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Internet of Things

Case Study

Developing a Software Solution for Healthcare Devices



Internet of Things Case Study: Developing a Software Solution for Healthcare Devices

01 Introduction

The healthcare industry is one of the most essential and fastest-growing sectors at current times in the world. The health sector is slowly and steadily catching up with the advancements in technology with the world witnessing thousands of innovations and technological interventions in this field. The global health tech market is projected to be worth \$974.5 billion by 2027, growing at a compounded annual growth rate (CAGR) of 19.8% in the upcoming years. According to a study by the Internet and Mobile Association of India and Praxis Global Alliance, India's health tech sector was valued at \$1.9 billion in 2020 and is expected to grow at a CAGR of 39% and will reach \$5 billion by 2023 and \$50 billion by 2033.

The major trends driving the growth can be narrowed down in general to telemedicine and online consultations, e-pharmacies, digital therapeutics, smart wearables, applications, and data. Smart wearables, also known as personal healthcare devices, are one of the fastest-growing sectors of both the health tech and Internet of Things (IoT) market and is sometimes referred to as the Internet of Medical Things (IoMT). These IoT-enabled healthcare devices offer numerous opportunities for healthcare professionals to monitor patients and more importantly for the patients to monitor themselves.

02 Key Challenges

Individuals with the need to constantly monitor their health, the elderly people, fitness freaks, and the tech-savvy youth have adapted themselves to personal healthcare equipment such as heart rate and blood pressure monitoring devices, smart wearables such as fitness trackers, smartwatches connected to smartphones, and other medical-grade products to monitor their health and fitness regularly. Considering the exponential growth in the development of IoT-enabled healthcare devices and the continuous release of new health tech devices into the market, it is expected from the mobile applications in smartphones to be well adaptable to the existing old generation devices as well as designed to be well-adaptable for the wide range of new generation health tech devices.

Thus, we designed a mobile application for the end users to address the need for a software solution capable of adapting itself to both the old and new generation of healthcare equipment with IoT.



03 Solution Design

For the above-mentioned requirement, we started to analyze the existing mobile applications that are designed to be compatible with the old generation of health tech devices with Bluetooth Low Energy (BLE) connectivity and understand the upcoming frameworks to be used in the new generation of personal healthcare devices that lean more towards wireless technologies for connectivity.

During the design of the solution in the form of a mobile application, we were mindful of the following principles and concerns in the industry:

● User and data privacy:

An application to manage IoT devices had to be designed in a manner to ensure that the application doesn't evade the user's privacy in any manner. Users are informed of the data that is collected by the device and given the option to control how their data is used.

● Data Security:

It is crucial to prevent unauthorized access and data breaches in IoT applications. To ensure users' sensitive personal health information is protected, the application implements strong security measures such as encryption and authentication, to protect user data from unauthorized access. Importance is given to the secure storage of data in the device and cloud with appropriate access controls.

● Data Isolation:

Data isolation has to be achieved in the mobile application to prevent the accidental or intentional misuse of data by unauthorized parties. The major three types of data that are kept isolated from each other broadly include personal user data, device data, and application data. Personal user data includes sensitive information such as name, address, and payment details. Device data has information on the device's location, status, and activity history whereas application data covers user preferences, settings, and usage patterns.

● Data Migration:

Since the old application had an already established customer base, we successfully performed a backend migration of the customer data into the revamped mobile application all the while ensuring that the process is seamless, and no customer data has been lost during the process.

