

Rural Healthcare & Artificial Intelligence

Prakhar Bhargava | 3rd Year, Computer Science And Design, IIIT-Delhi

The new age of healthcare in India

It's 2022 and India is still overcoming the Covid-19 pandemic. The healthcare situation in India brought out all its weaknesses in the open. The biggest flaw in the healthcare system was access to quality healthcare. With **1 doctor available per 1456 people** in India (WHO recommends 1:1000), it is hard for most people to access healthcare. The concentration of these doctors in the urban centers also means disproportionate access to healthcare for the rural population of India. The same is true for access to **diagnostic labs, medicines etc.**

Problem statement: Using AI how can we solve the problem of access to quality healthcare across the country?

Tasks:

1. Redefine the problem statement as per your understanding of the ecosystem
2. Showcase how you have identified the target user segment for this problem
3. Identify some key pain points for the target user segment. Highlight the tools used to conduct user research (Good to have conversations with at least 1 target user, showcase what you would cover in your research and how)
4. Customer journey through your product design
5. Pick 1-2 critical screens to showcase your UI design skills

Problem Statement

The healthcare system in India has been facing a major challenge in providing access to quality (or even basic) healthcare, particularly in rural areas. With low Doctor to people ratio, access to healthcare is limited. Additionally the concentration of doctors and specialists in urban areas due to better prospects lead to disproportionate access to healthcare for the rural population.

This is evident from the fact that only 13% of rural population have access to primary health centers, 33% to sub-center and 9.6% to a hospital.

There is an urgent need to address the issue of access to quality healthcare and find solutions implementable in the 70% population with no access to specialist doctor care.

Rural India and health-care

Digital health for all: Importance of digital healthcare in India

February 28, 2023, 4:54 PM IST / Dr. Shuchin Bajaj in Voices, Business, TOI



Dr. Shuchin Bajaj
The author is the
Founder Director, Ujala
Cygnus Group of
Hospitals

Driven by the Covid-19 pandemic, India has adopted digital health at a breathtaking pace. The unprecedented health crisis paved the way for the adoption of telemedicine and thus proved to be a dawn of remote and patient-centric care. However, the country has just begun to tap the enormous potential of digital healthcare for addressing issues of health quality, and affordability, and breaking accessibility barriers in the country's smaller cities and rural areas.

Digital healthcare has the potential to prevent disease and lower healthcare costs while helping patients monitor and manage chronic conditions. Not only this, but it can also tailor medicine for individual patients. However,

[WRITE FOR TOI BLOGS](#)

BLOGS BY DR. SHUCHIN BAJAJ

- 1 Is the new Covid wave really coming?
- 2 Bionic pancreas' effective in controlling blood sugar level in Type 1 diabetics

[MORE BLOGS >](#)

TOP VOICES

Health care in rural India: A lack between need and feed

Sandeep Singh and Sorabh Badaya

[Author information](#) [Copyright and License information](#) [Disclaimer](#)

Dear Editor,

Health is not everything but everything else is nothing without health. "In the beginning desire which was the first seed of mind," says Rig-Veda, which probably is the earliest literature known to mankind. Since antiquity India being the first state to give its citizens health care as a uniform right. However in the present scenario Indian rural health care unmatched to any other social sector. Nearly 86% of all the medical visit in India are made by ruralites with majority still travelling more than 100 km to avail health care facility of 80% is born out of pocket landing them in poverty.[\[1\]](#)

Rural health care in India faces a crisis unmatched by any other sector of the economy. To mention just one dramatic fact, rural medical practitioners (RMPs), who provide 80% of outpatient care, have no formal qualifications for it. They sometimes lack even a high school diploma.

In 2005, the central government launched the National Rural Health Mission (NRHM) under which it proposed to increase public expenditure on health as a proportion of the GDP to 3% from 1%. But increased expenditure without appropriate policy reform is unlikely to suffice. Experience to-date inspires little confidence in the ability of the government to turn the expenditures into effective service.

