It also enables family members to view the reports and check on the patient's progress. In addition to this, it also allows doctors to keep track of all the information and provide a systematic medication and diet. For the benefit of dementia patients, our software “Axon” combines a variety of capabilities with a simple user interface, unlike other apps. Axon is a full-stack programme that also uses machine learning. “Axon” is accessible as a web-based and mobile application. The applications offered by Axon range from straightforward trackers and reminders to more intricate programmes that include cognitive training, virtual caretakers, and other services. While some applications are made expressly for persons with dementia, others are geared toward family members and caretakers

1. INTRODUCTION

A person with dementia experiences changes in their memory, thinking, behaviour, and capacity for daily tasks. Axon is created to assist sufferers in controlling their illness and raising their quality of life. Axon is accessible in many different versions, including web-based landing pages and mobile apps. By tracking their symptoms, managing their prescriptions, and having access to useful information, persons with dementia can benefit from this app. “Axon” project is software that has been created to make it easier for dementia patients to use applications that can help them

occasionally remember things by displaying old photos that their family members have donated and jogging their memories. We try to assist the patients. In addition to a three-way video conference capability between the patient, the doctor, and the patient's family members to discuss the patient's condition, Axon offers music, games, and jokes to lighten the patient's mood. It also enables family members to view the reports and check on the patient's progress. In addition to this, it also allows doctors to keep track of all the information and provide a systematic medication and diet. For the benefit of dementia patients, our software “Axon” combines a variety of capabilities with a simple user interface, unlike other apps.

About the project: Software called “Axon” was developed to make it simpler for dementia patients to use programmes that can occasionally help them remember things. By showing the patients old pictures that their family members have provided and stimulating their memory, we strive to aid the patients. Axon provides music, games, and jokes to lighten the patient's mood in addition to a three-way video conference feature between the patient, the doctor, and the patient's family members to discuss the patient's health. Family members can also examine the reports and monitor the patient's improvement thanks to it. Additionally, it enables medical professionals to keep track of all the data and offer a systematic approach to nutrition and medication

Users perspective:

Most of the time, customers may get confused and can forget to specify the actual department of the financial company they are targeting to. The project helps users to target the proper department they are complaining to.

Any industry runs well if we can keep customers happy, they are the backbone of any industry and therefore their review plays a big role in shaping the company's fortunes. Customer satisfaction can drive the company's profits and any decision company takes should be done keeping customers in mind.

2. SCOPE

One of a kind is our Project Axon. Axon was designed with the dementia patient in mind, giving him access to personalized music therapy, games, reminders to interact with family, a library of previous photos and videos that his family members have uploaded, as well as jokes to improve his mood and the ability to video call with family and a doctor. The same app may be used by both doctors and family members to stay updated on the patient.

3. SOCIETAL/ENVIRONMENTAL IMPACT OF THE IDEA

Numerous apps, including Lumosity, Mindmate, etc. All of these earlier dementia applications were created to address a specific aspect, such as music therapy or connect the patient with their family. Our app combines several features, including custom music therapy, prompts to talk to family members, jokes to lighten the patient's mood, access to a gallery of old photos and videos contributed by family members, and video calls with both the doctor and family members. We use the most effective techniques we have discovered via doing an in-depth study on the subject to assist revive old memories. The app's straightforward user design makes it easier for the patient's doctor and family to get information about the patient and any updates on their medical condition.

4. PROBLEM DEFINITION

The word "dementia" is used to describe several illnesses that can develop as a result of different conditions and trauma that either directly or indirectly impact the brain. Although Alzheimer's disease may be a factor in 60–70% of instances of dementia, it currently has no known treatment. Since there is no cure for it, we thought why not use some sort of visual aid to assist those people in remembering information? There are no effective treatments or medications; we can only provide temporary relief. There are no previously built or started apps. Dementia is brought on by several illnesses, none of which have effective treatments available. Since Axon was designed with dementia sufferers in mind, all of these characteristics will also be advantageous to their everyday lives. The app will offer special features like personalized music therapy, games, reminders to interact with family, a library of prior photos and videos uploaded by his family members, jokes to lighten the patient's mood and the ability to video call with family and doctors. It also reminds the user about daily medications and reports the patient's progress to the family and doctors. The creation of Axon has faced several difficulties, including:

Usability: Using technology can be difficult for people with dementia, therefore it's important to create user interfaces that are uncomplicated, straightforward, and easy to understand.

Accessibility: Software created for dementia sufferers should be usable by those with hearing or vision impairments and compatible with assistive technologies like screen readers.

Data security and privacy: Applications for dementia raise severe concerns about the storage of private information, such as medical data. It is essential to guarantee that the data is secure and accessible to authorized users only.

