HOME ASSISTANT WITH A THROWBACK TOOL

HAwTT

A PROJECT REPORT

By

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DECLARATION BY THE CANDIDATE

I hereby declare that the project report entitled "Home Assistant With a Throwback Tool (HAwTT)" submitted by me to SITE, VIT University, Vellore in partial fulfillment of the requirement for the award of the Internet of Things is a record of bonafide project work carried out by me under the guidance of **Daphne Lopez.** I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full, for the award of any other course in this institute or university.

Place: Vellore   Signature of the Candidates

Date: 2nd November, 2017

Abstract

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data. Our project uses a Raspberry pi unit to implement certain basic functionalities into a mirror. Internet of Things is all about embedding technology into everyday objects so as to make our living more convenient. Our project is an attempt to do the same. The idea of talking to a mirror has been there since ages. With the growth of technology, we are finally being able to turn this into reality.

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Introduction

A. Background

In our busy, hectic lives we try to make things easier to better our lives and focus on more important things. Automation and assistance of such things are in great demand these days. This is where IOT plays its role. the goal of the Internet of Things (IoT) concept is to enable us to get our appliances to do what we want — and we won't even need to touch a button (for instance, you could simply walk into a room and your curtains would open, the temperature would turn up, and your favorite song would start playing).

B. Motivation

Over the last couple of decades, there has been an exponential growth in the way people use technology. The internet has evolved from being a tool for the army, to being an indispensable part of our lives. As a result of which IoT is supposedly the next big thing! There is always the need for technology to keep up with the rapid changes in people's lifestyles. In a world where mobile phones, TVs, Homes, Cameras, Cars and almost everything is evolving into a "smart" thing, it is only realistic to assume that trivial things shall also follow suit in this "smart revolution". Further Ubiquity, is rooted in the foundations of IoT. Thus an IoT system which manages to be modular, ubiquitous yet still being invisible to the user by providing a sense of familiarity and ease-of-use is an ideal IoT system. Our project is one such idea that is built on these principles.

Objective

This project is a meagre demonstration of how very interesting IoT is. With this project we aim to quantify the fact that something as simple as a mirror can be much more versatile than rendering people's faces. We intend to add functionalities such as:

- Adding Tasks

- Checking Tasks

- Show time

- Greeting according to time of day

- Text based assistant

- Acknowledging cab hire

- Open source code on GIT for future task creation

Methodology

The rudimentary objectives involved behind the project are:

I. Running an HTTP server, which shall host the web based interface on a raspberry pi 3 unit.

II. Developing Android/iOS apps to provide

  A. A means of authentication.

  B. Passing health data.

  C. Allowing remote access.

III. Using an ultrasonic sensor to detect motion, and toggle display on user's presence.

1. Software setup

The System:

- An SD Card was flashed with **Raspbian OS** using a secondary computer.

- **Raspbian OS** was installed onto the raspberry pi from SD card using noobs utility.

- A website was developed on the pi using **HTML5, CSS, and JavaScript.**

- **API.ai's web speech API** was used to develop a **voice based assistant**

- A minimal and dark themed interface was built with **contrasting text** so as to project through the glass.

- The project was initialised as a GIT repository so as to facilitate remote upgrades in the future.

- A simple HTTP Server was created using python to host the site.

- Python scripts were written for configuring the ultrasonic sensor and startup operations.

Mobile Apps:

• A common UI/UX was designed for both iOS and Android.

• The apps were built to provide the following three functionalities:

      - Authentication using Firebase-Auth

      - Throwback Tool

      - Pushing Health Data.

2. Hardware

- 2 AC ports were used to power up the monitor and the pi

- An HDMI-Male-to-VGA-female cable adapter was used to connect the pi with the monitor

- III.A mouse and keyboard were connected initially for the setup and were removed later.

- A microphone was connected to allow voice commands.

- A one way mirror was clamped on top of the display.