India still struggles with rural doctor shortages

Dinesh C Sharma

Published: December 12, 2015 • DOI: [https://doi.org/10.1016/S0140-6736\(15\)01231-3](https://doi.org/10.1016/S0140-6736(15)01231-3)

Although the number of health facilities in rural areas of India have increased during the past decade, convincing doctors to work in them remains a challenge. Dinesh C Sharma reports.

In the last week of November, two siblings aged 5 and 6 years died in a remote village in central India after they were given an injection by a quack who thought they had chickenpox. The village, Khodasan in Chhattisgarh state, is accessible only by boat and is more than 40 km away from the nearest government hospital. The incident highlights the poor state of rural health care in India, a system blighted by lack of access to health-care facilities, shortages of doctors and paramedic staff, and the predominance of untrained private practitioners as the first point of care.

The rural health-care system in India is composed of three tiers. Sub-centres are manned by trained health workers and auxiliary nurse midwives, with each centre covering up to 5000 people. Primary health centres, which act as the first point of contact between village communities and a medical officer, are supposed to have a doctor supported by 14 paramedics and other staff. Community health centres are meant to have four medical specialists (a surgeon, physician, gynaecologist, and paediatrician) supported by 21 paramedic and other staff as well as 30 beds and facilities such as an operating theatre and radiology room.

Specialist doctor crisis persists in rural India; no change in last five years despite rising seats in medical colleges

Experts say that specialists, particularly surgical and interventional, require a range of equipment to effectively practise their specialities. When Community Health Centres do not have these infrastructural support, they might be preferring to work in tertiary healthcare facilities where their skills could be more widely utilised and remunerated.

Based on this we narrowed down our target areas and subsequently the Target users and the Stakeholders.

Rural India and health-care

“

Despite network of facilities, only 20% of those seeking outpatient services and 45% of those seeking indoor treatment avail of public services. While the dilapidated state of infrastructure and poor supply of drugs and equipment are partly to blame, the primary culprit is the rampant employee absenteeism. Nation-wide average absentee rate is 40%.

”

The first available government resolution (GR) on the bond dates back to 1996. Since then, the policy has been amended, relaxed, cancelled, and re-implemented at least ten times. The most recent series of amendments commenced in January 2017, when a GR called for the cancellation of medical licenses of about 4500 doctors in Maharashtra on the grounds that they had failed to adhere to the bond conditions.

”

Doctors' expressions of their needs encompassed a range of reforms and improvements, including better salaries and job security, more rational posting and promotion procedures, and facility improvements. Opportunities for need-based skills training and better housing also emerged as key needs, as did better schools, assurance of personal security, and recognition and appreciation of their services by the administration. Increased investment in rural infrastructure and training, graded packages of benefits for rural doctors, and governance reforms to improve the internal accountability of government health services emerge as recommendations from the study.

”

Despite network of facilities, only 20% of those seeking outpatient services and 45% of those seeking indoor treatment avail of public services. While the dilapidated state of infrastructure and poor supply of drugs and equipment are partly to blame, the primary culprit is the rampant employee absenteeism. Nation-wide average absentee rate is 40%.

”

Based on this we narrowed down our target areas and subsequently the Target users and the Stakeholders.

Stakeholders

Primary Stakeholders

People living in rural areas

Doctors

Healthcare Staffs

Secondary Stakeholders

Regulation Authorities / Policy Makers

State

Private Players

Healthcare Industry

Doctors

Public



Perspective of a Doctor (in Rural Area)

Bio

Dr. Pravin Sehgal is an doctor practicing as a Physician in a Government Hospital in village near Mysore. He wishes to help the people living in the rural areas.

Core Needs

He needs a good lifestyle, not for him but for his 2 year old daughter who is about to start schooling.

He wishes to earn money to support his needs as he now has a family to take care of.

He also has a huge education debt which he needs to pay off.

Pain Points

There is lack of resources in the hospital.

Often he is short staffed and there is no specialty doctors in the hospitals.

