Application for easier healthcare access.

Symbiosis Institute of Technology, Pune

Team overview

Team members:

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PRN and Branch:

1. 20070122024 (CS)
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Roles and responsibilities:

1. Researcher, Interviewer, Designer
2. Researcher, Questionnaire, Designer
3. Researcher, Notemaker, Interviewer
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5. Researcher, Questionnaire preparation
6. Researcher, Notemaker
7. Researcher, Notemaker
8. Researcher, Notemaker

Project overview

The problem:

Hospitals are facing challenges in managing their operations, which include patient registration, appointment scheduling, staff management, inventory management, and patient data management.

The goal:

Design a user-friendly GUI of a mobile app as well as a website for hospital management.The web application should enable hospital staff to manage patient data, schedule appointments, manage inventory, and access reports and analytics. The mobile application should allow patients to schedule appointments, view medical records, and communicate with healthcare providers.

Research Plan

WHERE TO LOOK?

Look for problems in SUHRC Hospital during college days and local hospitals/clinics on weekends.

POINTS TO OBSERVE

Any kind of problems that can be solved by us like registration process, security protocol, registry process, navigation, etc

HOW TO LOOK?

Take a tour throughout the hospital all while taking notes on the points to observe. Take photos of the problems through a mobile phone. Come back to the team with results after analysis.

TEAM ROLES

In our team of 8 researchers, there are 4 notetakers, 3 interviewers, 2 designers and 2 questionnaire makers.

Observations

- Study of AS/IS
- AEIOU: Canvas
- Stakeholder analysis
- Mapping out the stakeholders between Core, direct and indirect stakeholders

Study of: **AS/IS**

Activities:

1. Finding of doctors and hospitals.
2. Contacting the hospital or the doctors.
3. Concluding the appointment for the doctor.
4. Confirming the disease and the treatment.
5. Taking prescribed medications.
6. Clearing the bills.

Existing Systems:

1. Finding of doctors through social circle and contacts.
2. Finding of doctors residing nearby or in the locality.
3. Finding nearby hospitals and taking inputs about the doctors from ex-patients and outsiders

Customer/user touch points:

1. Appointment Scheduling
2. Registration
3. Check-in
4. Triage
5. Medical consultation
6. Prescription Management
7. Billing and Payment

Techniques presently being used:

1. Wearable devices that are used for health tracking.
2. Remote monitoring using devices such as mobile phones.
3. Telehealth.
4. Health coaching.
5. Mental health support.

Gaps:

1. Privacy and security concerns.
2. Limited access and adoption.
3. Lack of regulation and standardization.
4. Accuracy and reliability.
5. Integration with traditional healthcare services.

AEIOU: **Canvas**

Environment:

1. Hospitals
2. Private Clinics
3. Health Centers
4. Pharmacies linked to Hospitals
5. Medical Labs and Research Labs.

Interactions:

1. Talk to doctors regarding their day to day activities.
2. Enquire at the reception how they manage patient and doctor records.
3. Enquire about how the staff communicates among themselves.
4. Enquire how data is sent to pharmacies and Med Labs.

Objects:

1. Hospital Machinery.
2. Beds.
3. Patient Reports.
4. Bills.
5. Stretchers.
6. Ambulances.

Activities:

1. Managing Patient Records.
2. Managing Doctors and Nurses Information.
3. Managing Staff information.
4. Connectivity with Pharmacies and Med Labs to share Prescriptions and Reports.

Users:

1. Hospitals with a large number of doctors, nurses and other staff.
2. Clinics with decent number of doctors and staff.
3. Small hospitals and Clinics.
4. Pharmacies affiliated to hospitals and clinics.
5. Medical Labs and Research Centers affiliated with Hospitals and Clinics.

Observation Tools and Frameworks

Observation Tools:

Observation tools for hospital reception management systems can help hospital staff monitor and manage patient flow, wait times, and overall reception efficiency. Here are some examples:

- Queue management system: A queue management system is useful for observing and managing patient flow in the reception area. This technology may offer real-time information on wait times, patient numbers waiting, and overall receiving process efficiency.

- Patient check-in kiosk: A patient check-in kiosk is a device that can be used to monitor and record patient check-ins. This tool can help reduce wait times and increase reception process efficiency.