3. Block Diagram

HAwTT mainframe system

USB

Microphone

USB

Power
Supply
Unit

LCD

LCD UNIT
One-Way Mirror

HDMI

5V

HDMI

VGA

HDMI-VGA
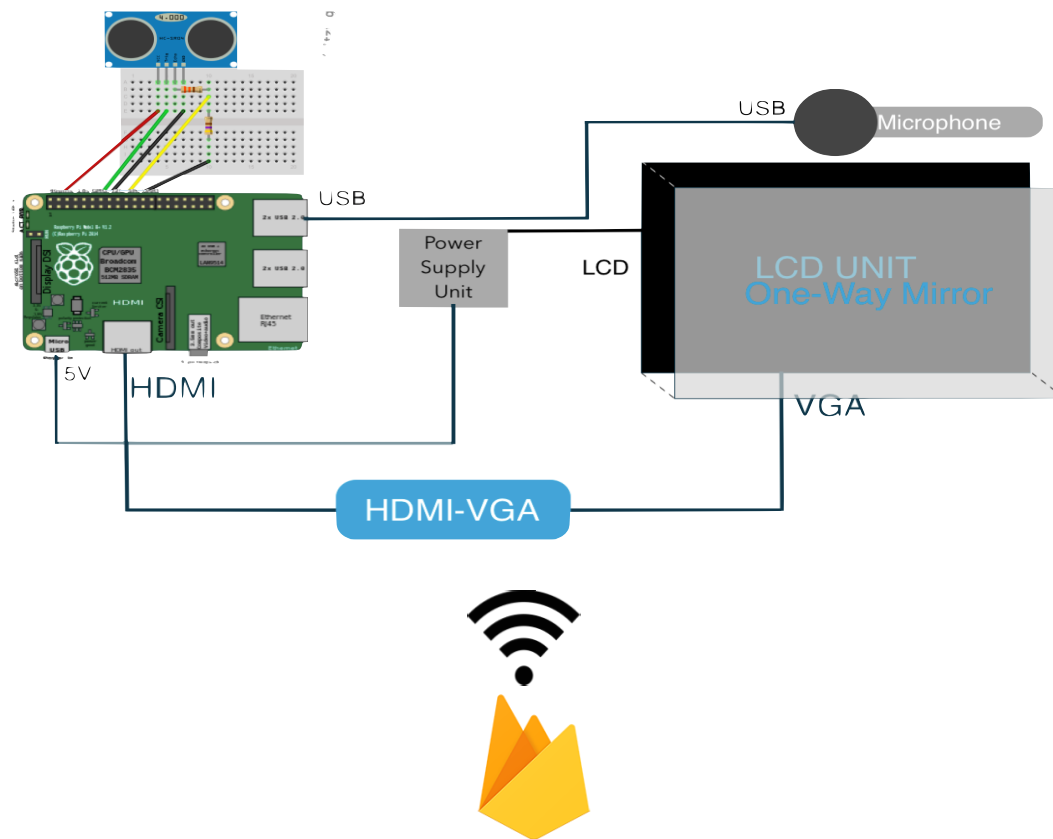
Firebase (Auth+Database+Storage)

iOS App

Android App
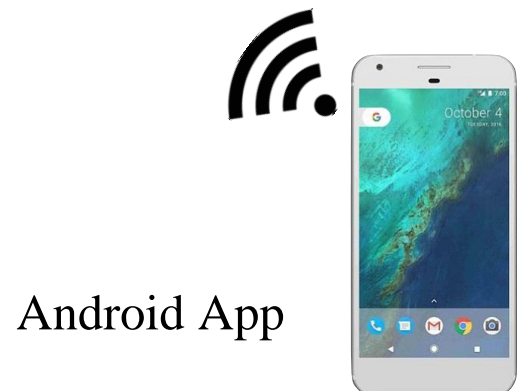
3. Components Used

- Raspberry Pi 3 :

The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing, and to learn how to program in languages like Scratch and Python.

- LCD Display :

LCD (liquid crystal display) is the technology used for displays in notebook and other smaller computers. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow displays to be much thinner than cathode ray tube (CRT) technology.One Way mirror

- USB Microphone :

We used a USB Microphone to employ voice control mechanism to our smart mirror.

- One way Mirror:

A one way mirror is just like a regular mirror except that it allows light to pass through it.

- Mouse and Keyboard:

Computer peripherals used to configure the mirror initially.

- Secondary Computer:

Used to load Raspbian OS on to the pi.

4. Languages Used

- HTML5
- CSS
- JavaScript
- Python

5. API Used

- Webkit Speech API - The Web Speech API enables you to incorporate voice data into web apps. The Web Speech API has two parts: Speech Synthesis (Text-to-Speech), and Speech Recognition (Asynchronous Speech Recognition.)