Due to lack of standard of living he plans to move to a bigger city.

People often blame him due to lack of medicines / resources.

There is no handsome paycheck.



To gather the information I interviewed 2 friends who is currently pursuing Medical (4th Year) in a government college where they have worked at Public Health Centers of Mysuru and Patiala respectively. Along with that I interviewed with one of friends father who has been practicing Medicine in Government hospitals for last few years.

Doctors

Perspective of a Doctor (in City)

Bio

Dr. Umesh Goel is an experienced Orthopedic doctor practicing as a Physician in multiple hospitals in Delhi. He is renowned and is often seen as the Go-To-Specialist in Delhi

Core Needs

He is a well to do person, respected in the society and often looked up to. He wishes to maintain his lifestyle and do a lot for the society.

Pain Points

He does not wish to move to a smaller city since he has an established work here. He enjoys bigger paychecks and lavish lifestyle here.

He wishes to work in places where there is no responsibility on the doctor to arrange for resources, medicines and other supplies.



Doctors

To gather the information I interviewed 2 friends who is currently pursuing Medical (4th Year) in a government college where they have worked at Public Health Centers of Mysuru and Patiala respectively. Along with that I interviewed with one of friends father who has been practicing Medicine in Government hospitals for last few years.

Perspective of a Person living in Rural Areas

Bio

Malti is a 29 year old women living with her father in law, while his husband is off to a bigger city for work. She is a housewife and part time LIC agent and manages the work at home and takes care of her FIL.

Core Needs

She needs a decent lifestyle and access to basic facilities nearby. She feels there isn't a lot medical assistance available unlike in bigger cities.

Pain Points

His FIL who is now old and is getting weak, needs access to medicines and medical support off and on. Most of the time they avoid going to the hospital, since it is very far away in another town, but with things getting worse, they need to visit hospital more often.



Concern Categorization

How can I find the basic medicines for Cold?
Will I be alright?

Short term concerns

It is expensive to go back to show reports to doctor.

How do I treat myself for this disease?

Doctor advised me to get blood test.
How to?
Should I go to the other town for checkup?

How do I protect my family?

What if I get prolonged illness?

Would the new doctor know about my past health record?

