HCI PROJECT REPORT

QWICKLY APP FOR SHOPPING STORES

Zeeshan Khand | Junaid Khursheed | Faiq Mehmood | Venus Kiani |Elaheh
|

PART 01: INTRODUCTION

1.1 Project Background

When we visit a product store like cloth store, our primary concern is to know whether the product suits our needs or not. One actually wishes to know the specifications of the product without being facilitated for each product he or she wants to know about.

We don't know what kind of material is used in the product, what is the color of the product as well as the price. Ideally, a customer should have an app that can use Mobile Camera, image processing and Augmented Reality to create a user experience in which he/she can use the app to get all details about the product he/she is looking at. People get frustrated and also lose interest when they have to call every time the staff of store to ask about every product they are interested in.

1.2 Problem Specification

When we visit a product store in a mall or locality, we want to know the basic details about the product like material used, what is the color of the product as well as the price. People get frustrated and also lose interest when they have to call every time the staff of store to ask about every product they are interested in. Adding so, the product shop's value and customer rate decreases due to incorrect information provided by the staff or when the customer queries are not properly entertained.

1.3 Proposed Solution

Our proposed solution "**Qwickly**" is an android app based on newly evolved technology – Augmented reality for mobile. The app uses mobile camera to read the barcode and object recognition to fetch all the details of a particular product on display at store and will display the tool tip as overlay over the product to user for viewing the information.
Initially our focus is on Cloth stores. So, the app would fetch the details like product price, color available, sizes available, the material used, quantity available, etc. Later on, we will further extend it for other stores like shoe stores, book stores and electronic products.

The app will use augmented reality and image processing APIs to read barcodes to fetch the details, and display them on real time. The user will open the app, use the camera and hold it on a product and the app will show the pop-ups on the camera screen after fetching the all product details available, so user click the pop-up and view all details of product in real time. This will not only let one shop in ease by just pointing the camera to product, but looking at data displayed, you can decide if you want to try/buy that product or not.

Furthermore, the user can save the product for later view. Additionally, the user can get notified of the discounts and promos offered by the particular store he is visiting or has visited.

1.4 Project Scope

The scope of this project is to provide a system to detect the barcode and fetch detail of the specific cloth from the cloth store's database, and pop-up those details on camera screen using Augmented Reality Vuforia tools . The system also provides option to add the cloth to favorites to be viewed anytime. Moreover, application provides facility to be notified for latest discounts and offers.

1.5 Not in Scope

The application does not provide us the facility to buy the product online, and doesn't have features to pay and buy the product on store through the app.

1.6 Assumptions and Dependencies

AD-1: User has a smartphone with Android OS 4.5 or above.

AD-2: User has a camera of no less than 12 mega pixels.

AD-3: Device must be connected to the internet to access the services of the app.

AD-4: User should have a basic knowledge of English as app is provided only in English Language

AD-5: The user must have Google Play Services Installed.

AD-6: User should be aware of the basic terms of sales such as size, size chart, material used etc.

1.7 External Interface Requirements

1.8.1 Hardware Interfaces

HI-1 The system will run on Android devices that is connected to internet.
HI-2 Camera is also used for scanning the barcode.

1.8.2 Software Interfaces

SF-1 This application will run on Android OS only.
SF-2 Google Mobile Vision API and Vuforia API will be used in app.
SF-3 App can be run on android version 4.6 or above.

1.8.3 Communication Interfaces

CI-1 Internet
CI-2 E-mail

PART 02 : Summary of Technologies Used

2.1 Background

Initially we had decided that we wanted to build a mobile app but we had to research what could be useful app idea to build upon. One of our team members had visited a cloth store nearby and was frustrated by the service of the local store employees. They did not provide adequate information about the products. Furthermore, the large crowd in store, deterred their attention again and again from one customer to another. So, we decided we wanted to fix this.

Adding so, the clear fascination for **Pokémon Go**, an augmented reality Game that went on to become instant hit was a big source of inspiration for us. We sit down and jotted down our ideas and came to conclusion that we wanted to hit the untapped market of **Augmented reality application** in E-commerce where users can view the products by just scanning the barcode and see the augmented details of products on their smartphones via an Android App.

Initially for the Project purpose, we have started with cloth stores but as its untapped market, there are many possibilities of where we can extend this idea for commercialization.

2.2 Research on the Tools

As the Augmented Reality on Mobile Phones is a brand-new concept, the first tasks were to look out for tools and technologies that could be used for the Qwickly App. Following is the list of tools that we used in the app:

2.2.1 Android Studio

Android Studio is the official IDE for the Google's Android OS for smartphones. It is built on JetBrains IntelliJ IDEA software for native Android Development. We used Android Studio latest version (3.0.3) for App Development. This version also comes with support for Kotlin, a new Android language set to replace Java in the next upcoming years.

The benefits of using Android Studio are its rich code Editor and developer tools as well as flexible integration with external libraries.

2.2.2 Firebase Real-time Database

The Firebase Realtime Database is a cloud-hosted NoSQL database that lets you store and sync data between your users in Realtime. The main advantage is that Data is synced across all clients in real time. The data remains available even when app is offline.

The Firebase Database is a cloud-hosted database. Data is stored in the form of JSON and synchronized in real time to all users of app. The Firebase Realtime Database enables us to build rich, collaborative applications by permitting secure access to the database directly from client-side code.

This Database is a NoSQL database and is different in form of optimizations and functionality compared to a relational database.