- Digital signage: Digital signage can be used to display real-time information such as wait times, appointment calendars, and other critical information. This tool can assist patients in navigating the reception area and staying up to date on their appointments.

Observation Tools and Frameworks (continued)

Frameworks:

There are several frameworks that can be used in Hospital Management to improve the overall efficiency and effectiveness of healthcare services. Here are some of the most commonly used frameworks:

- Lean Six Sigma: This framework is based on the principles of Lean Manufacturing and Six Sigma. It focuses on continuous improvement and aims to reduce waste, improve quality, and increase efficiency in healthcare operations.
- Total Quality Management (TQM): TQM is a management philosophy that emphasizes the need for continuous improvement, customer focus, and employee involvement. In healthcare, TQM can help improve patient satisfaction, reduce errors, and increase efficiency.
- Electronic Health Record (EHR): An EHR is a digital version of a patient's medical record. It can help hospitals improve patient care by providing a complete view of a patient's medical history and enabling faster, more accurate diagnoses.
- Clinical Pathways: Clinical pathways are a set of guidelines that outline the optimal sequence of clinical interventions for a particular condition or disease. They can help standardize care, reduce variation, and improve outcomes.

Stakeholder mapping

1

Core stakeholders

- Partners
- Patients.
- Healthcare providers.
- Payers(Insurance companies or government programs)
- Owner of the business

2

Direct stakeholders

- Suppliers of medical equipment.
- Pharmaceutical companies.
- Healthcare contractors.

3

Indirect Stakeholders

- Family members of patients.
- Advocacy groups.
- General public.
- Government agencies

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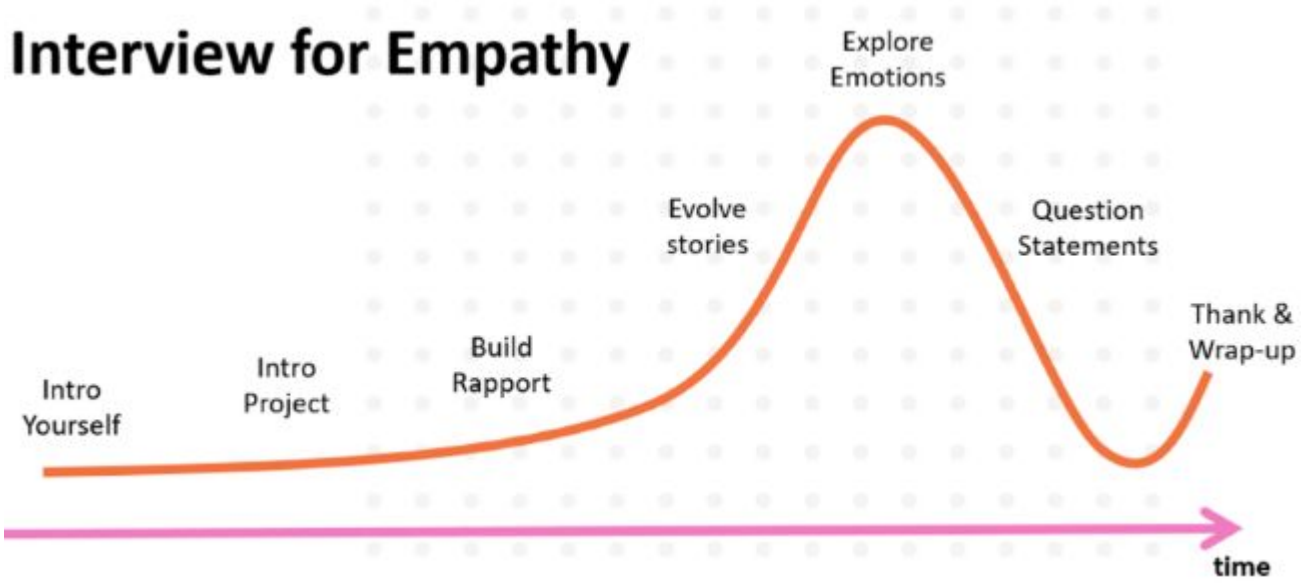
Understanding the user (Empathy)

- 5W and H Questionnaire
- User research
- Empathy Maps
- Personas
- Problem statements
- User journey maps
- User Pain Points (Based on insights from journey maps)

Empathy mapping



5W and H: **Questionnaire**

Who?