Long term concerns

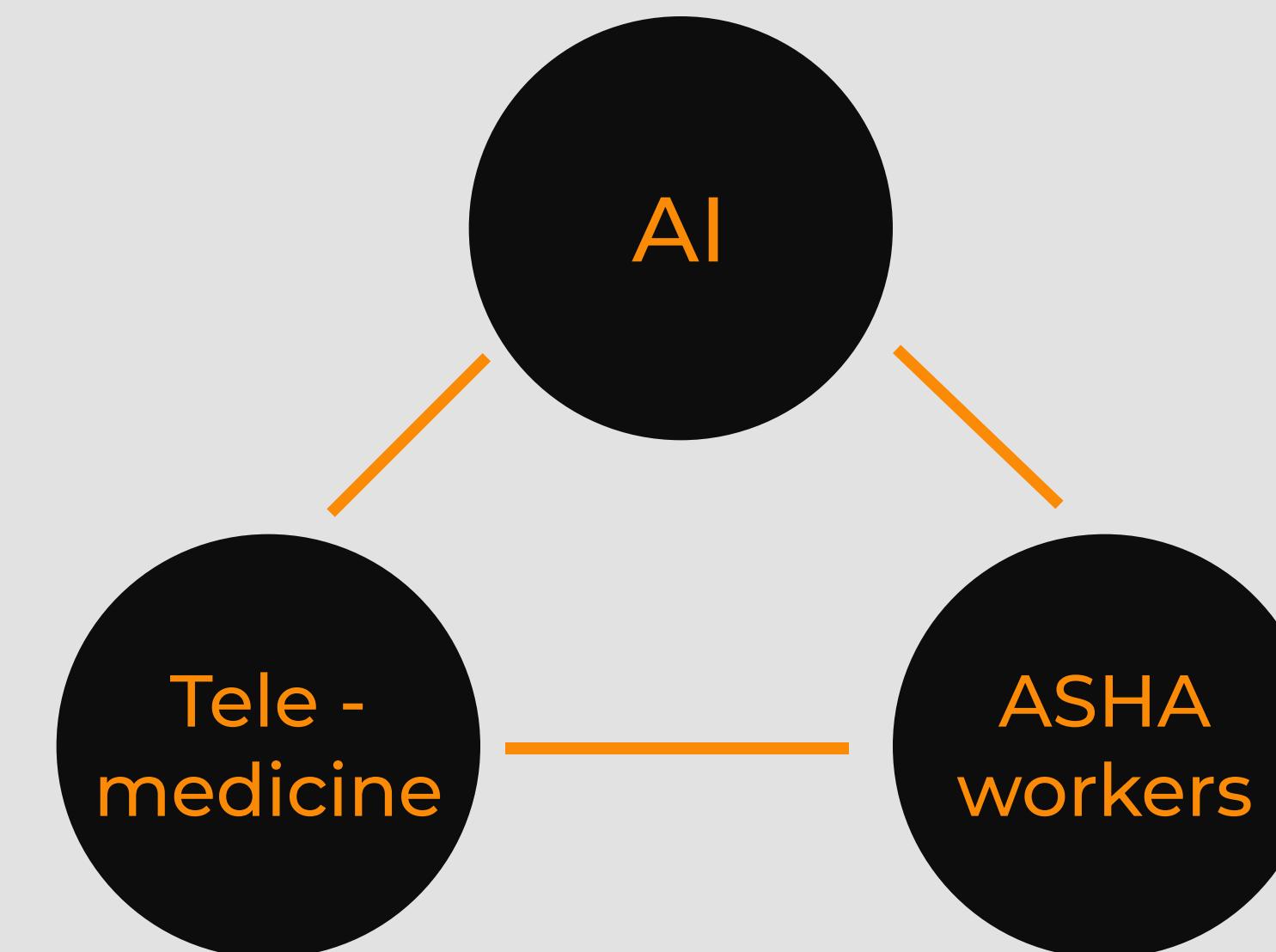
Can I still save money while getting treated?

Would there be a hospital nearby soon?

Can i faind a permanent shelter?
How to make ends meet?

Solution Statement

To address the challenge of limited access to quality healthcare in rural areas of India, we propose implementing an **AI-powered telemedicine intervention** that can provide affordable, high-quality healthcare services to patients. The solution will be supported by a network of local **ASHA workers** who will act as intermediaries between patients and doctors. AI technology will be utilized to enable remote diagnosis and treatment of patients, reducing the burden on rural healthcare infrastructure.



Telemedicine - New ray of Hope

The telemedicine solution will incorporate AI-powered diagnostic tools, predictive analytics and remote monitoring to improve patient outcomes. ASHA workers will collect diagnostic data such as blood pressure, heart rate, and hemoglobin levels and provide local support and testing services. This approach will enable doctors to quickly diagnose and treat patients remotely, providing specialist care to rural areas where access to specialist doctors is limited. Video consultancy and NLP based Chat Consultancy would be the driving force for the service, where experienced doctors would provide remote consultancy.

