# Storyboard

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## Overview

Traditionally in the film industry, there is normally a drawer/designer who is in charge of storyboard design. However, hiring a dedicated person for storyboards is not always feasible for small-budget or personal projects. Additionally, more independent filmmakers are emerging nowadays as film equipment is getting more accessible. Therefore, we want to come up with an app to help filmmakers and videographers to design their storyboards with ease using their iPads. The users can effortlessly draw rough sketches to describe their shots and order different shots in various scenes using our app. Moreover, they can conveniently share their storyboards with other crew members, which is significantly more efficient than the traditional way (print copies of drawn storyboards and distribute them).

## Similar Existing Applications

There are various applications out there on various platforms(desktop, web, mobile) to design storyboards, just to list a few:

- Mobile: Storyboard Animator (iPad App) - this is the only iPad App we found on the App Store that is related to storyboard

Desktop: Power Production Software (PC/Mac App)

- Web: StudioBinder(Web App)
- For more storyboard apps, one can visit: https://www.studiobinder.com/blog/best-storyboard-software-free-storyboard-templates/

Nevertheless, most of these apps' target audiences are not really individual filmmakers. Consequently, the price/subscription fees can go up to several hundred a year. Additionally, many of these apps have outdated interfaces which might impede the creative process. We will discuss more about existing solutions in the next section.

# Unique Selling Proposition

As mentioned above, most existing solutions are not really user-friendly to small projects, both financial-wise and user-experience-wise. More importantly, there aren't any apps that take advantage of iPad and Apple Pencil except for one called "Storyboard Animator", which has an outdated interface. Traditionally, there are two ways to draw a storyboard: either drawing by hand or using a graphic tablet. Given Apple Pencil's capability (sensitivity, angle detection, etc.) and integration with the iPad, it is actually a superior choice to the two options above:

- Draw by hand:
    - Pros: easy to draw (e.g. natural stroke)
    - Cons: hard to share; lose pages easily
- Apple Pencil & iPad:
    - Pros: has high-end stylus features (sensitivity, angle detection, etc.); store data digitally and safely; share easily; highly integrated with iPad
    - Cons: need an iPad to use Apple Pencil
- Graphic tablet:
    - Pros: high-end graphic tablet can mimic real drawing experience better than Apple Pencil; store data digitally and safely; share easily
    - Cons: to get the similar capabilities of Apple Pencil, graphic tablet usually cost more than Apple Pencil; need software support

Moreover, individual users should not be overwhelmed by all the professional features (animate characters, change camera focal length, etc.). Most of the time, being able to draw and arrange different shots is more than enough for the director/director of photography(DP) to communicate with other crews in small projects.

# Features

Priority Labels: P1 = High / Basic, must-have feature, P2 = Medium / Bells and whistles, P3 = Low / Optional / Cosmetic

| Sprint | Priority | Feature | User Story / Stories | Description |
|---|---|---|---|---|
| 1 | P1 | Drawing on Canvas | As a user, I can draw shots using Apple Pencil with customised colours and line weights. | This is a basic feature that a storyboard should have. Allowing hand-drawing of shots gives the user flexibility in expressing/illustrating his expectation. Color and line weights options will give further flexibility. |
| | P1 | Navigate between Projects, Scenes, and Shots | As a user, I can navigate between different projects, scenes, and shots. | Each project will have different scenes and each scene will have different shots.<br>Within the app, the user should have the ability to navigate between different projects.<br>Within a single project, the user should have the ability to navigate between scenes<br>Within a single scene, the user should have the ability to navigate between shots<br>The user must also be able to navigate backward from shots to scenes, from scenes to project, and from project to a more general screen.<br>The user must be able to navigate from the current shot to the previous and next shots. |
| | P1 | Reorder Shots | As a user, I can reorder different shots. | For a single scene, its shots are ordered in a sequence from the start of the scene to the end of the scene. This feature allows users who would like to change the appearance order to simply reorder them in some way using the app. |
| | P1 | Adding description | As a user, I can add and edit details involving a project, a scene, or a shot. | In most cases, videographers would prefer to keep important details included in their storyboard. Examples include the title of project/scene, dates, summary, captions, difficulty levels, duration, and notes for the videographer. |
| | P1 | Duplicate a Shot | As a user, I can create a duplicate copy of a shot, so that I can reuse and edit existing shots into newer shots. | There are many cases in storyboarding where the user realises that the current shot he plans to draw is very similar to another shot (e.g. a conversation between two people where the shot goes back and forth). Having this feature simplifies the user's storyboarding experience and definitely reduces the total amount of time and effort. |