1. Who is this application designed for?
2. Who will be responsible for it's optimisation and fault tolerance?
3. Who should be using it?

What?

1. What is the motivation/purpose behind this application?
2. What all services will be required in backend?
3. What kind of solution is your application providing over the traditional methods currently being used?

Where?

1. Where will your project be adopted?
2. Where will the application be promoted/marketed?

When?

1. When will the development be over?
2. When can you expect large scale applications all over the country/globe?
3. When will the user be able to use your application?

Why?

1. Why did you choose this particular field to develop your application?
2. Why should a user prefer your proposed application over existing solutions?
3. Why did you pick this Industry when you had numerous options apart from this?

How?

1. How are you planning to ensure your application's optimal performance?
2. How are you handling optimisation algorithms?
3. How are you planning to expand this further?

User research: **Summary**

Upon interactions with multiple individuals we have come to learn that there is a grave
requirement of efficient management systems in large hospitals due to enormous crowds. This often ends up in a chaos and wrong untimely panic situations.

User Personas.

Name : Pablo Sastabar

Regular Diabetes Patient

- Age : 43
- Occupation : Software Engineer
- Location : Bangalore
- More info : Pablo is a software engineer who has a 9-5 job and works from home. He spends the entirety of his time either on his work table or on his bed. He usually spends weekends getting as much sleep as possible.

Behavior

A laid-back lazy person who's accustomed to sitting in a place and work for 8 hours straight.

Interests

Someone who loves to get as much sleep as possible in his free time.
Someone who'd rather order-in than go out.

Power

Intelligent, knows how to organize and finish his work before deadlines. Always tends to find shortcuts (or, 'Jugaad') to complete his work.

Needs

Mohit is a hardworking man with little time to spend with his family that he values the most. Being able to provide a good standard of living for his wife and 2 children is all he aspires and will often sacrifice his family hours to work for a promotion or a bonus. He is rather timid yet extremely sensitive about anything to do with his children, he is an example of a typical Indian father with more worries than wants.

Values

His moral compass is to take care of his family

Aspirations

To give his family a comfortable and lavish life.

Name : Swagger Naut

"Has a grandchild with asthma"

- Age : 58
- Occupation : retired
- Location : Pune
- More info : Has a son and daughter in law who work in an MNC based in the US. They usually work until late and most of his time is spent looking after his grandchild.

Behavior

- Swagger is a hardworking man with little time to spend with his family that he values the most.
- He is rather timid yet extremely sensitive about anything to do with his children, he is an example of a typical Indian father with more worries than wants.
- He is also be patient, understanding, and supportive of his son and daughter-in-law's careers

Interests

Swagger usually spends his abundance in time with his 6 year old grandchild and is mostly responsible for his health and lifestyle habits. He makes sure that his grandson lives a happy life even in the absence of his parents most of the time

Power

Swagger Naut has a wealth of knowledge, experience, and skills that he developed throughout his life and career.
Other skills include coaching, planning, organization, etc.

Needs

Swagger has no problems in life, leads a happy and fulfilling lifestyle but he has one major worry - his grandson. He had been diagnosed with asthma, while not being completely treatable, he requires regular hospital visits and while there is no financlal issue, each visit takes atleast 3-4 hrs of waiting before getting an appointment, which is not only tiring for Swagger but also for his grandson.

Values

Swagger naut holds great value for his family, especially his grand-son. He runs around inspite of his own illness.

Aspirations

He aspires to have a healthy and happy family life. As a retiree, he also has goals of serving back to the community, maintaining his own health, etc.

Empathy map: **Pablo**

Name : Pablo Sastabar

Pablo Sastabar is a software engineer who has a 9-5 job and works from home. He spends the entirety of his time either on his work table or on his bed. He usually spends weekends getting as much sleep as possible

Feels

Pablo may experience a range of emotions related to managing their condition. They may feel frustrated or overwhelmed at times, but may also feel a sense of accomplishment when they are able to successfully manage their blood sugar levels while also meeting their work obligations.

Does

Irrespective of his health conditions, he does his office work first because of his fear of getting laid out.