Evidence-based design: Because there is limited information on how well technology aids people with dementia, it is crucial to develop apps using guidelines and techniques backed by the most recent research.

Cost and availability: Because dementia-specific applications can be expensive, many dementia patients and their carers may not be able to purchase them. It's critical to consider pricing and accessibility while developing these applications.

User engagement: People with dementia might not be interested in using technology or could find it challenging to use it regularly. The creation of apps that users will find engaging and appealing is essential

5. PROJECT DESCRIPTION

Software called "Axon" was created to make it easier for dementia patients to utilize an application. Access to games, customized music therapy, reminders to engage with family, a library of prior images, movies posted by his family members, jokes to lighten the patient's mood, and video calls with family and the doctor are all provided by this app. The app allows doctors and family members to receive updates about the patient. Family members may monitor the patient's progress, health, and activities by seeing the doctor's prescriptions and diet.

User categories in Axon

Doctors: Have a single screen where they may check the list of patients they have added using the patient-doctor feature and choose a patient to read their details. Every patient contains basic information including age, location, blood type, date of birth, gender, and a picture (optional).

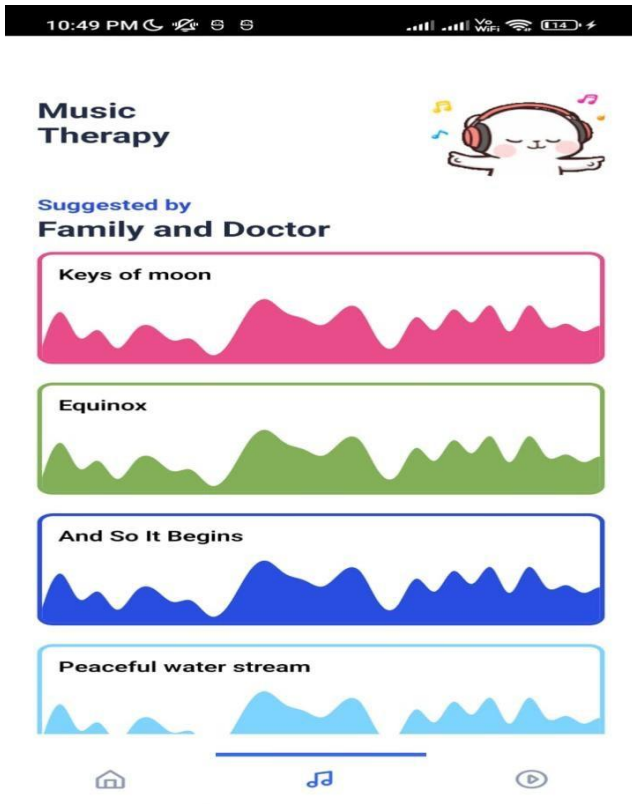
Additionally, there are two tabs: a Medical tab and a Personal tab. Medical information includes dietary recommendations, dose histories, and more. Additionally, he can change the patient's diet, stop or add to existing medications, view previous medications, and view allergies. Personal data includes contact (family) information and patient data. He may video call the patient from here as well.

Family: One or two family members may be added for each patient. Family members have access to the doctor's suggested diet and dosages. Additionally, he may send reminders to the patient, add music or video links for them to see, and upload pictures or videos to the patient's gallery of memories.

Patients: There will be tabs on Axon for your house, games, music, family, memories, and reports. A summary of the features is provided in the home, including call numbers,

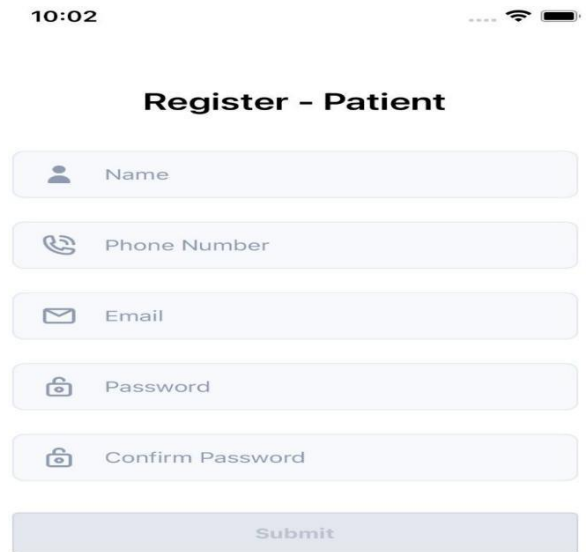
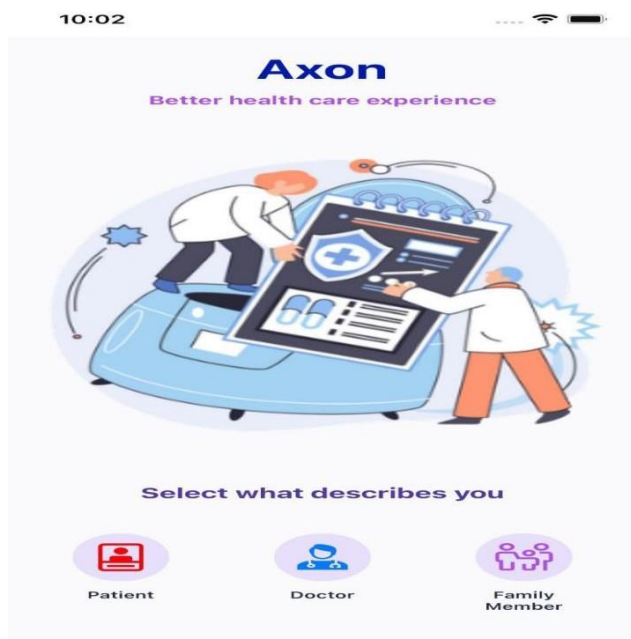
the ability to video call family members or doctors, games, the ability to hear and see jokes, music, lists of links added by family members for patients to listen to, and memories of photos and videos that family members have uploaded.