- Dialog.api -   Dialogs are created by using the REST API for the Dialog service or by calling the functions in the SDKS for Watson Developer Cloud applications in Node.js, Java, and Python.
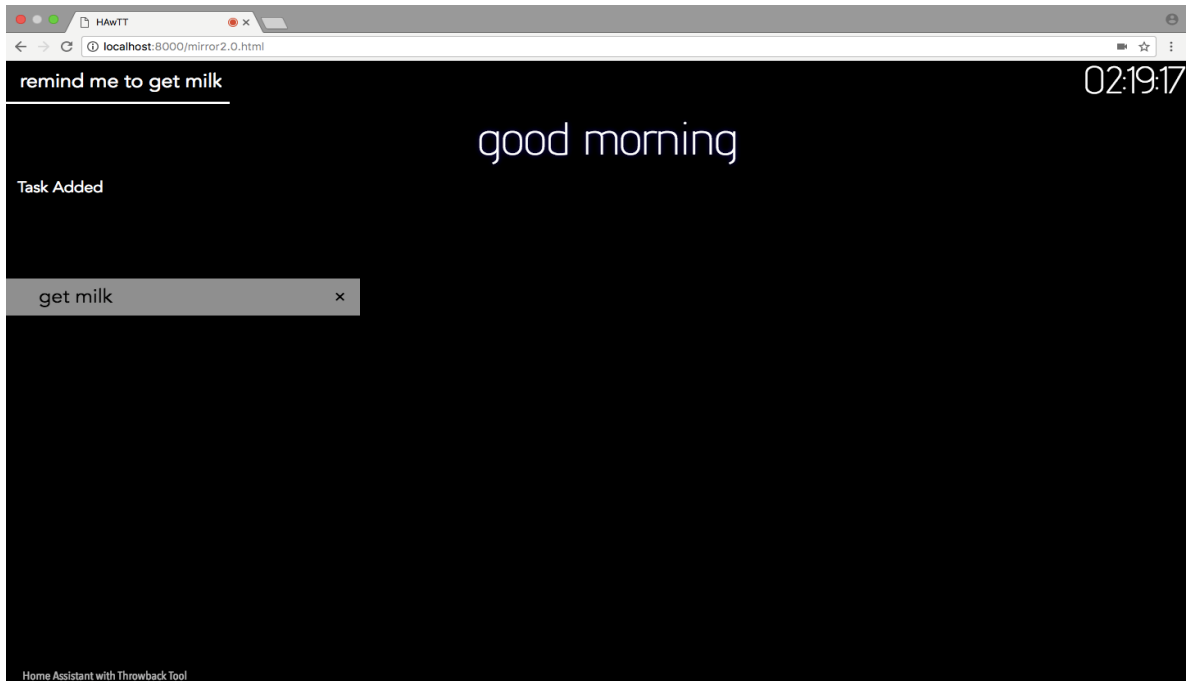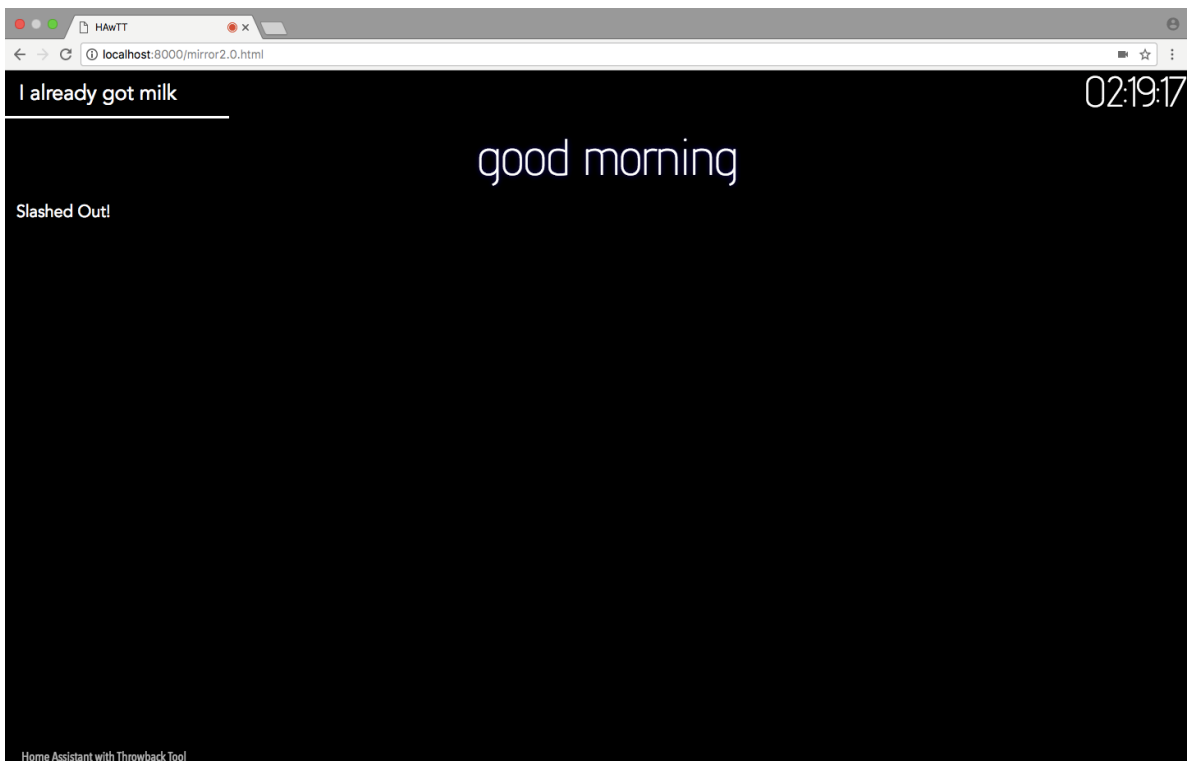
Results