Says

Says that he's got alot of work and has to tend to it while he's got no time for himself.

Thinks

Pablo may be focused on managing their health while also fulfilling their responsibilities as an engineer.

Empathy map: **Swagger-Naut**

Name : Swagger-Naut

Swagger Naut is a 58-year-old person who lives in Pune, India. Swagger Naut has a son and daughter-in-law who work for an MNC based in the United States, and spends a lot of time taking care of their grandchild, likely to help support their family. While also having arthritis, which can be challenging to manage while caring for a young child.

Feels

Swagger may feel a wide range of emotions including love and affection for his family, Frustration or stress due to the demands of caring for a young child and managing their arthritis, Empathy towards their son and daughter-in-law, who work long hours and may be unable to help out as much as they would like.

Does

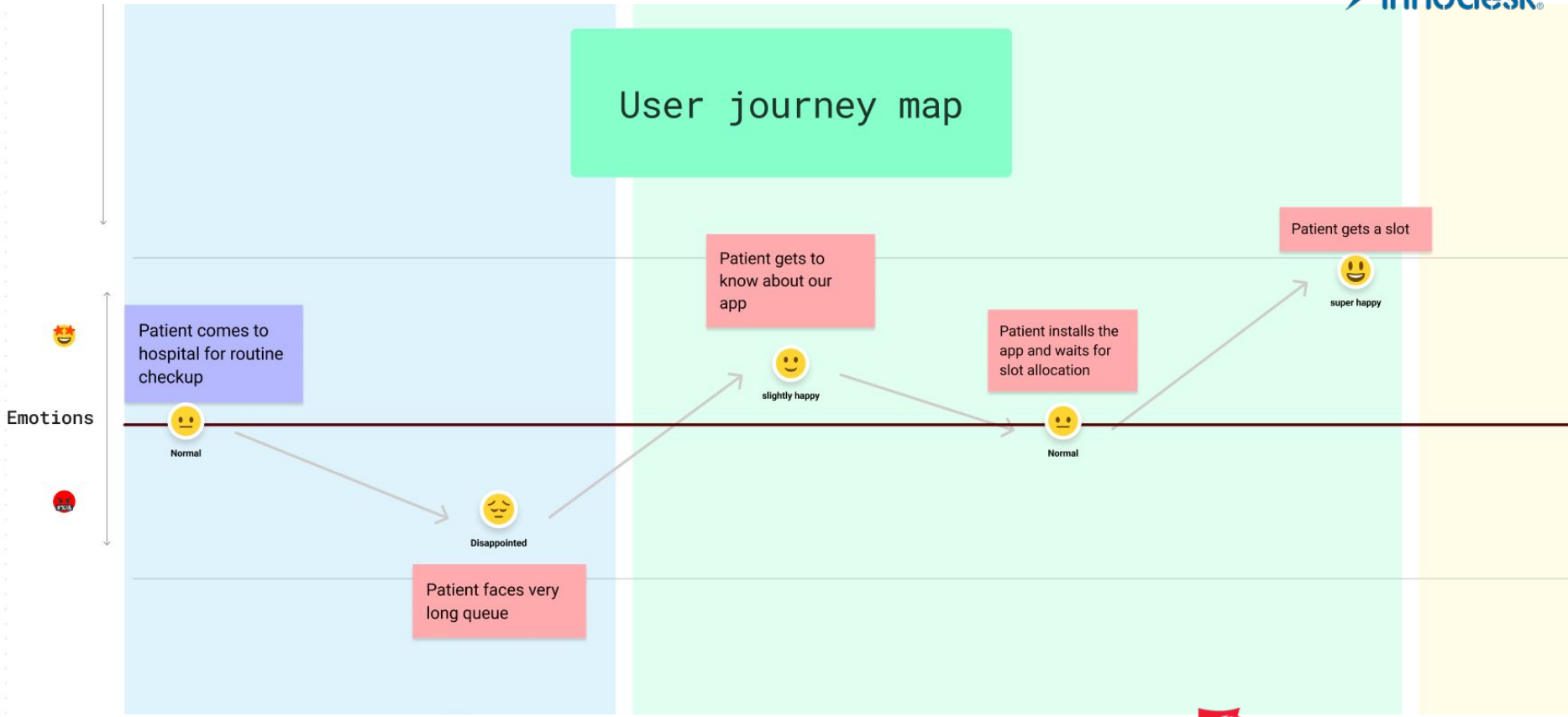
Swagger Naut spends a significant amount of time taking care of their grandchild, likely to help support their family while their son and daughter-in-law work long hours at an MNC based in the United States.