2.2.3 Firebase Cloud Storage

We use Firebase Cloud Storage to store the product's images and user images and all type of multimedia content needed for the app. Firebase cloud storage is used to store the user generated content, such as photos or videos,

We use the Firebase Cloud Storage due to its major advantages such as robust operations, strong security and high scalability.

Adding so, the flexible integration of Firebase cloud storage with app makes it an idea solution to storage problems of the apps.

2.2.4 Firebase Authentication

Our App uses Firebase authentication to store the user's information and authenticate the user. Only authenticated users will have access to the app. The Firebase authentication seamlessly handles user information, login and authentication so that you can easily build up your app for personalized experience.

Firebase authentication provides backend services, easy-to-use SDKs to authenticate user. It supports user authentication using passwords, phone numbers and even with Google, Facebook and Twitter.

The Firebase OAuth handles security issues so you can easily work on building the app rather than handling security issues and exceptions.

2.2.5 Vuforia Augmented Reality SDK

Vuforia is a software platform for creating Augmented Reality apps. Developers can easily add advanced computer vision functionality to any application, allowing it to recognize images and objects, and interact with spaces in the real world.

Through Vuforia, we can attack digital content to specific objects. We use Vuforia in our app to create an ARAF scene and attach recognition of the objects.

2.2.6 Vuforia Image Recognition

The Vuforia Cloud Recognition Service is an enterprise class Image Recognition solution that enables developers to host and manage Image Targets online. Cloud Recognition is available with the Development, Cloud, Pro, and Enterprise licenses. Usage is determined by the total

number of image recognitions, or “recos”, per month that your app performs and is counted when a target is matched.

The result of a Image Recognition query is determine by the API used to execute the query.

The Vuforia Cloud Recognition service is ideally suited for apps that use many targets, or targets that need to be updated frequently. Customers using the service can leverage the following benefits:

- Scale: More than one million targets can be used in an app.
- Flexibility: Integrate with existing content management systems.
- Time to Market: Deliver real-time, dynamically changing content and accelerate time to market

2.2.7 Vuforia Image Targets

Image Targets represent images that Vuforia Engine can detect and track. The Engine detects and tracks the features that are naturally found in the image (in our case barcode) itself by comparing these natural features against a known target resource database. Once the Image Target is detected, Vuforia Engine will track the image as long as it is at least partially in the camera’s field of view. Image Targets should be viewed under moderately bright and diffused lighting. The surface of the image should be evenly lit.

2.3 System Architecture of Augmented Reality Application

Figure 1 : Augmented System Architecture

The above is the first level of detail for an AR system. An end user perceives his environment as an amalgam of direct perception and computer mediated one.

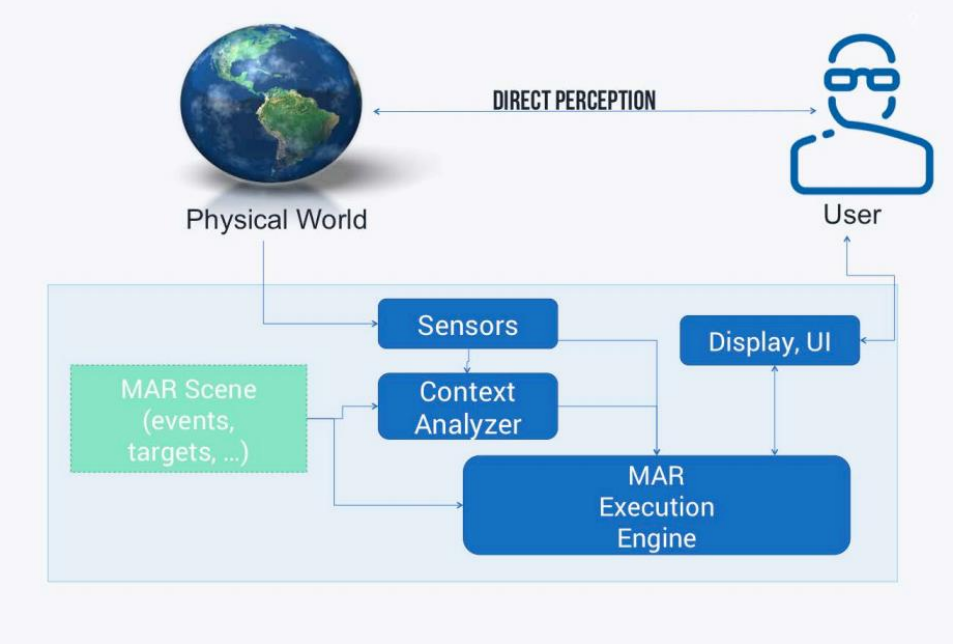

Figure 2: Augmented System Architecture Detailed

The computer mediated perception is what we are interested in. The components in blue box are responsible for the computer mediated perception.

The connection with the physical world is done by a set of sensors of various types like cameras, microphones etc. The data produced by these sensors is continuously analyzed by what is called Context Analyzer.

Then the data produced by the sensors and results of analyzer is transferred to the brain of the system, the MAR Execution Engine. The main task of the MAR Engine is to check if the conditions specified in MAR Scene by AR designer are met or not. Such conditions can be for example, a phase detected by camera, a specific sound captured by the microphone and so on.

In our case, it's the barcode detected by camera that triggers the MAR Execution Engine to overlay an AR Scene.

The end user can also interact with the system by using UI components.