MedAid

Course: CS 446 **Section**: 002

Team Name: M.A.N.S.
Team Members:
Mufaddal Jerwalla - mjerwall
Aditi Shetty - a3shetty
Nabil Barakati - nbarakat
Stephanie Fok - s3fok

1. Introduction

The problem we decided to tackle involves making an improvement to the field of health management. Our application would be used by stand alone users or by organizations with high involvement with managing other people's health, such as nursing and senior homes. This will serve as an extremely useful tool as a centralized point of information used by those that consume medicines daily.

Currently, there is no easy-to-use, intuitive application for those looking for a way to maintain and manage their medications. Primitive physical organizers are the standard for the distribution of such medication which is extremely prone to errors. Some of such errors include patients forgetting to take their medicine, conflicts that may arise with certain combinations, and poor management of personal medicinal inventory or insurance claims. Furthermore, for social workers that are responsible for the care-taking of many seniors, identifying such aspects for multiple people can become extremely difficult and time consuming to do, potentially resulting in errors that could be life-threatening. As a result of the issues mentioned above, we believe that tackling such problems will serve to be beneficial for millions of people worldwide.

The unfortunate truth about healthcare is the lack of new and improved technology. With that in mind, such systems are also not distributed in terms of data. For example, a family physician may not be aware of the other medications that may have been prescribed to the patient by other doctors. By providing the patient with a centralized system to input and manage their medicines, they can then share this information with the doctor as supplemental information regarding the prescription of new or pre-existing medication. Moreover, a mobile application would be the most applicable in solving such problems as a mobile device provides a compact, portable, and easily accessible solution. With ease-of-access as our primary goal, nurses and social workers working in senior homes and hospitals would be able to pull up such information effortlessly, move to various patients, and repeat the same process without being slowed down by carrying a larger device, such as a laptop. For stand alone users, a phone is something majority of people carry along with them, as a result this would be the easiest way for them to receive such information in a simple to use and timely manner.

2. Functional Properties

Our system will include multiple functionalities that will allow for users to easily manage and view information related to their medication and physical health.

2.1 Calendar

The calendar interface is a vital part of our application, which will contain users' prescribed medications and timings at which these medications need to be taken. The calendar will display information such as any upcoming appointments, what days/time of day certain medication should be administered and reminders around medication renewal when our system identifies inventory running low. This information will also be shown to the user through the use of reminders. This system can also be leveraged by the user to input personal health reminders, pertaining to certain medications.

2.2 Medication Information & History

By displaying information on any medication conflicts, doctor's instructions on how to take the medicine, and physical health and diet recommendations, we are making users more informed on the drugs they are putting into their systems. As users become more informed, they can make better and healthier decisions. Additional functionality will include storing and displaying a user's past medicine history, allowing the user and their physician to easily view such information and make decisions.

2.3 Financial Tracker

Users will able to input information to this application about their current medical insurance, medical costs, and monthly medical budget. With this information, the financial tracker will provide users with information regarding their monthly expenditure on all their medicines and insurance coverage on these medicines. This property will also be able to display upcoming medical payments, using the information provided by Section 1.1 and their insurance coverage, and will let users know their current status in their monthly medical budget. Users will be better informed when making financial decisions.

2.4 Multi-User Experience

As mentioned above, the target user groups of our system include individuals as well as organizations. In the case of organizations, our application will provide the ability to easily manage the medication of several patients under one account. The most practical use cases for this functionality would be for nurses or social workers who need to administer medicine for multiple patients. Our platform will provide and easy-to-use interface that allows patients' medication information to be stored separately and securely, while making it easy to switch between different patient profiles.

3. Scenarios

An example user in our single-user group is a 55 year-old female who takes multiple types of medication regularly for diabetes, high cholesterol, and depression. For diabetes, she must take this medication twice a day with food, while her other medication should be taken once a day. She is a working woman so her schedule is usually very busy, thus she has difficulty in always taking her medication on time. Though she uses a pill organizer to organize her weekly medication, she would prefer viewing her medication usage for upto a month. She will sometimes take other non-prescribed medicine and due to her hectic schedule, she does not always have time to look into conflicting medication. She would find usefulness in this

application through the calendar, reminders, and information features. The calendar and reminders would help her better manage her time for taking and renewing medication. By providing a unified source of information on her medications, she can obtain this information swiftly from her mobile device. Additionally, the ability to view her medical and insurance bills helps her easily manage her budget.

An example user in our multi-user group is a social worker in a nursing home, who is responsible for the medication of several patients. With all patients needing to take various medications several times a day, simply using a pill organizer, a binder of paper, or a computer can be error prone and inconvenient to carry between patient visits. Additionally, the ability to have all patients' medicine information in a portable device makes it easily accessible and quick to update. The reminders that show which patient needs what medicine is also helpful and prevents medication from being incorrectly administered. The portability of our system also enables flexibility between social workers. For example, if a worker is finishing their shift and needs to pass their knowledge onto the worker of the next shift, having a platform that stores up-to-date information allows for much easier and more efficient knowledge transfers.

4. Non-Functional Properties

4.1 Dependability

Keeping these properties in mind, our application will enable users to access and use it at any given point for prolonged periods of time. If the application crashes or forces user logout, any new input or output during that session should not be discarded. Additionally, leveraging cloud resources will guarantee our application is readily available.

4.2 Usability

We should ensure that new users do not encounter any difficulties when discovering the capabilities of our application, specifically the tasks surrounding the upload of personal medical information and specifications regarding medicine intake to the calendar. By incorporating intuitive design, users should be able to effortlessly understand and navigate the calendar interface. As mentioned in Section 4.1, our application factors in memorability ensuring that information is not lost when the application crashes. As mentioned in Section 1, the goal of this application is ease-of-access when replacing manual medicine management, hence our application needs to guarantee user satisfaction.

4.3 Scalability

Our application should be able to scale and support a high number of users without affecting the user experience. This includes account load times, data access, and computation times. Our system will be provisioned to ensure there is always buffer to handle a sudden increase of requests to our system, as well as auto-scale capabilities in our cloud stack. Due to hardware limitations of different Android devices, we are limited in our capability to scale vertically. Thus, we will ensure only sensitive data calculation is performed on device while the rest of the computation will be performed externally.

4.5 Security

As we store all our sensitive user data in an encrypted manner we ensure that such personal details will not be compromised in the event that someone with malicious intent found their way into our system. Accounts will also require username and password to be authenticated