AR Applications in e-Commerce

Motivation

The motivation for this project stems from this project's sponsor, YYC Beeswax, wanting to reduce the number of returns that they receive. When customers purchase an item online, such as a candle, they sometimes misjudge its size and how it will look in their home even though the item's dimensions are clearly labelled on the website. This leads to an increase in returns where the customer receives their product and feels it looks out of place. As such, our sponsor tasked us with the development of an application that utilizes augmented reality (AR) to allow customers to visualize YYC Beeswax's products in their own space, which hopefully would lead to fewer returns.

Problem Solution

The solution that our group decided on for solving this problem is an AR web application that can be accessed through a smartphone browser. By utilizing AR, a visual of a product can be overlayed onto a smartphone camera feed of the user's surroundings. A web app instead of a smartphone app was chosen for our solution as a web app lowers the barrier for users accessing the application as downloading and installing a native app can be a nuisance for users.

Some key features of our solution include switching between products, translating and rotating AR content, hiding and unhiding AR content from the camera feed, and providing relevant product information to the user. For the AR implementation of this project specifically, the team has chosen to use WebXR along with Three.js. For the web app, vanilla JavaScript with HTML and CSS is used for the front end, Express.js is used for the back end that services requests from the front end, MongoDB is used for the database and an AWS S3 bucket is used for image, and model file storage.

Along with developing the web app, obtaining 3D scans of the products featured in this web app and documentation writeups pertaining to the API and deployment of the web app are secondary objectives for this project.

Result

Upon entering the web app, the user will have to first enter AR mode. Users will then specify a position in their surroundings with the aid of a virtual marker. Users will also have to specify a product to view using AR in the product menu. The application will then overlay a visual of the product onto a camera feed in the web app for the user to view. At the bottom of the screen, the product card will display some information regarding the selected product. The user may expand the product card for more information and buttons for interacting with AR content.

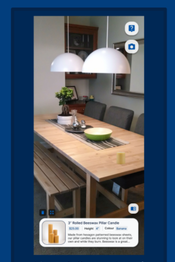

Figure 1: Screenshot of collapsed product card

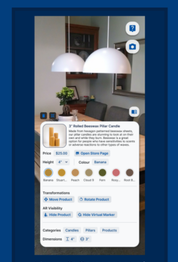

Figure 2: Screenshot of expanded product card

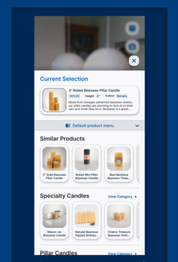

Figure 3: Screenshot of default product menu

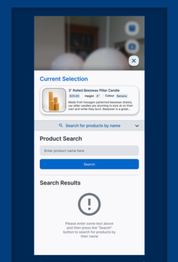

Figure 4: Screenshot of name search product menu

Future Work

To keep development simple, the application currently supports only a small sample of products. For future work, we would include a more complete selection of YYC Beeswax's products.

Originally, we planned to build the front end using the Angular framework. Unfortunately, the team ran into some issues with integrating WebXR with Angular. Due to time constraints, we switched over to using vanilla JavaScript. As for alternatives, React Three Fiber is a React (another front-end framework) library that supports Three.js and has some AR support. For future work, we would port the front end over onto React.

In our designs, we came up with some stretch features that we would implement if we had extra time. One of these features was the user being able to "favourite" products. The other stretch feature included the ability to project multiple products at once, as well as a "popular products" category in the product menu. For future work, these features could be implemented.

Contributors

- **Nolan Chan** – Project Manager/Front-end Developer/Designer
  nolan.chan@ucalgary.ca
- **Abhishek Balasubramanian** – Front-end Technical Lead
  abhishek.balasubrama@ucalgary.ca
- **Rubaiyet Meem** – Front-end Developer
  rubaiyet.meem@ucalgary.ca
- **Braeden King** – Back-end Technical Lead
  braeden.king1@ucalgary.ca
- **Hao Nguyen** – Back-end Developer
  hao.nguyen@ucalgary.ca
- **Dylan Windsor** – Back-end Developer
  dylan.windsor@ucalgary.ca

Teaching Assistant: Muskan Sarvesh
Academic Advisor: Dr. Kangsoo Kim

Sponsor

Sponsoring Company: YYC Beeswax Ltd.
Sponsor Representative: Lisa Graham

Try it Out!