1. Interface Design
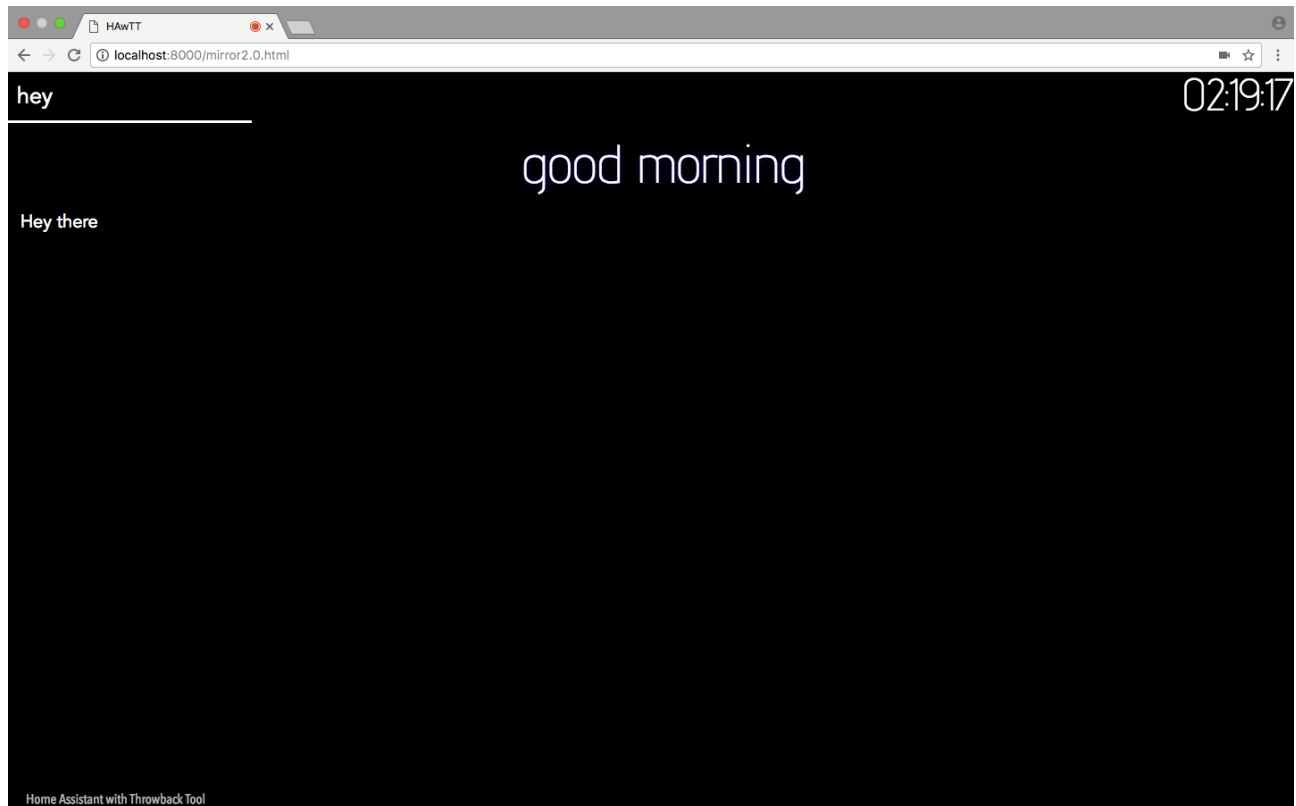