Log in or register: The user can create an account if they are a new user. They can sign in if they already have an account.

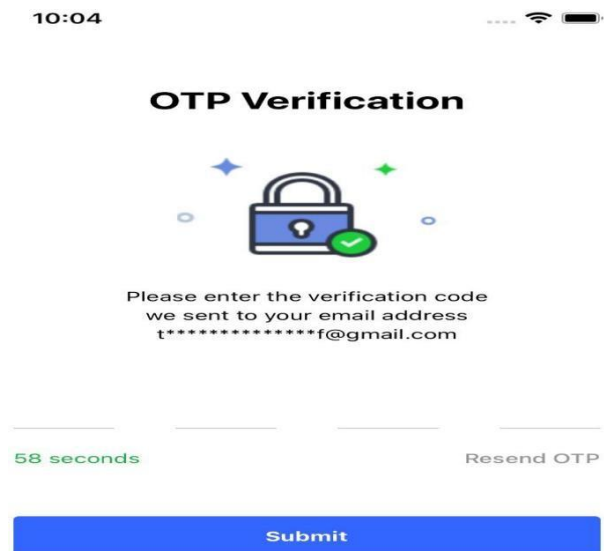


An example of an Axon Outlook may be as follows:

- **Start:** The user can log in or establish an account when the programme launches and welcomes them.



[Already have an account? Login](#)



- Primary menu Options including memory aids, reminders, communication tools, and settings are available from the main menu.

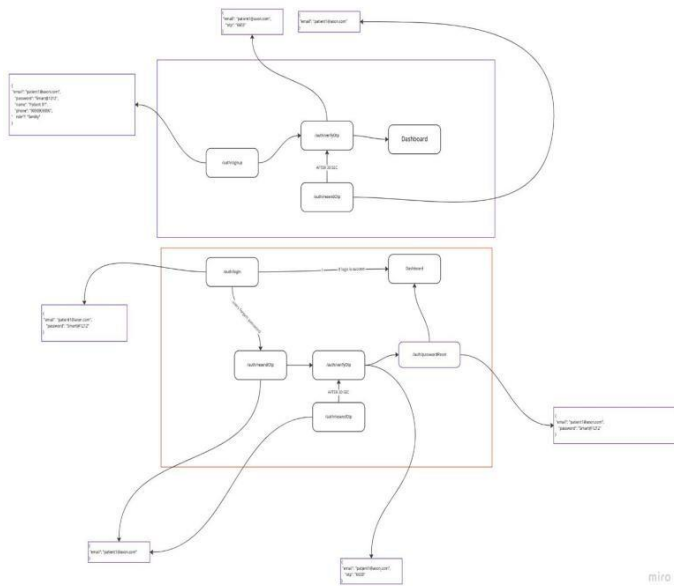


Fig: Flow chart for login and register

- **Memory aids:** This area offers resources and methods to aid users in recalling information, including visual aids, games, and flashcards.
- **Reminders:** The user's preferences can be taken into account when generating reminders for tasks, events, and appointments under this area.
- **Tools for communication:** This area offers users to text and video calling services to keep them in touch with their loved ones and caretakers.
- Users may change options in this section, including text size, colour scheme, and alerts. Logout: The user has the option to leave the programme at any moment.

6. REQUIREMENTS

FUNCTIONAL REQUIREMENTS

1. Stagnant Landing Informational website for the mobile app.

Authentication: Patient, Family Member, and Doctor login options

Games App: An application that uses entertaining and engaging games to stimulate the brain. Problem-solving, speed, memory, and attention are the four primary cognitive domains that the games are meant to test.

