Project Proposal – Team 080

Interior On You

Team: 080

구동완, 김민지, 최현준

내용

Project Overview and Motivation

Complete your room with our auto-recommendation system.

Home is essential to human life. There are many people who want to decorate their house, but not everyone is talented on it. People who are not talented can hardly think about how to decorate and where to ask for information, even if they want to get help. This reduces interest and consequently makes them give up decorating.

Existing programs only support functions such as selecting the furniture which you like by looking at photos of other users of finding an interior contractor. However, there is no program that directly suggests improvement of interior design. In addition, there were cases where feedback was provided by other users and therefore could not be answered.

For a better quality of life and to solve the existing programs limit, we thought the interior evaluation and recommendation program "Interior On You". The program receives pictures of room from people who want to decorate them, and scores them by evaluating colors, furniture layout, etc based on photos. The assessment will be made automatically in the program.

Evaluated users will be recommended for better ways. Users can apply recommended methods within the program and experience deploying other furniture. Also, we plan "Today`s Interior" to release user's room photos for comparing and competing with others.

[Picture 1 – Our Desire Picture]

Project Objective

"Interior On You(IOU)" web application`s goal is to complete user`s interior based on user`s preference with our auto-recommendation and pre-placed system.

1. We will provide to user our recommendation system through uploaded image by user. We can <u>display additional furniture or delete exist furniture</u> at image.
2. We will provide to user our pre-placing system through uploaded image by user. User can <u>choose recommendation color and coloring walls, floor, and also furniture</u>, too.
3. And finally, User <u>can experience VR image which is improved image by our system</u>, so user can see how exact room will be changed.

User Case

These days, it is difficult to go outside. The company where 'A' works has been changed to telecommuting. And the time he spends at home has increased. To refresh himself, he decided to change the location of furniture in the house. 'A' tried moving the furniture around by himself but ended up getting tired before he could find the layout he liked.

A. User can see the forecast of the furniture being moved without using any effort.
B. The user's interior can be evaluated based on such criteria as whether the arrangement of the moved furniture is stable.
C. User can listen to people's opinions such as furniture's arrangement through SNS function.

B succeeded in buying his own house for the first time since his marriage. 'B' wants to have a pretty interior like the house posted on SNS, but he is at a loss even before he starts because he has no sense of beauty. 'Should I buy new furniture? if I buy it, will it fit in with existing furniture?'. B's head is full of worries.

A. IOU can set the standard for choosing new furniture to match existing furniture because it tells you the colors that match the existing interior.
B. By recommending new products to match existing furniture, you can save time looking for new furniture.

Exist App and Platform

About "오늘의 집" application…

"오늘의 집" is user-based interior evaluation app. This app provided many furniture, gadget and goods. This app is strong at what "Product" users are interested in, and strong at other user`s interior image, also related products. But unfortunately, this app is user-based interior app. What this mean, if we are not talented, users are not interested in my interior ( image ), so we can`t even get comment for improving it. So we want to reinforce "Auto-Improving System" then "오늘의 집" application, so we can improve our interior only by myself.

Hotplace (2018 Capstone Application)

" Hotplace " is AR application which we can placed 3D model to our room. This application is based on AR system, user can experience dynamically. But this model only provides 2 or 3 types for furniture types. And also, it can`t remove exist furniture but only addable. We want to reinforce "Freely Add – Delete Furniture System" then "Hotplace" application, so user can experience more dynamically.

"코비하우스 VR", "룸플래너", "magicplan" … (Pre placing systems)

These apps are VR or 3D modeling pre-placing systems for house and furniture. This application provides user can place furniture at house in VR / 3D Model, so user can see exact feeling of house. But above app does not give existing interior improving / recommendation system. We want to reinforce "Even Non-talented user can improve interior design." Using IOU, User can improve their skills and can check their preference

Visualizecolor, behr, online stain visualizer … (Auto Coloring Systems)

Above app / webs are coloring house wall system with image processing. This application / Web site provide user to color wall before they really painting on them. But this website / app do not auto-select wall, do not recommend color and can not using our own pictures. We want to reinforce "Even non-talented at color, user can change color of rooms with their own image." points then above app / web. Using IOU, user can experience how color give interior`s feeling. (Link1, Link2, Link3, Link4)

Below tables are for our reinforcement points then each apps.