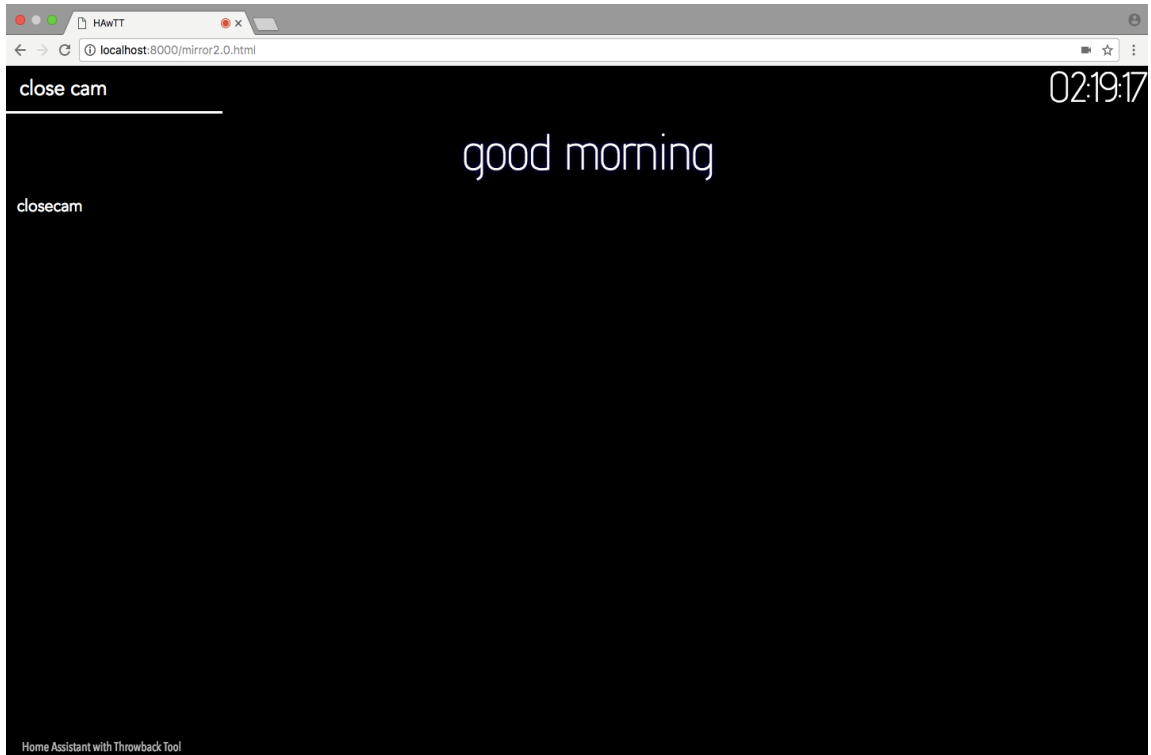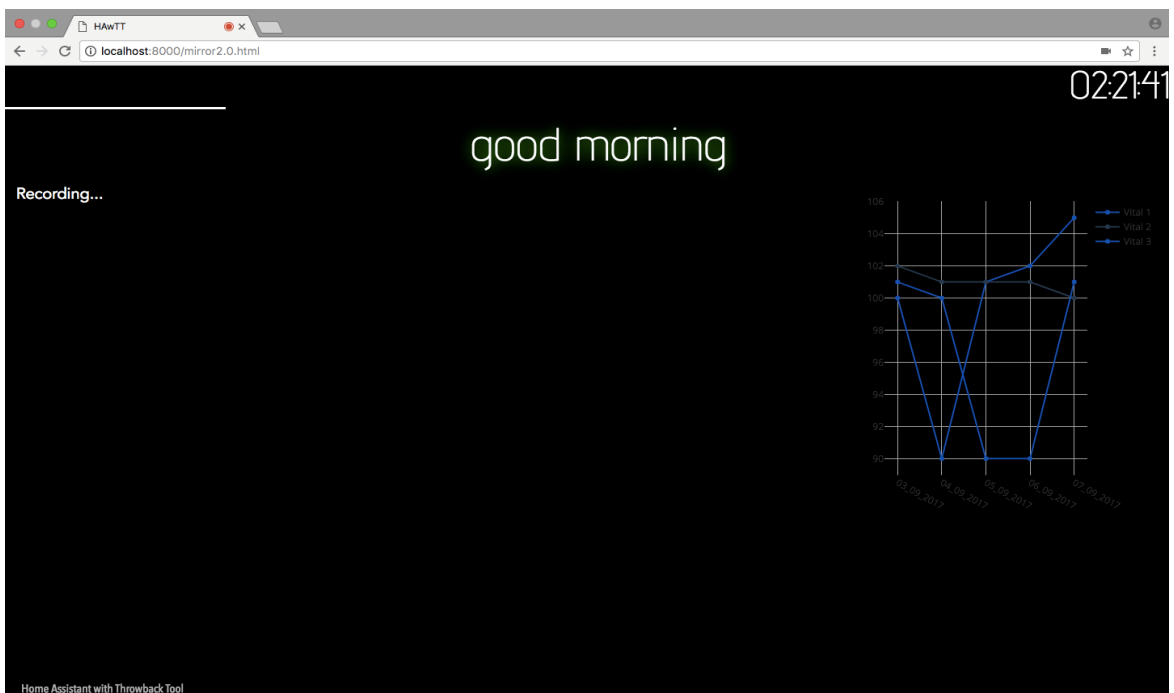

