Title

My app name is Furniture Trouble Solver. It is an app that consists of AR furniture builder and a platform to search for renovation companies. The targeted users are those who are struggling on what changes to make on their current environment or the new place.

Motivation

AR technology is getting more popular these days. Furniture shops like IKEA and Pricerite have incorporated this technology into their products in their application. From the perspective of a customer, despite the loyalty to a particular brand, customers do not limit themselves on the brand when choosing a suitable furniture. Since the brand is not limited, my app provides a tailor-made option for customers.

Also, in IKEA Place, the AR app for IKEA's products, a change in color of a particular model without switching in the product list is not available, this point is grasped and is applied to the tailor-made option for customers in my app.

Another application that I took reference from is CoDeco (好師傅), this app can provide estimation on the renovation fee and measurement to the customers' place free of charge. A renovation worker will be paired within the app. However, without providing information on the size of flat, my expectation for the renovation and contact information, I am not able to view the renovation workers that are registered into this app.

As renovation workers must be involved in tailor-made furniture, the information of renovation workers within the app can provide one-station service from the design to carrying out the design on furniture. This meets the goal of my app.

Screenshots and How-To-Use

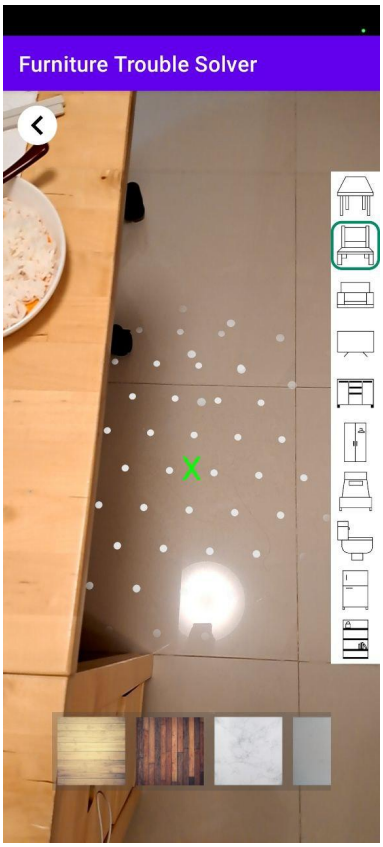
There are two functions in Furniture Trouble Solver. They are the AR furniture mode and find a renovator. The landing page shows two blocks to serve as the entry to the corresponding function.

Landing page:

The one with blue background brings the customer to the AR view. A short description is provided to tell the customer about the function.

Whereas the one with green background brings the customer to the list of renovation companies.

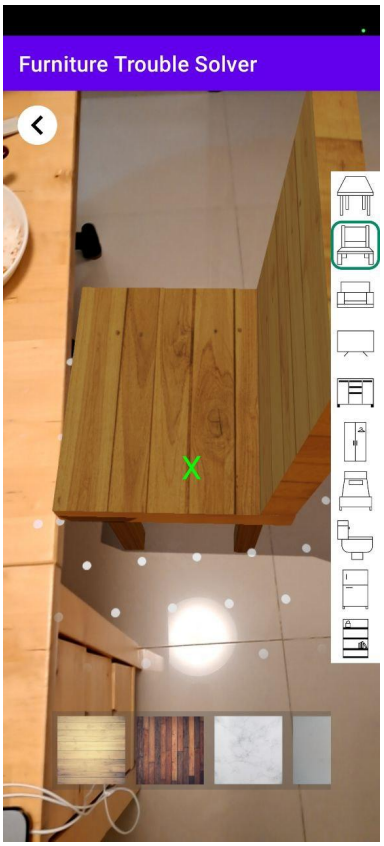
AR view:

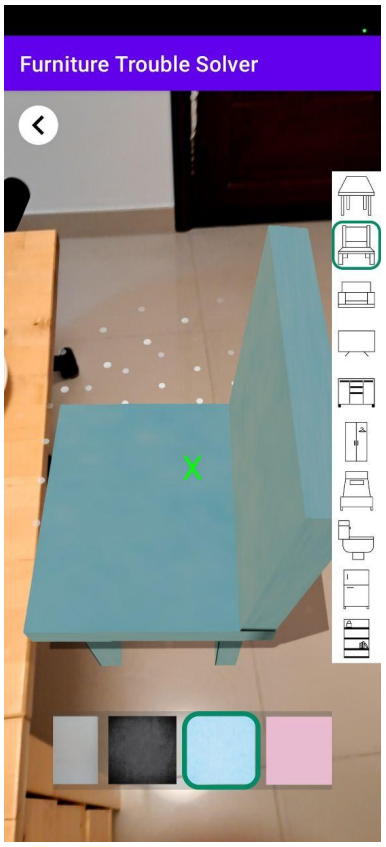


After the area in blue on the landing page is clicked, the customer has to move the phone around until white dots appear on the screen.