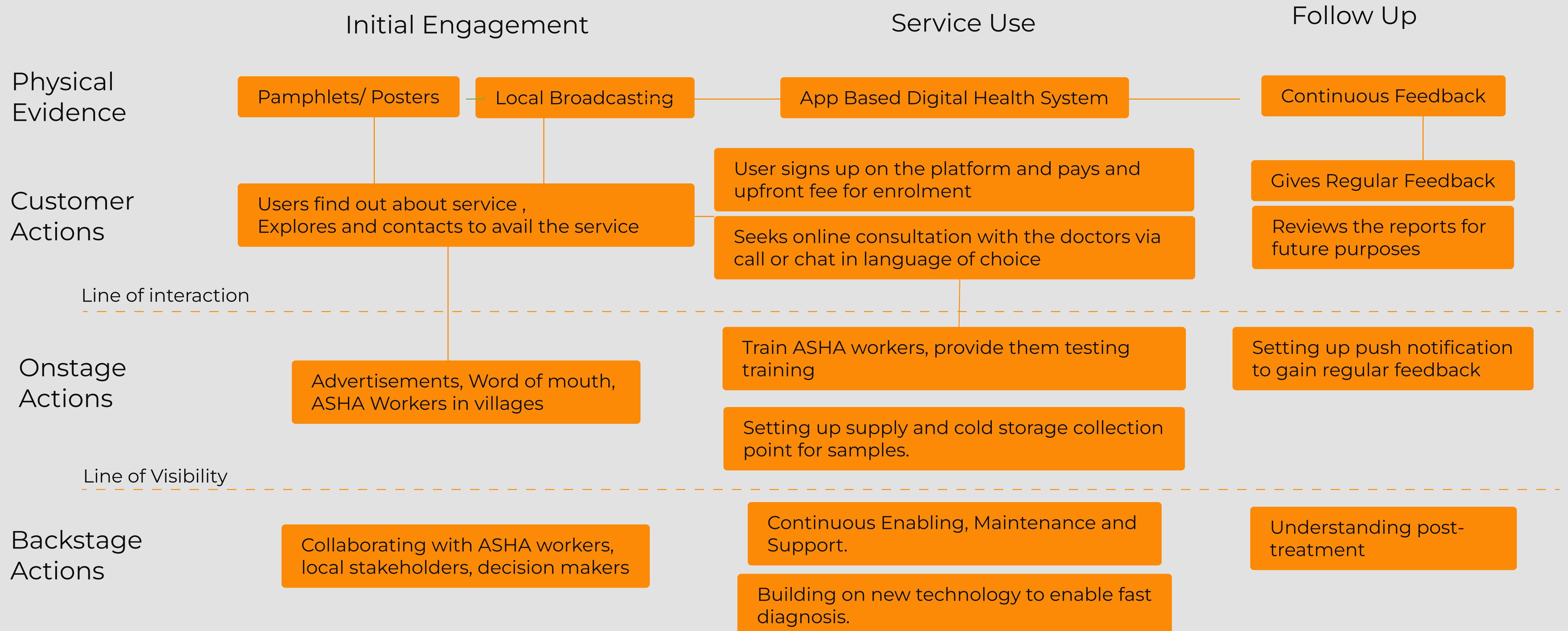
Virtual Consultation

Local support & Testing

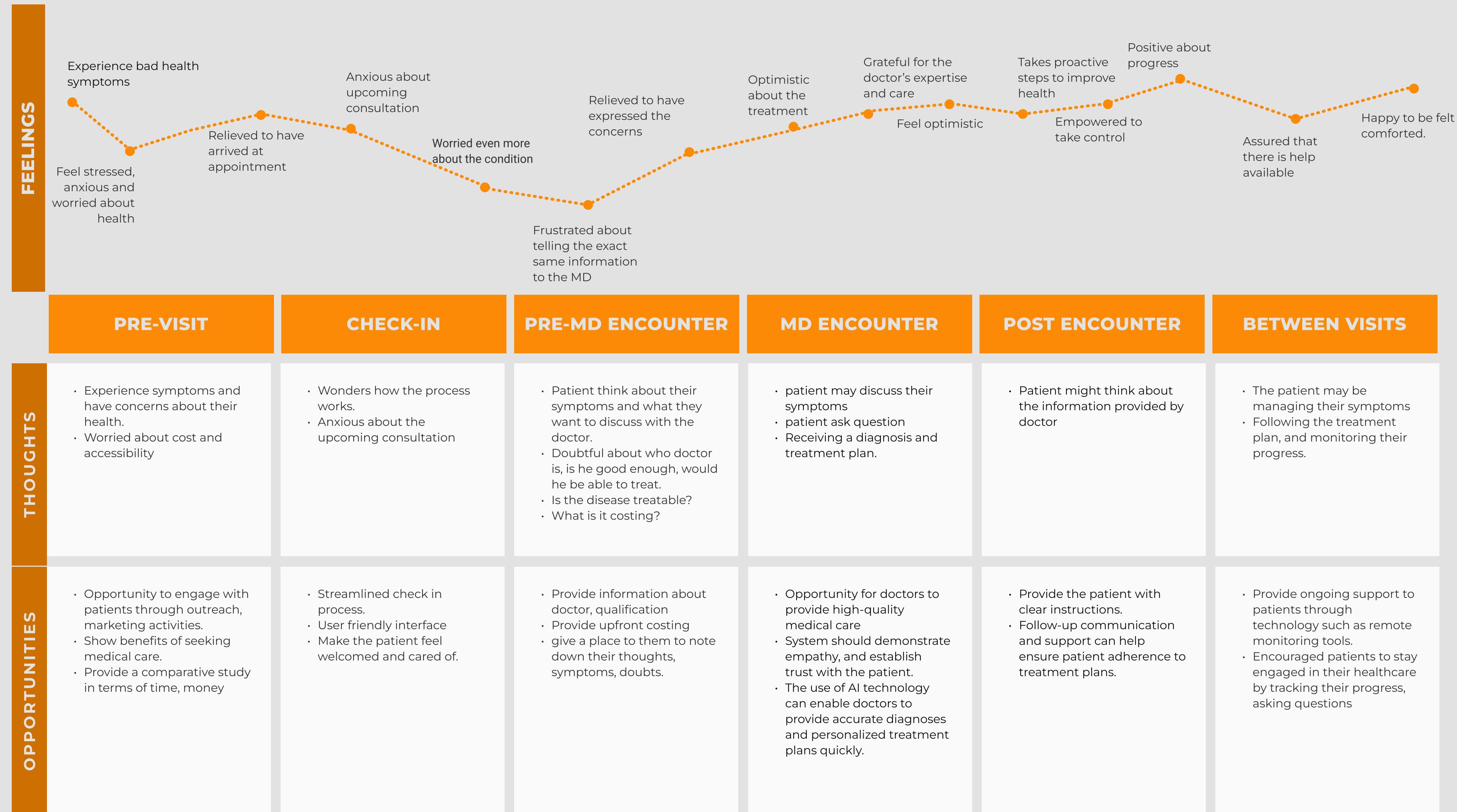
AI enabled Faster
Diagnosis



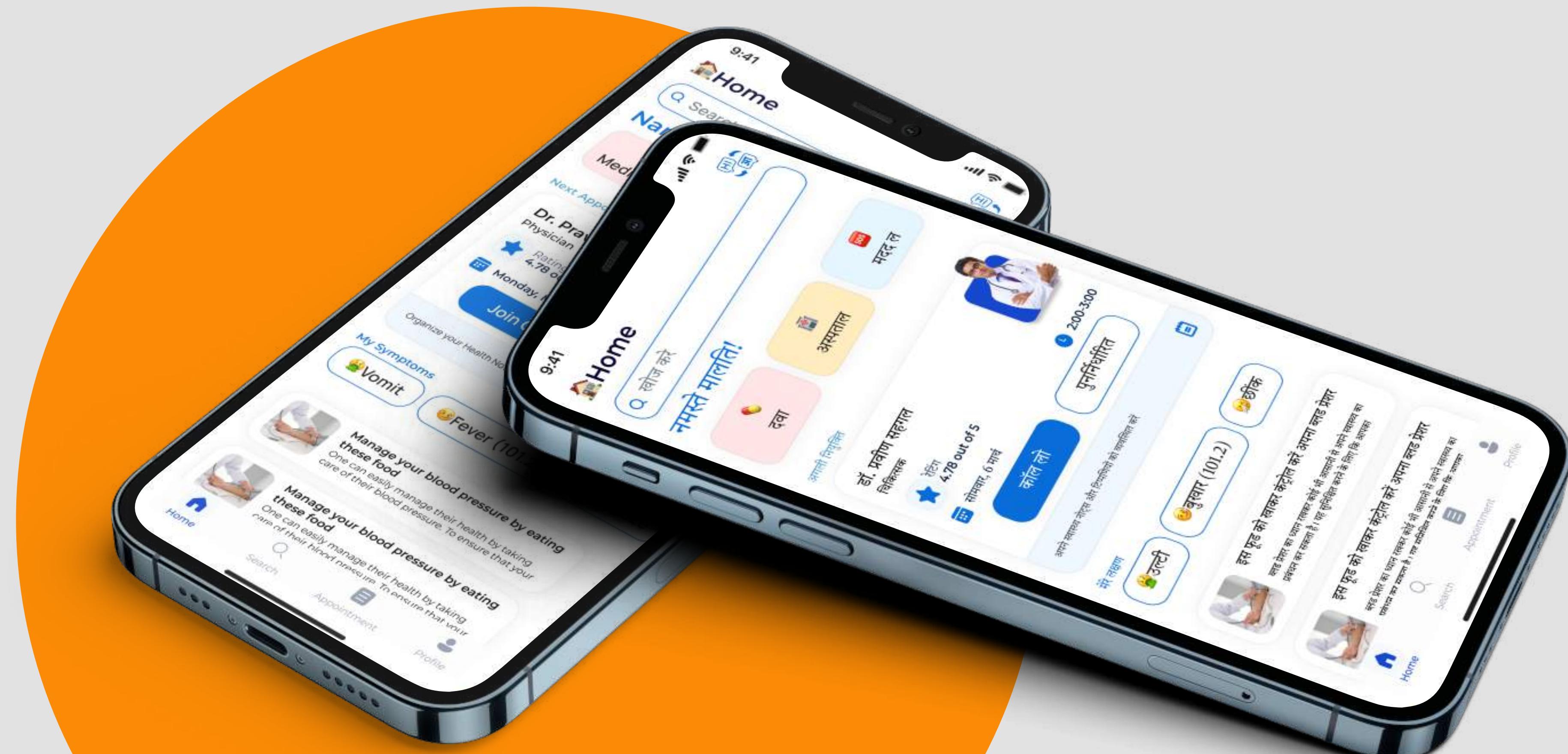
Service Blueprint



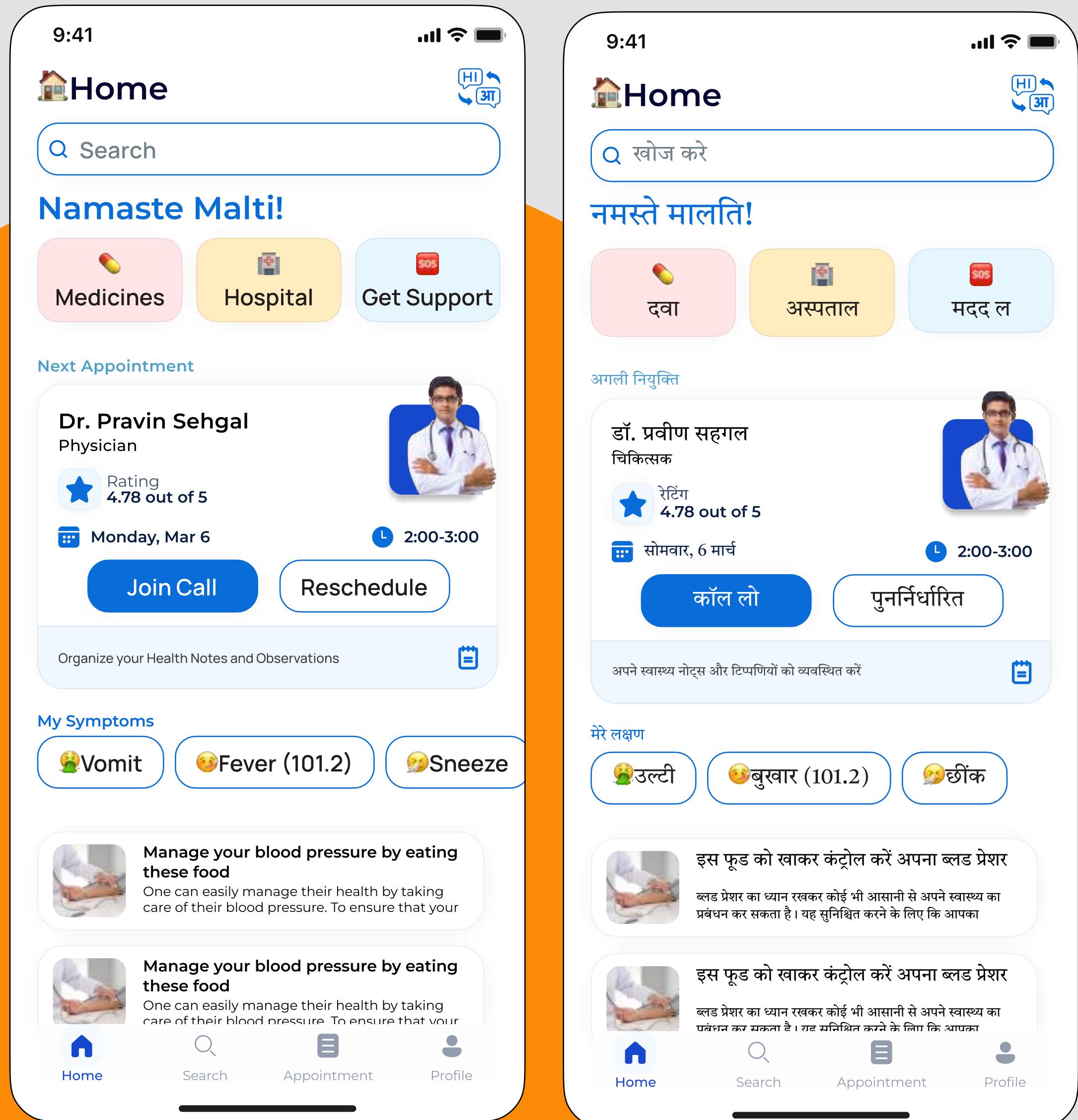
Customer Journey Map



User Interface



User Interface



The UI of the healthcare app has been designed with the opportunities mentioned in the Customer Journey Map in mind. The design is simple, with a focus on emojis and icons that people are familiar with from using smartphones and messaging apps like WhatsApp.