Says

1. "I'm doing okay, just taking it one day at a time."
2. "It's a bit challenging, but I'm managing."
3. "I'm happy to help out with my grandchild, it's a joy to spend time with them."
4. "I'm grateful for my family and happy to support them in any way I can."

Thinks

Love and devotion towards their family and a strong desire to provide support and care for their grandchild.
Concern or worry about their own health and ability to continue providing care for their grandchild.
Frustration or stress due to the demands of caregiving and balancing that with their own health challenges.
A sense of purpose or fulfillment in being able to help their family and be an important part of their grandchild's life.


User journey map
Emotions
Patient comes to hospital for routine checkup
Normal
Patient faces very long queue
Disappointed
Patient gets to know about our app
slightly happy
Patient installs the app and waits for slot allocation
Normal
Patient gets a slot
super happy

User research: **Pain Points**

1

Lack of administration

Hospitals couldn't prioritise different cases in terms of emergency cases due to excessive crowd.

2

Prolonged waiting time

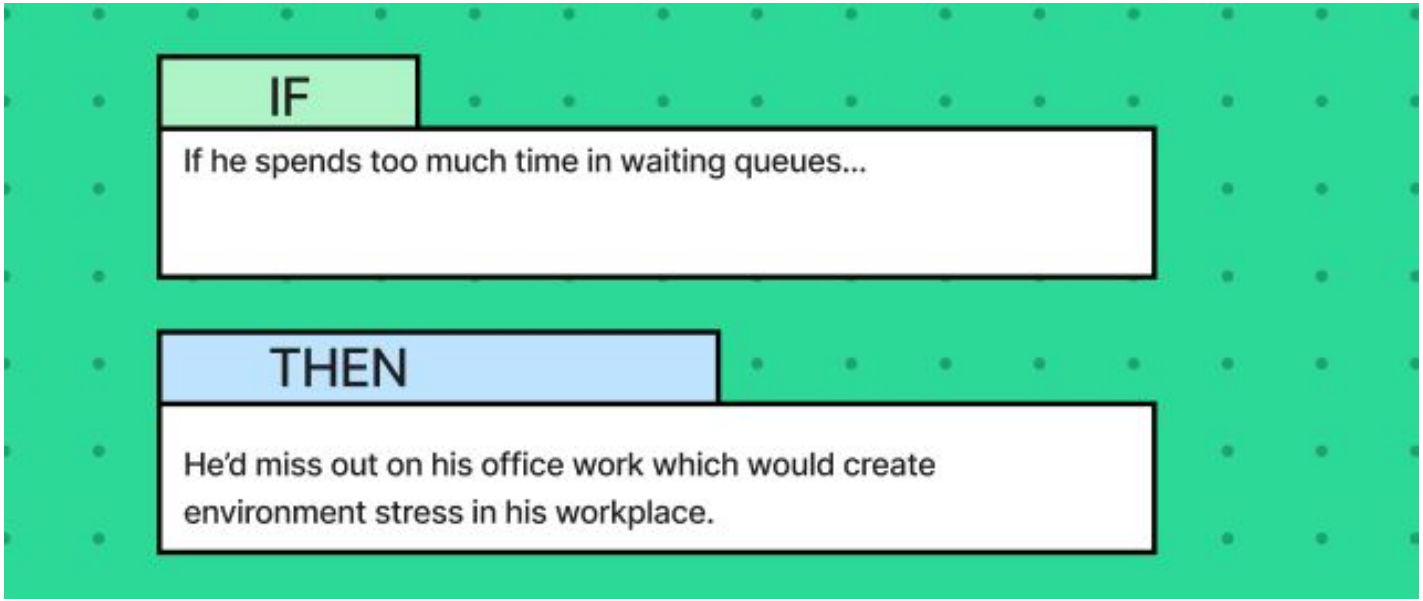
Due to enormous crowds coming at the same time slot.

