SUggestions Of Sets App

ABOUT SOSA

How often have you stood in-front of your closet wondering what to wear? Did you ever want to know which clothes you have worn in the past?

Imagine that every cloth in your closet is tagged with a unique identifier. Now, you can view your wear history, choose a cloth set for the day, get personalized suggestions and more.

SOSA provides an answer: When you get a new cloth, you take a picture and tag it in the SOSA app. Then, the cloth information is saved on a NFC tag, that is attached to the cloth.

The system's device is attached to the closet's door, allowing you to scan every cloth that you wear during the day. Clothes that are worn together are combined to a set and sent to the application server so that later on, you can view your wear history in the application.

Additionally, the application will provide set suggestions based on the clothes' kinds, your wear history and the weather.





NFC

Tag

Feather HUZZAH device: the device is attached to the user's closet door. It is connected to the internet via WiFi. When scanning a cloth, the device waits for more cloth scans for a predetermined time (up to 3 clothes per set). Then, it sends an event through Azure's IoT hub containing the set's clothes. Finally, it awaits further scans.

Android SOSA Application: used to tag new clothes by adding a new cloth to the server, and then writing the cloth's id on a NFC tag. Also used to track the user's wear times and suggest clothes sets by querying the server.

Azure services: IoT hub & event hub, used to receive clothes information from the device. Also contains SQL database and Azure Function Apps used by the android application.

NFC

NFC (Near Field Communication) is a set of short-range (typically up to 10cm) wireless communication technologies designed to offer light-weight and secure communication between two devices.



NFC operates at 13.56MHz, and is based around an "initiator" and "target" model where the initiator generates a small magnetic field that powers the target, meaning that the target does not require a power source. This means of communication is referred to as Passive Communication, and is used to read and write to small, inexpensive 13.56MHz RFID tags.

THE DEVICE'S WIRING



The device's NFC module, the Adafruit PN532 Breakout Board, was connected according to <u>it's wiring</u> <u>instructions</u>. Additionally, the board's IRQ pin was connected to the feather HUZZAH in order to detect when scans occur (instead of reading all the time).

LIMITATIONS

Ideally, We would have liked to implement the project differently: The user would put the clothes in some container (e.g. a laundry basket), and the tag scan would occur without any further user actions.

However, the NFC module we used is limited to read tags for a very short range (about 10 cm). Extending this range would require a bigger antenna, as well as a greater supply of power by the HUZZAH, which is not possible.

Additionally, this specific module can only handle reading 2 tags simultaneously.



Upon launching the app, enter your details at the login screen:



The app's main screen is the playlists screen. It displays several groups of sets:

- The first playlist is sets that fit to the current weather (the weather is read from OpenWeather API and is displayed at the top of the screen).
- All playlist are created by querying the SQL server



When clicking the "Closet" button at the buttom, the user's closet page is opened. It contains the user's entire scanned wardrobe.

Additionally, upon clicking a cloth, it's information is displayed (description, tags, last worn date)



The closet is searchable via the top input box. Every cloth that contains any of the searched word in it's tags will be displayed.



The "History" page is accessible from the button on the button right of the application. It contains the user's wear information, and can be further filtered by picking a start date at the top input box.



To add a new cloth, click on the "+" button (anywhere across the app). Then, take a photo of the cloth and input a description and tags.



\varTheta 💎 🖌 91% 📋 13:32

ADD

After clicking on the "add" button, the device queries the server in order to insert the new user's cloth into the SQL server, and receives the new inserted cloth's ID. Then, the user is prompted to hold a NFC sticker to the device's NFC sensor. The new cloth ID is written to the sticker.

😑 ▼⊿ 91% 📋 13:33



Please hold the NFC sticker against your mobile device

 \triangleleft

0

Finally, the cloth is added to the user's closet page, as seen below:



DEVICE USAGE

In order to wear a cloth after adding it, the cloth's NFC tag should be held near the PN532 board. Then, blue light flashes in order to indicate that the scan succeeded.



DEVICE USAGE

After scanning the first cloth, the device waits for further scans in order to have the full set of clothes that the user has taken from the closet. The device is set to wait for 30 seconds, and up to 3 different clothes (see the image below for the device's log).

After 30 seconds, the device sends the clothes' IDs (representing the set worn by the user) through the IoT Hub. Then, an event trigger triggers, which in turn updates the SQL database with the set information (which clothes are in the set, and last worn information for each cloth).

Number is: 31

First cloth scanned. clothId1: 31, millis() = 16284 Unable to read the Capability Container (page 3) Number is: 66

Second cloth scanned. clothId2: 66, firstClothScanTime = 16284, curMillis() = 21843 Unable to read the Capability Container (page 3) Number is: 42

Third cloth scanned. clothId3: 42, firstClothScanTime = 16284, curMillis() = 27404 Number is: 42

Sending clothesIds:31, 66, 42 IoTHubClient accepted the message for delivery

IMPLEMENTED:

MS Azure app service layout:

- IoT Hub, Event Hub, Function App Service
- SQL Database

Physical device's logic:

- WiFi connectivity
- NFC tag readings
- Building clothes sets by time elapsed
- Sending clothes sets to server by triggering an event triggered function app through Azure IoT Hub

Android app:

- UI & layout
- Weather information (using API)
- Clothes inventory
- Cloth information display
- Add cloth dialog
- Home screen's sets views (playlists)
- Personalized sets suggestions (based on history/weather/tags)

THANKS!

Raz Weinstock

Adi Eldar

Ram Shimon