Capstone Project iBeauty Photo Editor

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Problem Statement

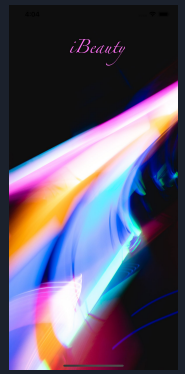
Study and analyze the imaging styles from users while they are editing their photos for convenient automatic photo-adjustment service.

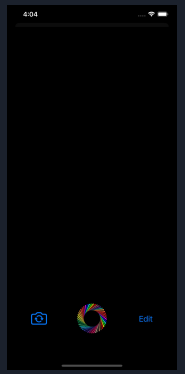
- Core problem: How machine learning and deep learning algorithms help studying images and classifying users' passed inputs
- Traditional photo-editors on smartphones are humdrum
- AI functions on real-time photo capturing only in industry:

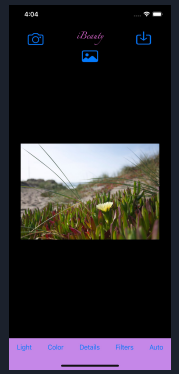
  iPhone's bokeh; Xiaomi's face makeup

General Picture

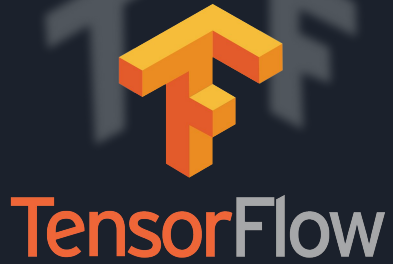
- An Intelligent photo editor
- It has a number of basic photo adjustment functions
- A number of filters for fast editing
- An intelligent mode to generate a post-edit photo automatically using machine learning



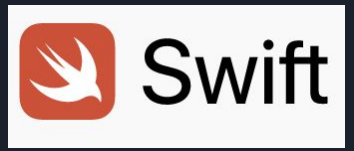


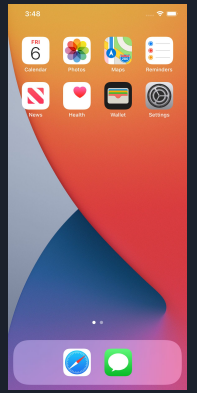


Platform & Technologies



- IOS (iPhone 11+; Not compatible with iPad)
- Developed in xcode 12 using Swift and its API: Core Image and Core Data
- Python API for machine learning algorithms: SKLearn & Tensorflow
- Custom Kernel code (similar to MATLAB in terms of functionalities); the language name called: OpenGL Shading Language (GLSL)