Welcome Screen

Adding reminders:

Removing reminders:
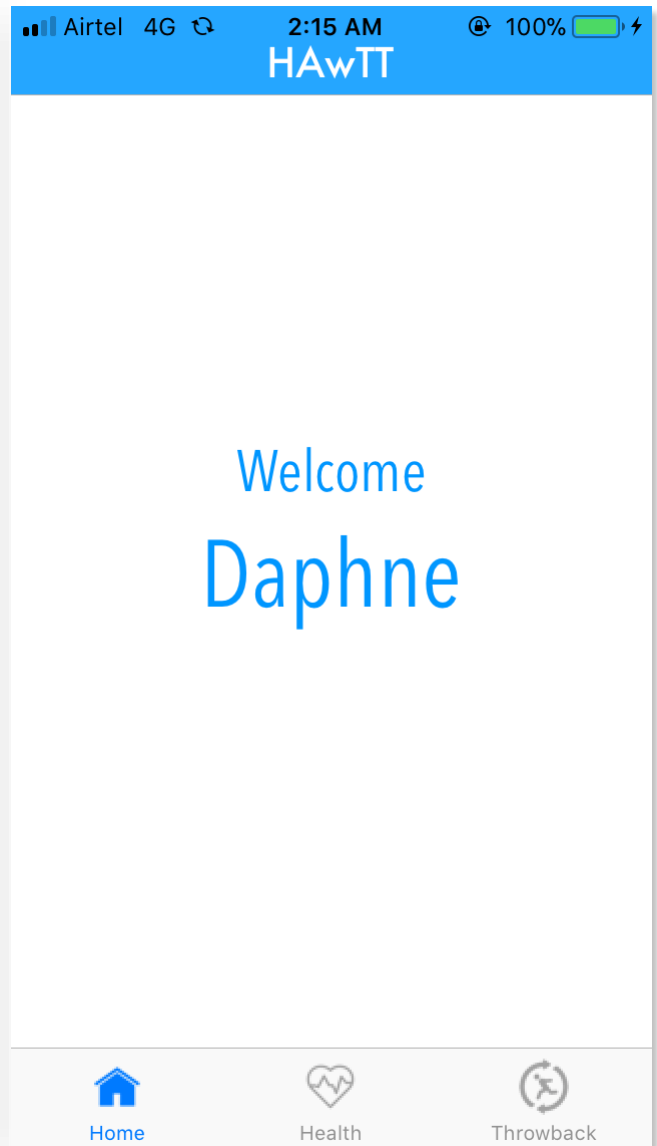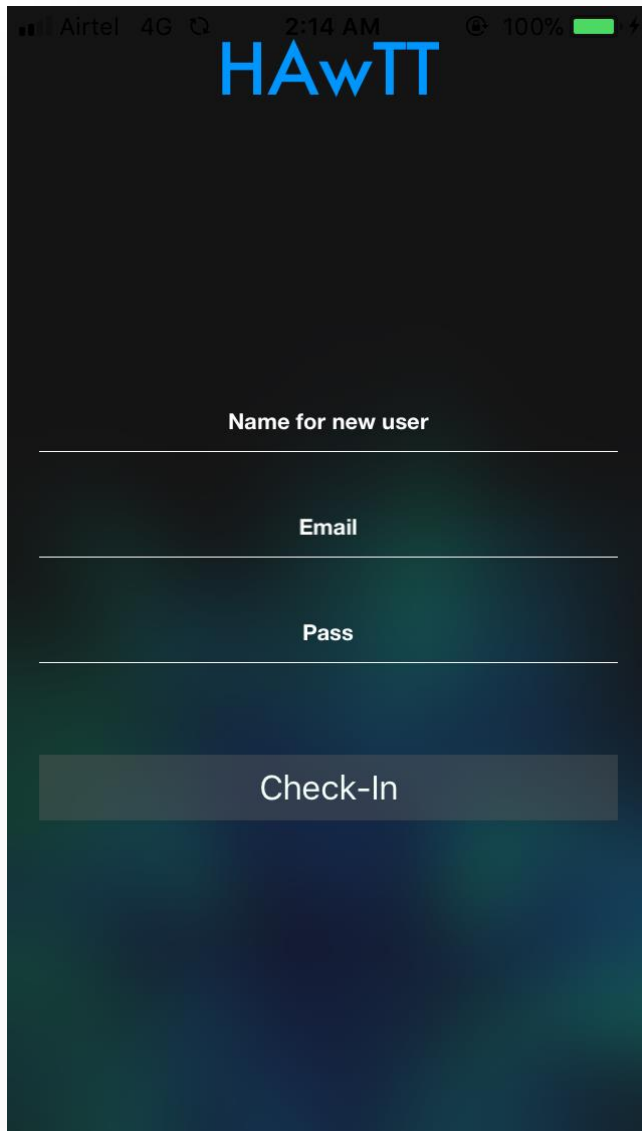
Clicking a throwback selfie:
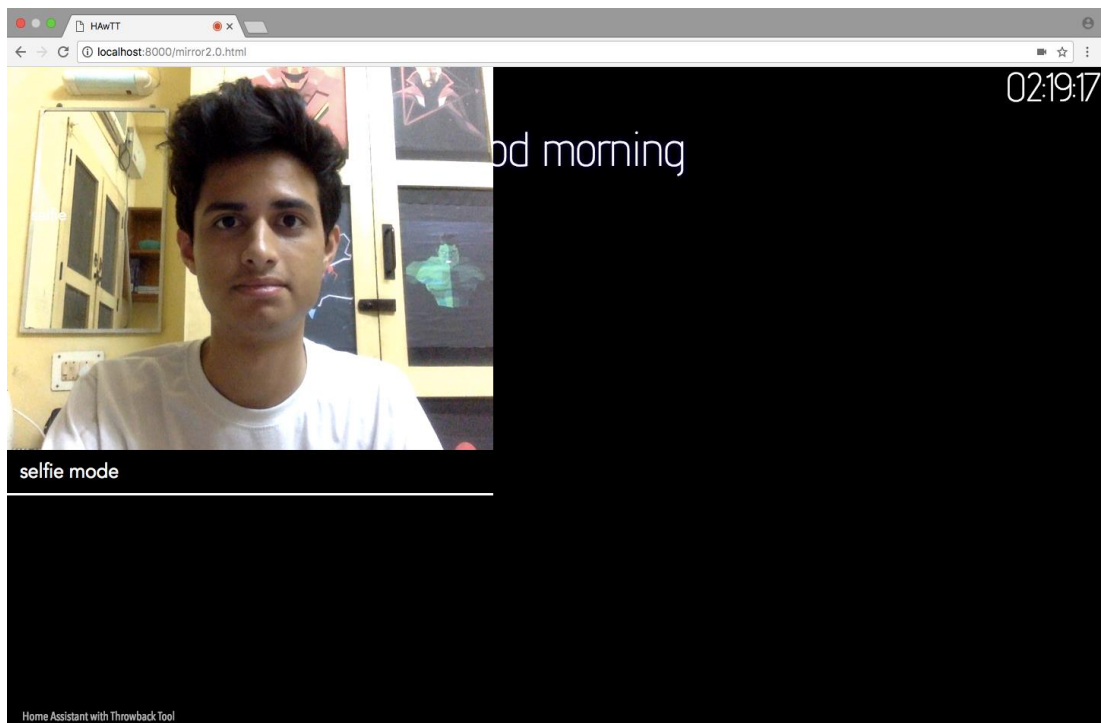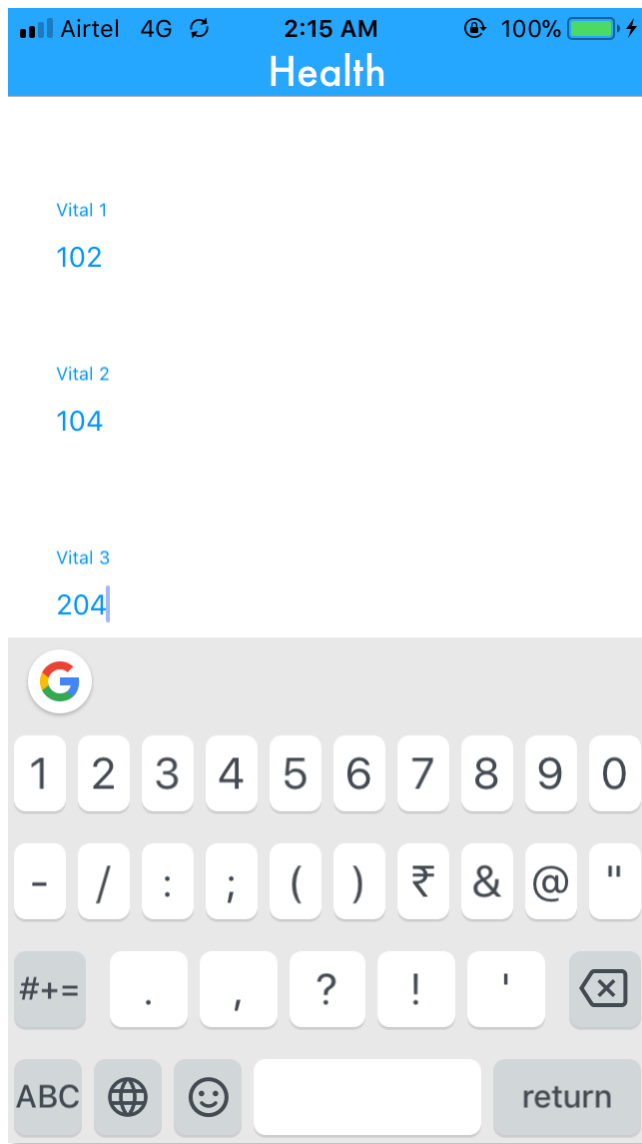
Closing Camera:

Health Graphs

2. Interface Design of mobile app

Authentication and Welcome Screen:

Health Data Push and Throwback

Conclusion

The Internet of Things (IoT) is aimed at enabling the interconnection and integration of the physical world and the cyber space. It represents the trend of future networking, and leads the third wave of the IT industry revolution.

Here, in our project, we embedded the functionalities of a smart phone on to a regular mirror. With such a device, one can book a cab, decide whether to take an umbrella or not, go through the to-do-list, see the time and check e-mail while getting dressed for work, all of which are controlled by voice.

The rapid advancements in the field of technology is witnessed every year. Last year, in CES, LG came up with a television as thin as a paper. They call it the wallpaper TV. Virtual wardrobe is already functional in the fashion industry.

Counting on all the above developments and technology, it can be pictured that in near future, every surface of our buildings can be transformed into a Smart surface. Smart interfaces can change the way we perceive a smart home.

Thus, this project is a meagre demonstration of the infinite possibilities that IoT offers.

References

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[2]   http://www.makeuseof.com/tag/6-best-raspberry-pi-smart-mirror-projects-weve-seen-far/

[3]   https://developers.google.com/web/updates/2013/01/Voice-Driven-Web-Apps-Introduction-to-the-Web-Speech-API

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