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| | P1 | Persistence | As a user, I can save drafts of my project, so that I can continue working on them whenever I want. | This feature is definitely a must-have as the storyboard often takes time to come up with and users often need to continue the projects at a later time. The choice of which type of persistence (JSON, Core Data, etc.) is still left undecided and this will be decided depending on the frameworks or architecture we will be using. |
| 2 | P1 | Undo and Redo Drawings | As a user, I can undo or redo my previous moves in case I accidentally. | This feature gives the user the ability to revert strokes (undo) and to restore strokes that were previously undone (redo). It creates a sense of simplicity and assurance because the user can draw knowing that any changes can be easily discarded without much effort. |
| | P1 | Automatic Labelling | As a user, I can see the scene and the shot sequence number of any shot. | Automatically label scene and shot number upon adding or rearranging. |
| | P1 | Layers | As a user, I can edit several layers of the shot. | A shot typically consists of several layers. Working with layers allows high reusability of drawings (e.g. background). |
| | P1 | Rotate Canvas | As a user, I can rotate my canvas and draw in a specific orientation of my iPad. | For this feature, we would need to consider how the canvas size changes with the rotation. |
| | P1 | Resize Canvas | As a user, I can resize my canvas. | For this feature, a maximum and minimum canvas size should be imposed. Furthermore, the size should be compatible with the iPad. |
| | P1 | Preview Previous/Next Shots | As a user, I can preview the previous and next shot on top of the current shot. | The preview shot will appear translucent on top of the current shot. |
| | P1 | Searching | As a user, I can search for projects, scenes, or shots based on the shot-specific details. | This feature should, at the very least, allow users to look up based on project and scene title. Searching descriptions of specific shots should also be implemented. |

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| 3 | P2 | Export as Video (Slideshow) | As a user, I can export a video containing a slideshow of any particular scene's shots, so that I can share the file with others. | Each shot should be timed based on the duration as fixed by the user in the details portion. Captions and descriptions of each shot could also be placed below each shot image. |
| | P2 | Export as PDF | As a user, I can export my project as PDF, so that I can share the file with others. | The user should be able to determine the page settings. The formatting would likely be similar to printing PPT slides, including orientation and the number of shots per page. |
| | P2 | Preview Storyboard as Slideshow | As a user, I can preview my storyboard as a slideshow | Each shot should be timed based on the duration as fixed by the user in the details portion. Captions and descriptions of each shot could also be placed below each shot image. |
| | P2 | Drag and Drop to add image | As a user, I can add an image to a shot simply by dragging and dropping. | We will need to consider how the size of the added image will be adjusted. |
| | P2 | Support multitasking | As a user, I can open this app while in split-screen mode to allow for multitasking. | This feature complements the drag-and-drop feature. Furthermore, the user might want to refer to other images when drawing so this feature makes it easier for the user to do so. |
| - | P3 | Transition effect between shots | As a user, I can determine the transition effect between shots of a scene for the slideshow. | |
| | P3 | Add sound to a shot | As a user, I can add a sound to any shot. | We can provide the option of adding sound to a shot (e.g. voice recording of script or explanation of shot). However, this must not exceed the specified duration of the shot. The start time and end time of the sound must also be specifiable |
| | P3 | Share file via… | As a user, I can share my exported PDF / Video to other users via email / social media apps. | |