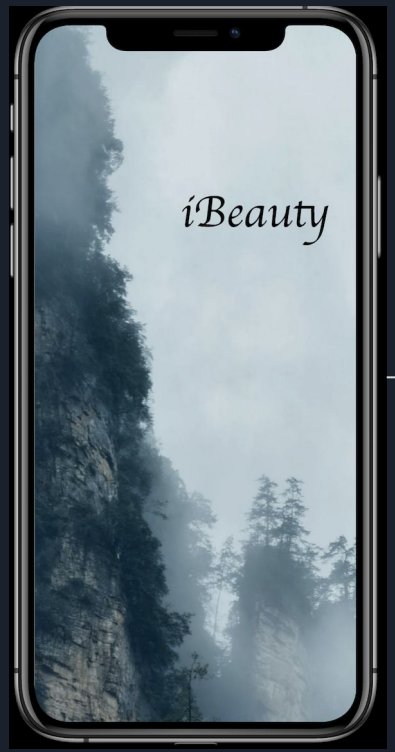


Solution

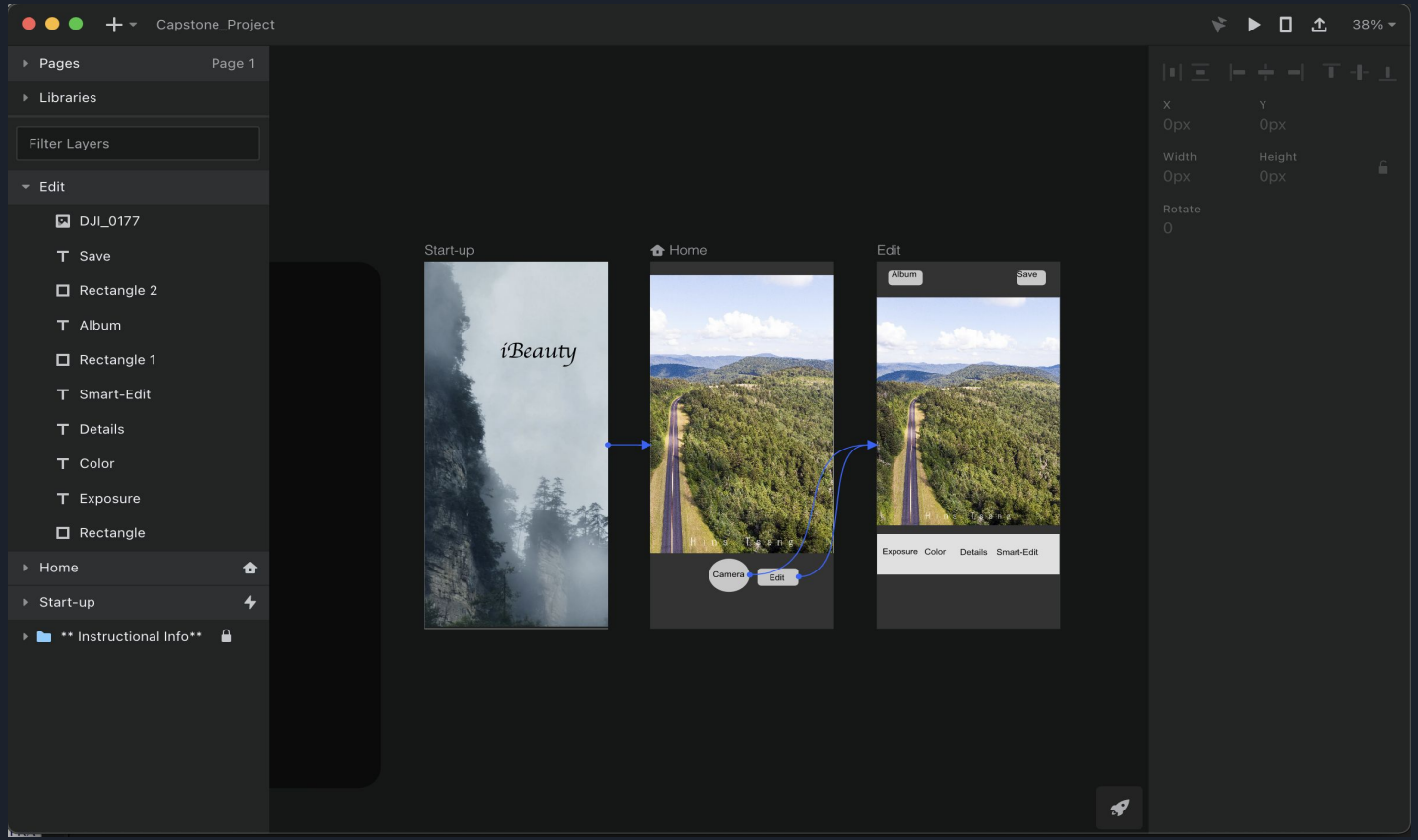
- UI Design Prototype
- Software Architecture/Design Pattern: MVC
- Core Image for images editing filters
- Core Data for permanent storage in the App
- Neural Networks(Deep Learning) in Tensorflow for image classification: Portrait/Landscape
- Support Vector Machine (SVM) for input classification & prediction

UI Prototype

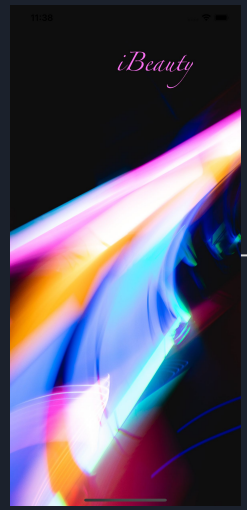
InVision Studio App:

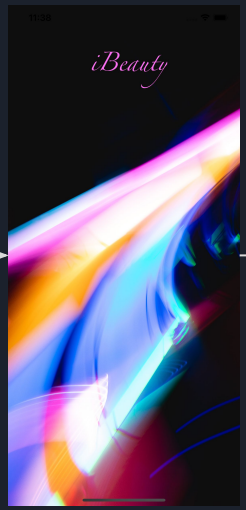


Prototyping



UI Product


iBeauty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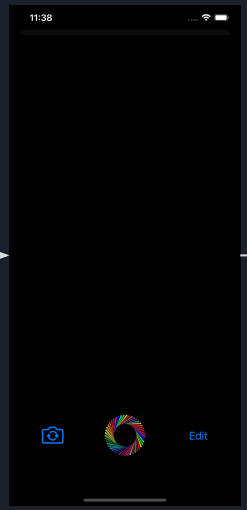
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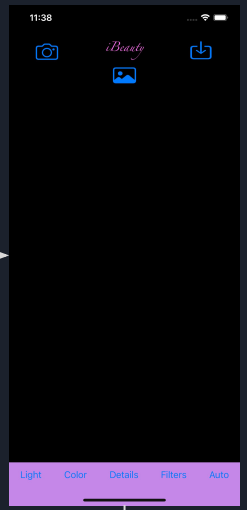
Edit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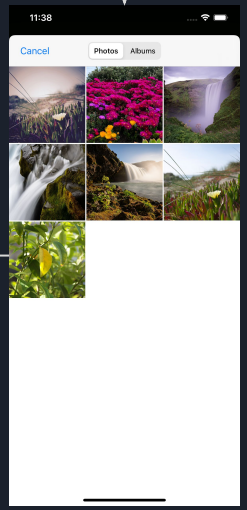
iBeauty
Light
Color
Details
Filters
Auto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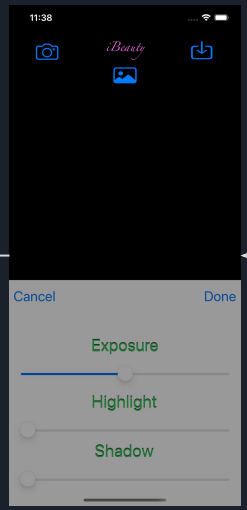
Cancel
Photos
Albums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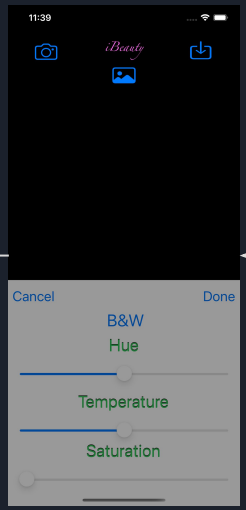
Cancel
Done
Exposure
Highlight
Shadow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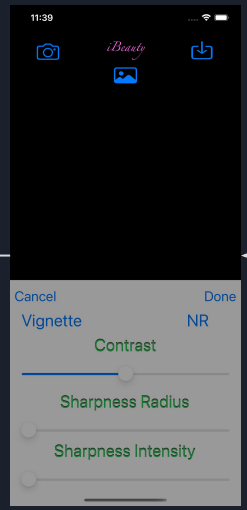
Done
B&W
Hue
Temperature
Saturation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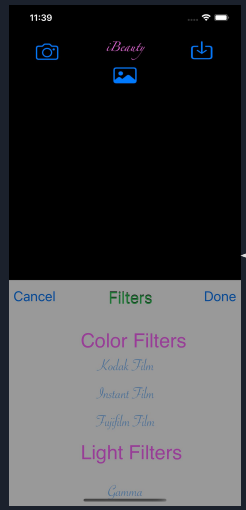
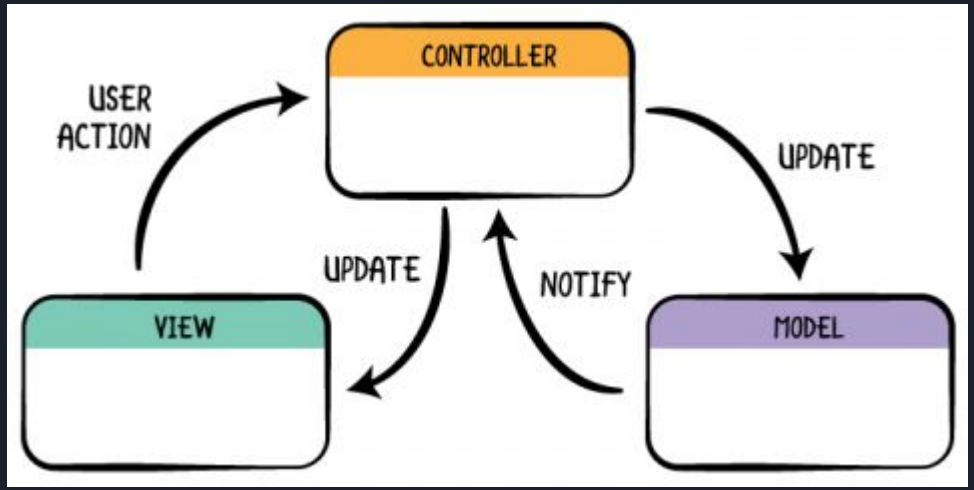
Done
Vignette
NR
Contrast
Sharpness Radius
Sharpness Intensity


11:39
iBeauty
Cancel
Filters
Done
Color Filters
Kodak Film
Instant Film
Fujifilm Film
Light Filters
Gamma

Design Pattern

Model-View-Controller

Aka: MVC



Neural Networks

Support Vector Machine

Storage on Core Data

Train and Tune the Algorithms

Use Cases

1. Taking photos and save
2. Edit a photo right after taking it
3. Edit a photo chosen from photo album
4. Quickly edit a photo using automatic editing

Stories

1. For the first couple times, user might just want to use it as traditional photo editor
2. After a few inputs in this app, algorithms are trained enough to study the input patterns and image styles
3. User starts to use the auto-editing function in this app
4. From that point, the application are used in hybrid mode(both traditional editing and auto editing)

Demo...

Future Work & Improvement

1. Set a standard of Groundtruth & Testing Datasets (Is it possible?)
2. More classifications on Images Styles and Categories
3. Use GLKView for instant updates & image processing with advantages of GPU usage and OpenGL
4. Remote Storage (SQL database) instead of Local Permanent Storage
5. Add user account for tailored service with respect to different users

Thank You!