PROJECT

EPIONE

THE WEARABLE OF TOMORROW

BY GAIP IOTW 19 G1

40%
Of elderly Singaporeans have experienced joint pains

50+%
Of people are afraid of undergoing surgeries to cure their pain

10%
Actually get their injuries/pain treated

We aim to improve the quality of life of people, particularly the elderly, by providing them with guidance for simple exercises, physiotherapeutic movements and implement a fitness and health monitoring system.

Source: https://www.asiaone.com/health/nearly-half-elderly-sporeans-suffer-knee-pain

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THE PROBLEM AT HAND

PROTOTYPE AND ITS CONSTRUCTION

FINAL PRODUCT AND ITS FEATURES

BUSINESS MODEL AND EXPENSES

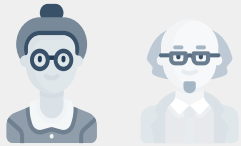
PROBLEM STATEMENT

To provide smart physiotherapeutic aid for the elderly.

OUR SOLUTION

1. Ensure that the exercise routine is being followed correctly in order to prevent pain and injury
2. Monitor patient vitals and activity (steps, movements) remotely.

THE PROTOTYPE



MOBILE APPLICATION

USER

Image taken by the Camera for Mobile App

Over Wi-Fi

Image Processing on Google Cloud

Exercise correction using PoseNet

Yes or No signal sent to user via App

WEARABLE

Data from Wearable

Sensortag

Microbit

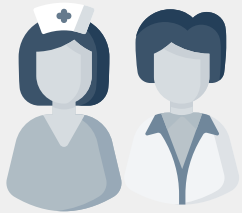
Data collected in Raspberry Pi

- Over Wi-Fi
- API
- JSON Format

Azure IoT Hub

PowerBi

Visualization



ARCHITECTURE

THE NETWORK CONNECTIONS

MOBILE APPLICATION TO CLOUD

Wi-Fi

SENSOR TAG/MICROBIT TO RASPBERRY PI

Serial (wired)

RASPBERRY PI TO IOT HUB

Wi-Fi

SENSORS ON THE WEARABLE

- Temperature sensor
- Accelerometer
- Gyroscope
- Light Sensor

IOT SECURITY

DEVICE TO PI

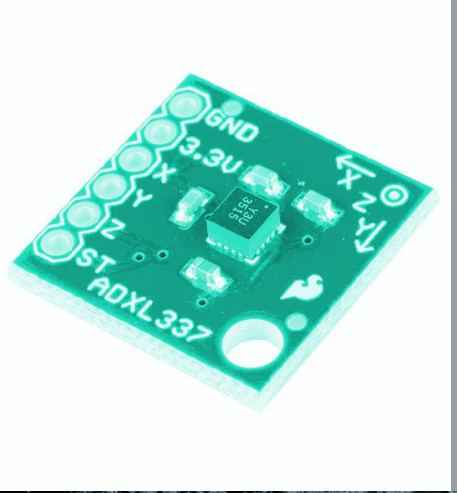
- Encryption

PI TO HUB

- Symmetric Key Encryption

PHYSICAL SECURITY FOR HARDWARE

- Blocking the ports of the Raspberry Pi
- Smartphones have an in-built security system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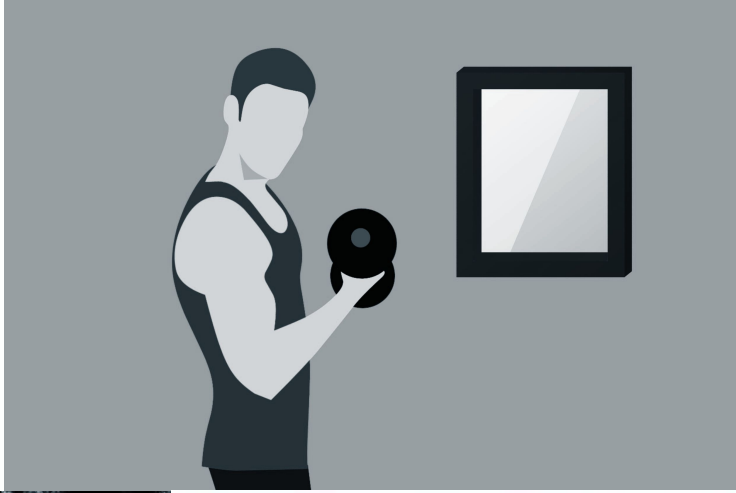


THE PRODUCT

PORTABILITY

Portability can be improved tremendously by using a more compact processor (e.g: Qualcomm Snapdragon 429) instead of the Raspberry Pi

WRIST WEARABLE VARIANT

A wrist wearable variant can be introduced to cater to the requirements of different customers

ADD MORE EXERCISES

The system can be trained to detect errors in more varieties of exercises. This can be extended to yoga and aerobics as well.