# Timeline

Tentative Project Timeline

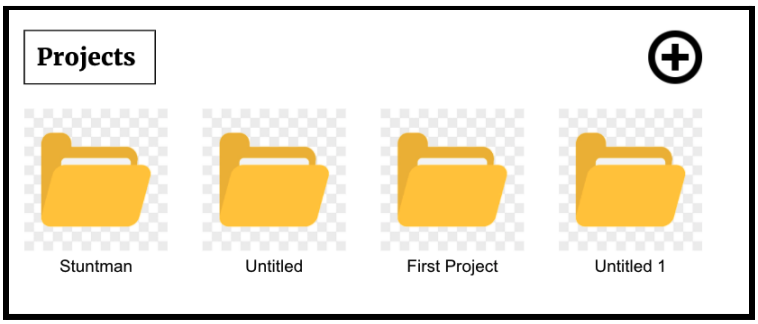
| Sprint | Week | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|---|
| 1 | 8 | | | | Proposal Meeting, Weekly Team Meeting | | | |
| | 9 | Weekly Team Meeting | | | | | | Sprint 1 Report |
| 2 | 10 | Weekly Team Meeting | | | | | | |
| | 11 | Weekly Team Meeting | | | | | | Sprint 2 Report |
| 3 | 12 | Weekly Team Meeting | | | | | | |
| | 13 | Weekly Team Meeting | | | | | | Final Sprint Report |
| - | Reading | Project Presentation | | | | | | |

Features to be implemented in each sprint are indicated under the “Features” section.
Each member will give daily updates through telegram group chat at 8pm.