Similar Apps	Problem	Reinforcement Point
오늘의 집	User-based evaluate system	Auto-improving / Recommendation System
Hotplace	Can`t Remove exist furniture	Freely add-deletion furniture
코비하우스 VR, 룸플레너 etc..	Do not improve non-talented user and do not have recommendation system.	Even non-talented user can improve skills.
Visualizecolor	Do not recommend Color	User preference based color recommendation system.
Behr	Can not use our own picture.	Using ML, user can freely upload their own interior image
Benjaminmoore	Do not auto-select walls.	Using Object Detect Algorithm, We select object automatically.

Development environment and implement

Development Environment

We will develop this program with web-base, there are few reasons.

1. To easy access from everywhere.
2. To reduce download – install troublesome work.
3. For support SNS function.

So, Front-end will be developed with React.js because

1. one of the team member is already knows.
2. There are many library, open source, and also VR features already exist.

Back-end SNS Function will be developed with Node.js because it has many libraries and it is easy to use. There is also an advantage that we already know the language.

Machine Learning Algorithm will be developed with python (especially, tensorflow hub). If we need more feature for furniture, we will use Microsoft Vision API or Google Vision API.

We will use image processing to crop image or make training set for Machine learning, so OpenCV might be used for our project. It will also develop with Python.

Implement Feature

1. Auto improve for interior image.

We will give user improvement for user`s interior image, based on user`s preference. For this feature, we need to get user`s preference.

2. SNS Feature (React + Node)

We will implement below SNS Feature.

1. Basic Login, Sign-in or proceed with anonymous.
2. Save user`s preference.
3. Basic notice boards, comment system and like button. User can write, revise, delete about post and comment.

-     - Kinds of notice boards : Vote Boards, Recommend Boards and Information boards

3. Auto recommendation and correction for improve interior.

We will develop auto-recommendation / auto-correction for user`s interior image based on user`s preference.

4. 360 degree Picture Download.

Task Assignment / Project Schedule

Task Assignment

구동완
- Back-end – SNS Feature Login, Voting system.
- Image Feature analysis. (If needed, using ML)

김민지
- Front-end – Web App develop.
- Additional Object tag Training (TensorFlow Hub API)

최현준
- Edge Detecting Auto Picture Crop, Detect Wall using ML.
- Object Detection to find / classify furniture.
- App Design.

Task Schedule

Group Schedule

Month	9				10				11				12		
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Topic selection and Presentation	■	■	■	■					Midterm demo					Final Demo	Final Report
Language and Platform Study				■	■										
Machine Learning Design				■	■	■	■			■	■				
Back and Front Develop					■	■	■	■				■			
Test and Integration								■					■		
360 image Develop												■			

구동완 Schedule

Month	9				10					11				12	
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Language and Platform Study				■	■				Midterm demo					Final Demo	Final Report
ML – Interior Feature Labeling				■	■	■									
ML – Get User preference						■	■								
ML – Labeling Test								■			■				
ML – Interior Advanced Feature Labeling										■					
Backend – Log In / Sign In / Sign Out					■										
Backend – SNS Board (Notice Board)						■									
Backend – get ML Data from Server							■								
Integration and Test								■					■		
Backend – 360 Image data processing												■			

김민지 Schedule

Month	9					10				11				12	
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Language and Platform Study				■	■				Midterm demo					Final Demo	Final Report
ML – Get Image and Labeling.						■	■			■	■				
ML – Labeling Test								■				■			
Frontend – Log In / Sign In / Sign Out UI					■										
Frontend – Main Form						■									
Frontend – Placing Furniture						■	■	■							
Frontend – Setting Color at wall								■		■					
Frontend – SNS Board (Notice Board)										■	■				
Integration and Test								■					■		
Frontend – 360 Image Form										■	■				

최현준 Schedule

Month	9				10				11					12	
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Language and Platform Study			■	■					Midterm demo					Final Demo	Final Report
ML – Image Segmentation				■											
ML – Object Detection and Auto Crop Feature					■										
ML – Object Texturizing						■									
ML – Test for designed ML Product							■								
Integration and Test								■					■		
App Design				■	■										
ML – Auto recommendation system for Furniture						■	■			■					
ML – Auto Color Recommendation system										■	■				
ML – Auto Recommendation System Test												■			