Tap on one of the furniture icons on the panel on the right. A green rounded square will circle the latest icon that the customer has clicked.

Then tap on a spot within the covered area with white spots. The furniture that the customer has selected will be placed to the spot he or she tapped.





Pointing the green cross on the screen to the furniture on the screen, the customer can change the pattern or the color of the furniture by clicking one of the palettes at the lower part of the screen.

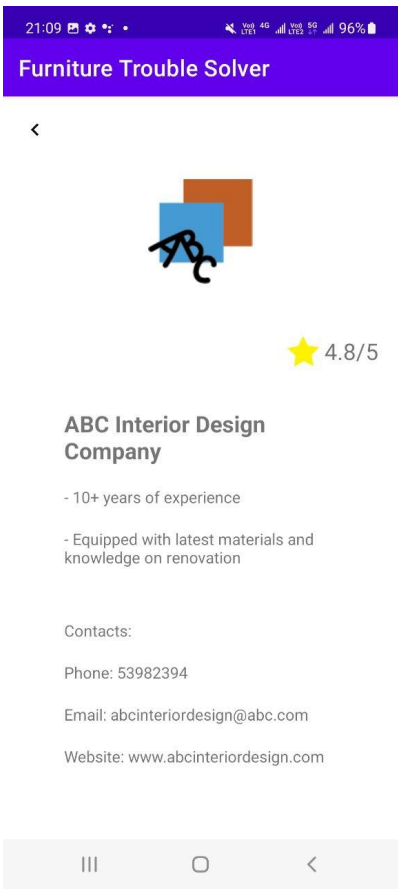
A green rounded square will circle the palette that the customer has added to the furniture.

Find a renovator function:

When the area in green on the landing page is clicked, it will bring the customer to the list of renovation companies registered on the app.

The information for each company on this page includes the logo, the name, two descriptions/strength and the rating.

Customers can click on the company that he or she is interested in to view details.



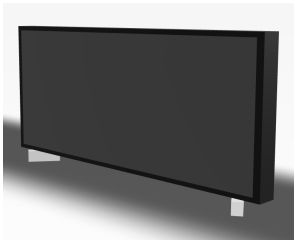
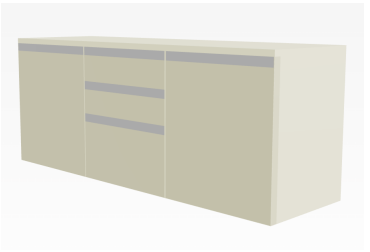
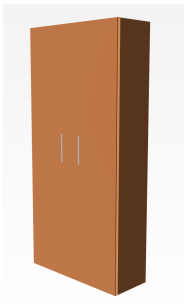
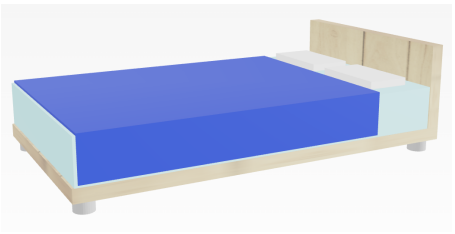
This page shows the details of the interested company. Contact information is provided. Since my application cannot contain all the detail information of the company, the link to website (if any) is provided. Customers can call, message or email the company with the information provided.

Logo/Icon

The icon of Furniture Trouble Solver is a table with the app name on it. As the app aims to be clear and provide one-train service, it is like putting all the information on a table so the customer can overview each part whenever they like.

Graphics




The 3D models are built in Blender. I tried to use SketchUp at first but .glb file type is not supported. Exporting the 3D model in another file type then converting it the .glb file type does not work too. After consulting the advice from professor, I used Blender and the models can successfully load in the AR environment.


These two graphics are used in the landing page to serve as the icon for AR view and find a renovator respectively.


Logos for the five companies on my app are also designed.

All non 3D graphics are drawn using Adobe Illustrator..