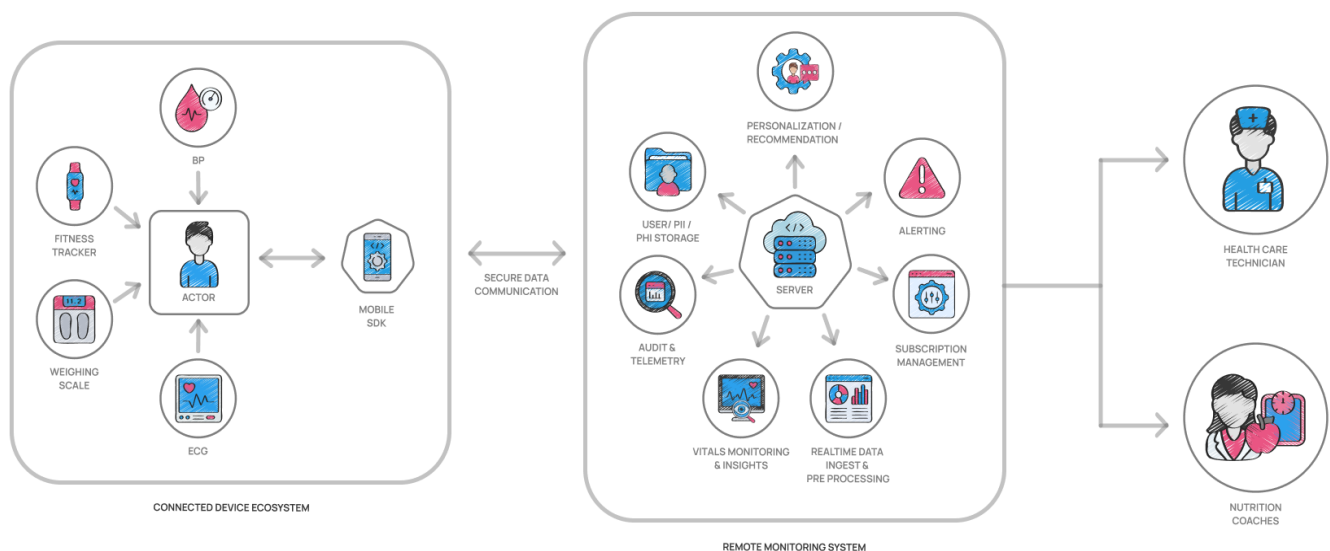


● Application Adaptability:

For a mobile application to stay relevant in the market for a longer period of time, it is necessary to ensure that the application has the ability to adapt to changing users' needs and requirements and, in this case, be compatible with the new and upcoming generation of personal healthcare devices. This is achieved in the application by implementing a modular architecture, allowing the developers to add or remove components easily.

● Application Scalability:

Considering the number of personal healthcare devices compatible with the application and an exponential increase in the number of devices bought and its growth in the future, the mobile application is designed to handle increasing levels of traffic and usage through a scalable infrastructure.



04 Solution Stakeholders

The major stakeholders in the IoT health tech devices can be broadly classified into two major users: the end customer and the device manufacturer who in this case can be referred to as the administrator.



● End Customer:

The success of the developed mobile application is determined by its ease of use and adoption by the end customer and using the features provided to their advantage. Thus, the application enables the end customer to pair the app with both old or new-generation personal healthcare equipment using Bluetooth or other wireless technology. It enables them to monitor the data provided by the equipment such as heart rate, blood pressure, blood sugar, oxygen levels, and other relevant parameters in real-time and also share it with their health guardians.

In addition to the above-mentioned functionalities, users are provided with an analytic tool to track their health status over time which facilitates this in health goal setting and tracking all the while ensuring the user's privacy and data security.

● Administrator:

The performance of the solution to access the data from the IoT-enabled healthcare equipment can only be optimized and new features can be added when the equipment manufacturers are provided with real-time insights into their device and application functionality. Hence, a dashboard that displays real-time data on device usage, performance, and other end customer-relevant metrics is shown to the administrator.

The admin panel allows the user to manage and configure the connected healthcare equipment, including firmware updates, settings, as well as troubleshooting. The admin is also provided with only the basic and necessary customer data for their operations.

05 Key Achievements

Post-launching the application in the market, it witnessed increased downloads for both Android and iOS versions of the application with more than a hundred thousand users keeping track of their health through the IoT-enabled healthcare equipment. In addition, the usability and friendliness of the application have proved successful in retaining the customer base as well as expanding it.

The functionalities provided to the administrator have enabled the IoT healthcare equipment manufacturer to maintain and configure the application and equipment in a timely manner. The integration of the analytics dashboard has helped the marketing team of the organization to understand their user's demographics and streamline their marketing efforts.



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06 Statistics References

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