Memory Software: This app uses memories (pictures and videos) and activities to assist people with dementia to remember their family members.

The patient's medical history may be monitored by the doctor, who can also add medications if necessary so that family members can view them.

Music therapy allows patients to listen to soothing music to enhance their health.

Video Call: The patient, doctor, and family members can all participate in a video call.

Machine learning: Another use of ML in our project is to identify dementia for the doctor.

4. Non -Functional Requirements Security:

Patient identification: The system requires the patient to use the phone to recognise themselves.

Login ID: To access the system, users must have a Login ID and password.

Changes: The ward administrator is the only person who can make changes to the database, such as inserting, deleting, or updating information.

1. Performance:

Maintainability: The system must have the capacity to accommodate several users simultaneously.

User-Interface: Within five seconds, the user interface acknowledges.

Backup: The system effectively backs up data.

Errors: The system will maintain a record of each error and track them all.

7. System/Software Requirements

HARDWARE REQUIREMENTS

Intel i3 Processor
 4GB RAM
 Windows 10 or Mac OS or Linux

SOFTWARE REQUIREMENT

Node LTS version
 Visual Studio Code
 Postman
 Git and Github Desktop

Additional Tools: Varcel, AWS, Git, MongoDB Atlas etc.

8. SYSTEM DESIGN

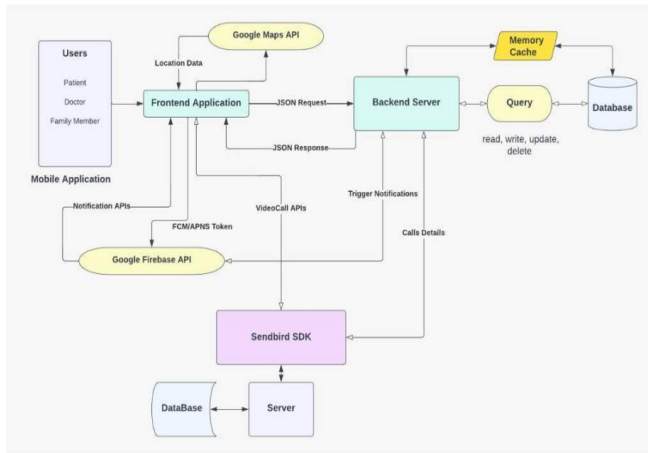


Fig: Deployment Architecture

9. DELIVERABLES

A full-stack web application and mobile application that will serve as a link between people with dementia and doctors because this programme will be the first of its type, we'll work to meet all the user's expectations and to deliver accurate, generic material that will be helpful. This programme will deliver to patients' mobile phones all prescribed drugs for dementia that have been approved by doctors.

10. CONCLUSION

A complicated neurological disorder called dementia may have a significant negative influence on both the quality of life of the affected person and the caretakers. However, advancements in science and technology offer the potential to lessen some of the difficulties brought on by dementia and enhance the general well-being of individuals who are affected. The project concentrated on creating a dementia application that attempted to solve some of the major problems experienced by those with dementia and those who care for them. The application was developed with care to offer support and help with a variety of tasks, including medication management, memory aids, and social interaction. This was done in consultation with healthcare

experts and stakeholders. The study showed how technology has the potential to have a big influence on dementia care, and it emphasized the need for a user-centred design approach in creating solutions that are efficient and practical. The significance of interpersonal relationships and the function of caretakers in giving emotional and social support to people with dementia cannot be replaced by technology, it is crucial to remember this.

REFERENCES

- [1] Gill Livingston and Jonathan Huntley: Dementia prevention, intervention, and care: 2020 report of the Lancet Commission.
- [2] Ploypaphat Saltz and Shih Yin Lin: Dementia Detection using Transformer-Based Deep Learning and Natural Language Processing Models.
- [3] Simon McCallum & Costas Boletis: Dementia Games: A Literature Review of Dementia-Related Serious Games
- [4] Musani Aqsa and Khan Afifah: DIGITAL SIGNAGE(MOBILE APPLICATION FOR DEMENTIA)
- [5] Gunther Eysenbach: A Tablet App Supporting Self-Management for People With Dementia.
- [6] Knapp M, Prince M. *Dementia UK: full report*. London: Alzheimer's Society; 2007
- [7] Matthews FE, Arthur A, Barnes LE, Bond J, Jagger C, Robinson L, et al. A two-decade comparison of prevalence of dementia in individuals aged 65 years and older from three geographical areas of England: results of the Cognitive Function and Ageing Study I and II.
- [8] Gorno-Tempini ML, Hillis AE, Weintraub S, Kertesz A, Mendez M, Cappa SF, et al. Classification of primary progressive aphasia and its variants. *Neurology*.