INCLUSION OF A HEART RATE SENSOR

For better monitoring of vitals

BUSINESS MODEL

TYPES OF INJURIES

TRAINING INJURIES

Training errors can occur when you take on too much physical activity too quickly.

Our vital monitoring system summarizes the user's workout intensity, so that the changes can be implemented when needed.

TECHNIQUE INJURY

Improper form can lead to imbalanced loading on specific muscles and tissues, which can lead to long-term damage.

Our real time exercise monitoring helps in correcting possible faults the user could be making to prevent sustained damage.

CUSTOMER EXPENDITURE

~3 SESSIONS PER MONTH

After which the patient would have to maintain an unsupervised exercise routine.

135 SGD COST PER SESSION

A session lasts for typically 45 mins.

Source:

- https://www.coreconcepts.com.sg/service-fees/
- https://www.arthritis.org/living-with-arthritis/treatments/natural/other-therapies/what-is-physical-therapy.php

CAPITAL EXPENSES

SENSORS

Heart rate, Temperature, Gyroscope
~ 10 + 8 + 4 = 22 SGD

CLOUD SERVICES

~10 SGD/MONTH

APP DEPLOYMENT

= 34 SGD

INFRASTRUCTURE REQUIREMENTS

Smartphones(2/3/4G), Wi-Fi connection

OPERATIONAL EXPENSES

APP MAINTENANCE

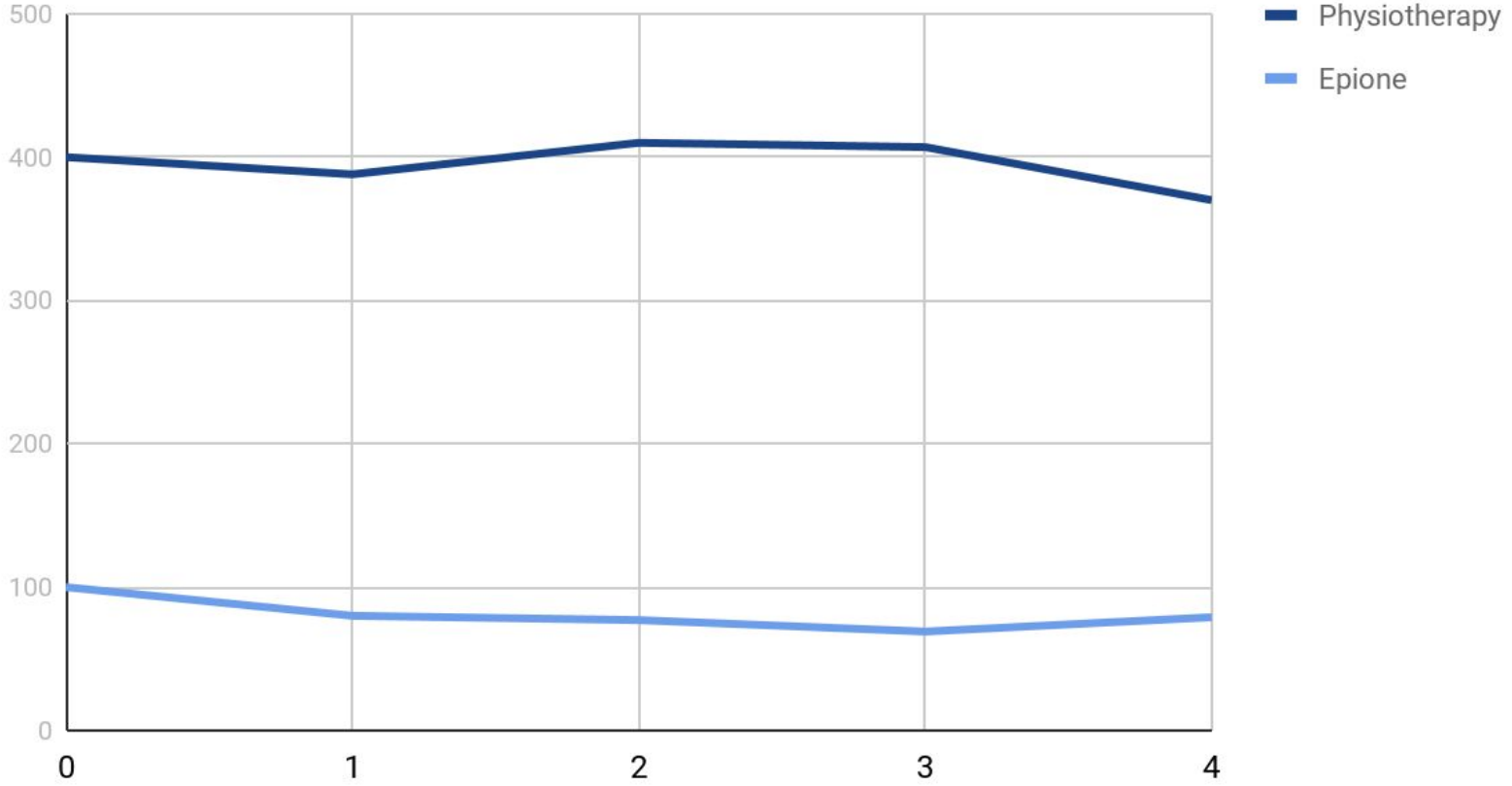
CASE STUDY

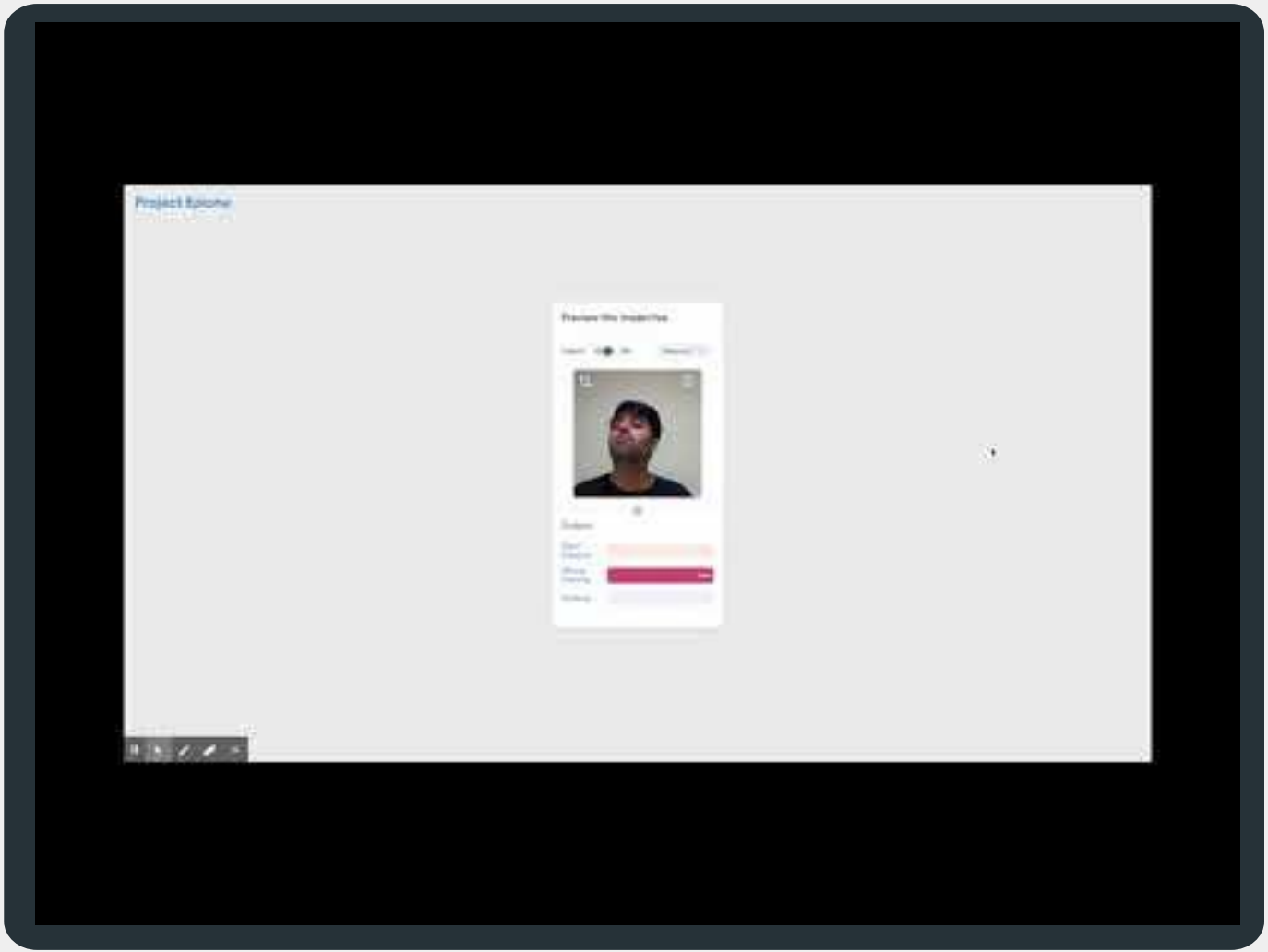
John is a 63 year old gentleman living in Singapore. Recently, he has been suffering from neck and elbow pain. Upon his family's advice, he visits a physiotherapist, who recommends 3 weekly sessions for a period of two months. Each session costs John approximately **SGD 135-150**.

CASE STUDY (CONTD.)

John decides to buy our products. Considering that the product sells at **SGD 40**, John buys it and sets up his Epione App Account. His doctor can monitor his vitals and suggest various exercises depending on how his body reacts. Now, John needs to visit his physiotherapist once a month to follow up on his reports. Each appointment costs him about **SGD 60-80**.

Monthly Cost Comparison





SNEAK PEEK

THANK YOU