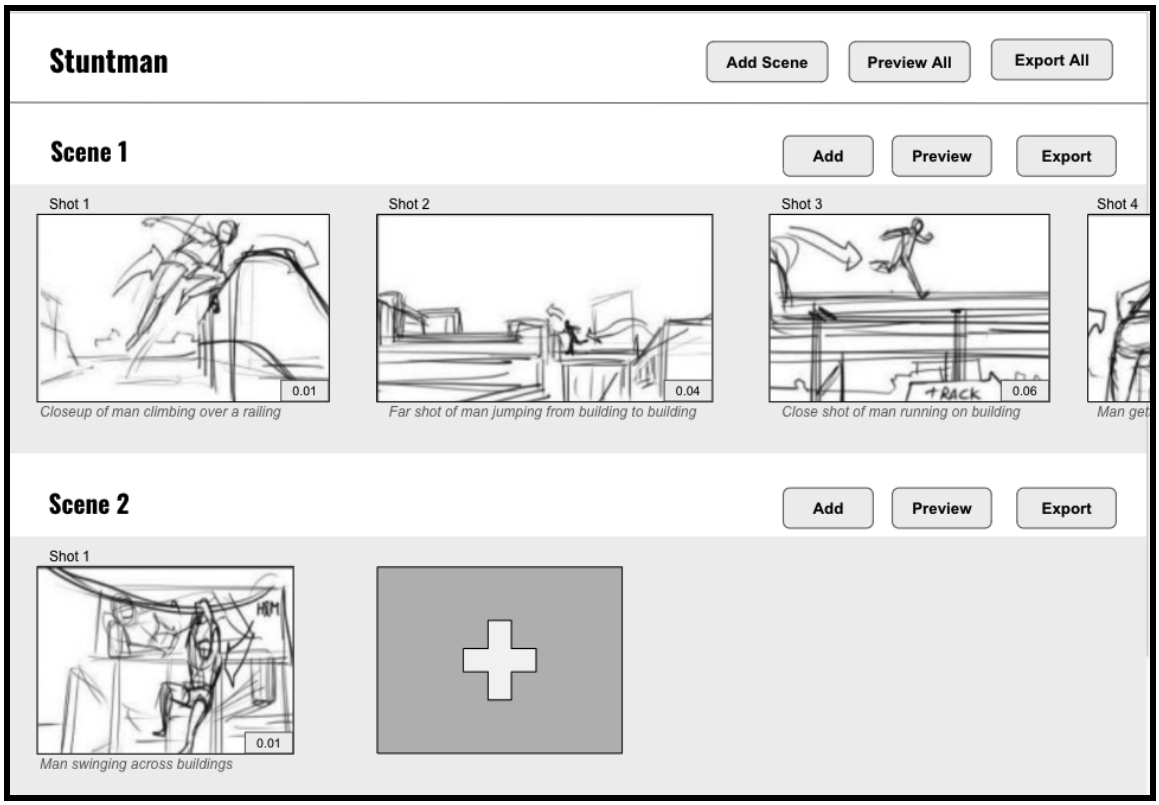
# User Interface Mock-ups

The hierarchy of the application follows **Project > Scene > Shot**. Individual shots can be drawn and edited. An individual shot also contains information such as description, notes, duration, etc. Shots are ordered together to create a scene. A scene can be converted and saved as video format.

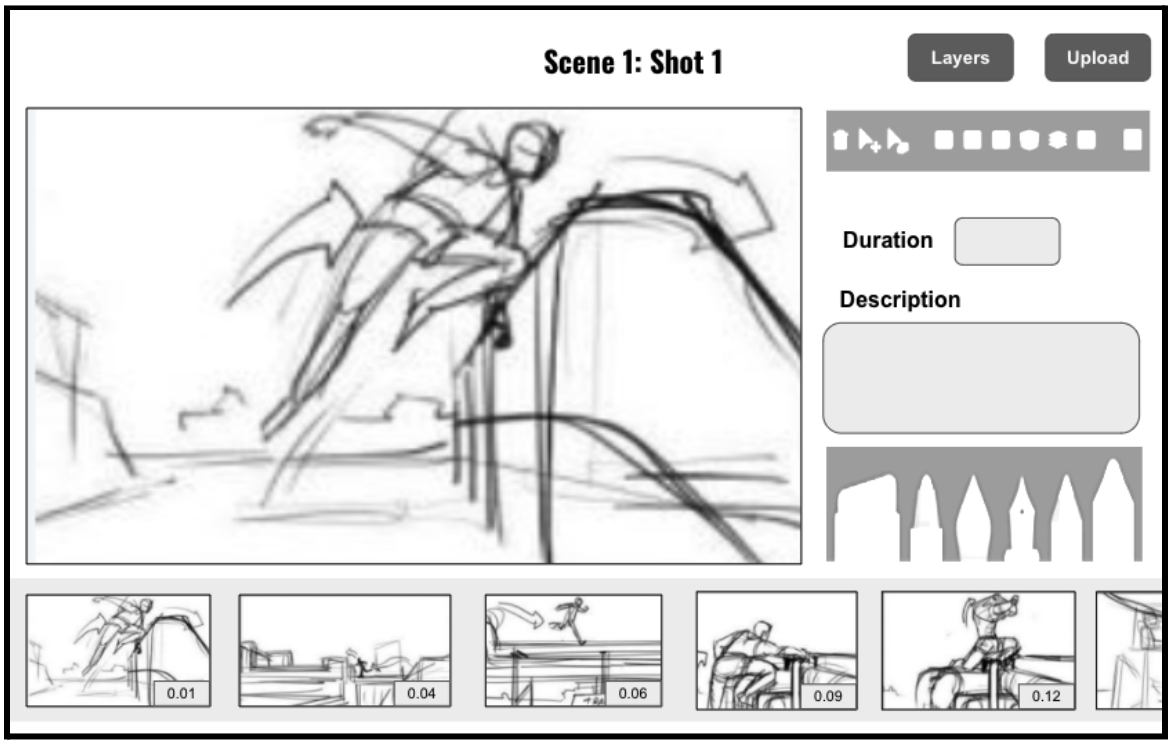
The user can add a project or select existing projects.