Functions

You can:

- Build AR furniture models on a surface regardless of place
- Change the color/pattern of the model within the AR space
- Capture the screen with the model you like and send it to the renovation companies registered on the app
- Find a renovation company that suits your need

Technical points

How to get into the AR space

Click the upper block with blue background and the phrase “Furniture in AR”.

How to find a renovator

Click the lower block with green background and the phrase “Find a renovator”.

How to know when is the AR space ready

When the cross in the middle of screen turns into green and when some parts of your screen has white spots on it.

How to place the AR models

Choose the furniture that you want to put into the space, then tap on the area surrounded by white spots, the model will be placed on where you tapped.

How to change the color/pattern of the model

Move your phone until the cross at the middle is pointing to the model that you want to change the color/pattern. Choose one of the palettes at the horizontal scroll view that is located at the lower part of the screen. Once you clicked on the palette, the color/pattern of the model should be changed immediately.

How to contact the renovation company

Go to “Find a renovator”, then inside the list of companies, choose one of them, click it, then you can view the details of the company including the contact method. You can phone it, message it or email it on social media platforms or email account.

How to rate a company

A link with the rating form will be sent to you after you have finished using the service from the company.

Code-wise items:

How to get which company is click on the list

Shared preferences is used to send the data of the click company. For example, when the first company on the list is clicked, a variable storing the clicked company index will turn to one and sent by shared preferences to another activity (DetailsActivity).

How to load textures

Similar to how furniture is loaded to renderables, Texture[ ] is used instead of ModelRenderable[ ].

How to attach textures on the models

When the palette is clicked, a function displayNode(int textureIndex) is called. In this function, the node that is detected at the area where is green cross is located will be known. Within this function, another function changeMaterials(Node gotNode, int textureIndex) will be called. The node is passed to changeMaterials, including the position information and name of that node. The name of the node is used to check which node is passed and the renderable is set to the same furniture but without styles (another list of furniture model is without styles). The textureIndex is used to retrieve the corresponding texture loaded on the list and is added to the furniture model without styles.

Further expansion and developement

The furniture panel and palettes can expand to support different models of furniture and colors or materials. Although the customer who is using the app is supposed to be using the tailor-made service for the furniture, a wider choice of AR furniture model can outline the unthought design more accurately. Also since it is supposed to be tailor-made, the colors and materials available should have a more significant range when compared to traditional furniture shops like IKEA and Pricerite.

I tried to support customized color when building the app. I got two approaches, one is to change the color of the drawable and load it to texture, the other one is to change the color of the drawable then save it as a new drawable to load to texture. Since an integer must be passed as the parameter for setting the source to load, a drawable is a drawable and I cannot find any way to convert a drawable to an integer because the integer is generated when adding the drawable to Android Studio. Therefore the first approach failed. For the second approach, I cannot save a drawable as a new drawable (having another id for that new drawable). I thought if I save it as a new drawable during the running of the program, if it is possible, a new id that is the integer can be generated so I can use this new integer to load the texture, but I cannot generate a new drawable when running the program. If I can figure out the way to do this, I think this add a lot of value to my app because the customer is really customizing their furniture according to what they want and it is not feasible for developers to generate palettes of colors with all the combinations that rgb channels can provide.

The collaboration between my app and renovation companies and also expand to provide discounts or try out service. These elements can better attract potential customers to stay loyal to my app instead of using services provided by other applications that do not provide one-train service.

When the list of renovation companies get longer, a scroll just by the descending rating of companies may make it hard for customers to search for a company. A sort can be used and

also a search bar can be added. If the customer type in a keyword that is shown as the description and strength, that company will also appear as the result. Best quality is surely good but there must be customers who would focus more on the price more than the quality. Such companies tend to have a lower rating and thus the search function is helpful.

To prevent some users spread a low rating to a company without using its service, the rating system now is to give out a specific link that requires the code of that renovation job to confirm the identity (that is why you cannot find anywhere to enter the rating for a company). In the future, each customer will have to create an account and is only allowed to rate the company that has record on my app that the customer had used its service before.

Device

Device used for testing: Samsung Galaxy A53

References

https://www.youtube.com/watch?v=fJEFZ6EOM9o (shared preferences)

https://github.com/SceneView/sceneform-android/blob/master/samples/image-texture/src/main/java/com/google/ar/sceneform/samples/imagetexture/MainActivity.java (load texture)

ARshooting class example (setOnTapArPlaneListener, detect and identify targeted node)

ARshooting class example perFrameAction() - copied