3

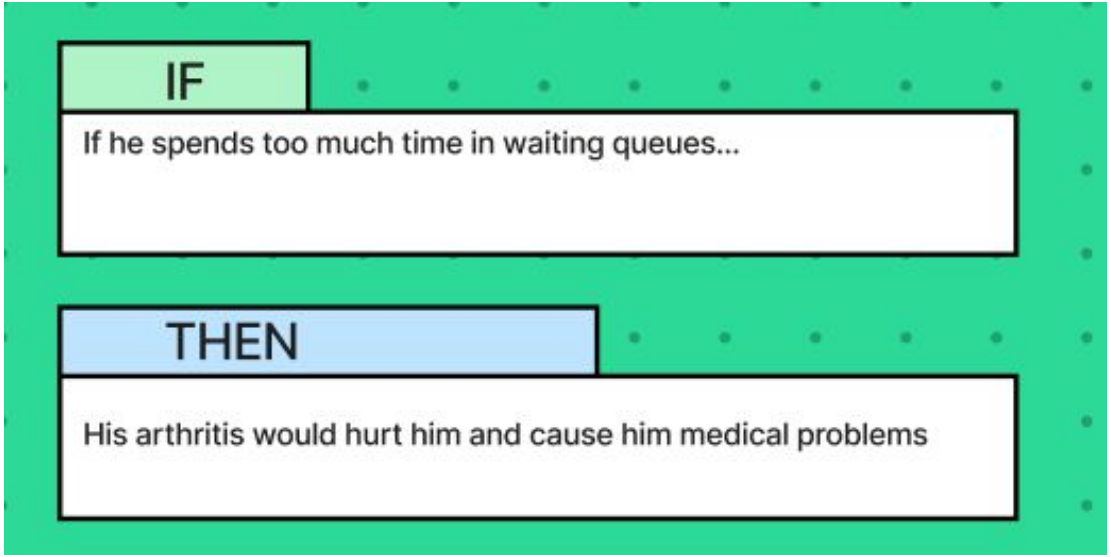
Not enough transparency

Random priority given to users at times.

IF/THEN Statement: **Pablo**



IF/THEN Statement: **Swagger**



Problem **Articulation**

End Users

1. End users are hospital and patient.
2. Patient and hospital staff have customized privileges.
3. Patients of all ages should be able to navigate the mobile phone application.
4. Staff will get administrative powers.

Website and Mobile App

1. **Website:** A fast, responsive, easy-to-navigate website is to be created for the management of hospital by staff. Website will have integration features with paired mobile app.
2. **Mobile App:** Mobile app is to be created for patients of hospital. Patients should be able to get quick help and book appointments, buy medicine etc.

Online Intractability

1. Patients will get access to the complete details and facilities of the hospital through the mobile phone, making physical commute necessary only for treatment.
2. Staff managing the website can do so without being physically in the hospital.

Availability

1. Website and mobile app servers will be operational 24/7 for use by patients and staff.
2. Redundant servers and distributed system management is to be implemented to achieve the availability standards.

Other Facilities

1. 24/7 helpline.
2. Medicine encyclopedia.
3. Home routine checkup.
4. Health test bookings.
5. Online test report viewing.
6. Reminders about prescriptions finishing.

Technologies and Development

1. Development: Agile Methodology
2. Website: HTML, CSS, JS, NodeJS, Python Flask, MongoDB & ReactJS.
3. Mobile App: Java and Kotlin for Android development, Objective-C and Swift for iOS.

Problem **Validation**

Validations from **Stakeholders:**

Pharmaceutical Companies:

Input for an online integrated pharmacy built into the mobile app.

Equipment Suppliers:

Input for dashboard of medical equipments, details on maintenance orders etc.

Hospital Technical Department:

Input for heavy security against attacks or vulnerabilities. Measures to be taken for social and cyber security.

Hospital:

Input for monetization, which is to be implemented as in-app and website advertisement of hospital facilities and schemes.

General Public:

Input for appointment booking to be as seamless and fast as possible for immediate patient service.

Healthcare Providers:

Input for dashboard of patient details, past prescriptions, medical histories etc.

Thank You!