After selecting a project, the user can scroll (vertically) through all the scenes in the project. For each scene, the user can scroll (horizontally) through all the shots of the scene in sequential order. The user can add shots, reorder them, preview the scene (as a video) or save the scene (as a video format).

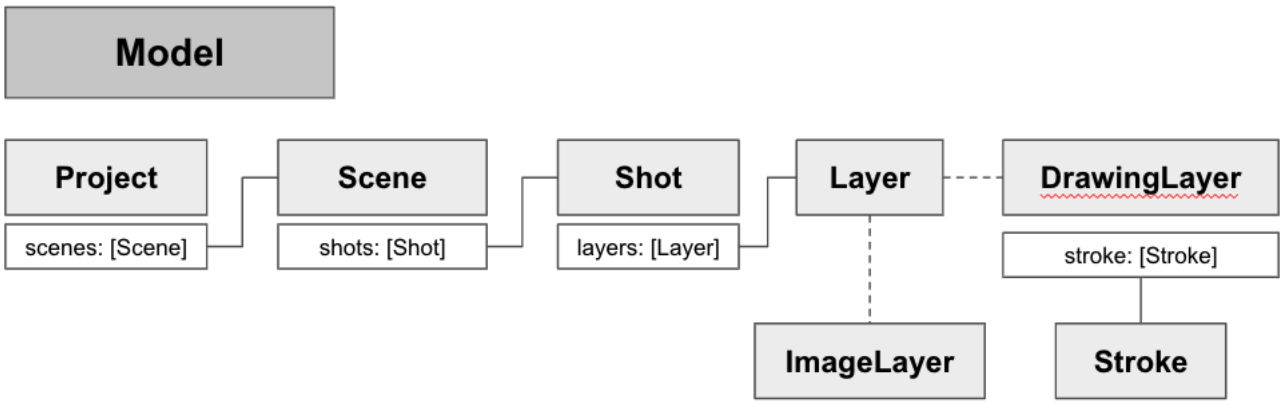



When the user selects a shot, he is navigated to the shot where he can draw and edit the shot with the pencil tools, or even upload images into the shot. He can also update the duration and description of the shot. He can navigate to adjacent shots from the slider below.

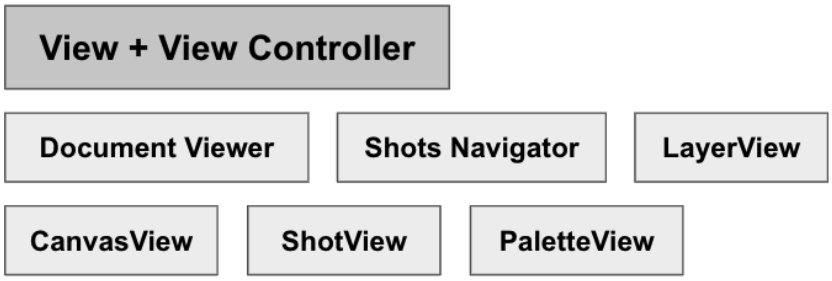


## High-level Architecture Design

For our application, we will be using the MVC architecture. The high-level modules of the model can be described below. Note that this is very preliminary and most probably subject to changes.




The high-level models of the view and view controller can be described below. Note that this is very preliminary and most probably subject to changes.




## Individual Contribution and Roles

In Sprint 1, most works will be on the Model. Therefore, Marcus and Tian Fang will be in charge of Model in Sprint 1, and Yongjing will start building the interface (ViewControllers and Views)

After Sprint 2, Marcus will continue to refine the Model; Tian Fang will be in charge of the drawing experience; Yongjing will handle other ViewControllers and Views (e.g. navigation, labeling, etc.)

## Tech Stacks

We will be using Swift and UIKit for our app. Additionally, we will be using PencilKit to support Apple Pencil. Currently, we have no plans to use external frameworks, unless we need to add extra features that depend mostly on non-software-engineering skills.