The app has been developed for deployment in rural areas, with an intuitive and user-friendly interface that makes use of self-explanatory emojis. To ensure accessibility, the app supports multiple languages, as demonstrated by its use of Hindi, with the possibility of adding other regional languages as well.

The app's clear UX writing avoids the use of difficult jargon, making it easy to understand and navigate.

Self Reflection

Undertaking this assignment has been a rewarding experience for me as it involved extensive research through a variety of sources such as research papers, journals, news articles, and independent reports. I also had the opportunity to interact with people in the healthcare field and those who have served in rural areas. However, due to ongoing mid-semester exams, I was only able to begin my research on Saturday evening, which limited my ability to gather more information.

If I had more time, I would have liked to conduct further secondary research by reading more papers and finding relevant independent news articles. I also would have liked to connect with more people, particularly doctors living and serving in rural areas, to gain a deeper understanding of the challenges they face.

While the proposed solution has potential, I acknowledge that there are still some shortcomings such as a lack of personal touch and incomplete information about the supply chain and revenue models. To address these gaps, it would be necessary to conduct further analysis.

A detailed analysis before defining the problem was also necessary, which I do while working on a UX project, which was missing here, and I can clearly feel the difference.

Additionally, I would have liked to visit a public healthcare center established by the government and interact with locals to gain a better understanding of the situation on the ground. This could have provided valuable insights to further develop the proposed solution.