

drawer

by CDJR technologies

Final Project Report
INFO30005

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Introduction & Background

Our challenge

'How might we inspire young people to cultivate their creative confidence?'

Why we chose this challenge

While we considered several of the challenges from the OpenIDEO website, we ultimately settled on this one for two main reasons:

Firstly, we felt that this was a challenge that we could realistically help solve by creating a website. Although we found that many of the OpenIDEO challenges like 'accelerating immunisation coverage for rapid urbanisation' were both interesting and important, they generally seemed to fall outside the scope of what a single website could achieve. The challenge of 'cultivating creative confidence' is a personal and social problem, and thus one that can be tackled more readily through the implementation of a simple platform-based website. It was simple enough for us to build a viable solution within the timeframe of a semester, but also complex enough for us to have room to come up with creative solutions to the problem.

Secondly, we are ourselves passionate about art, creativity and design. In our spare time we like to draw and create things, and so we saw our potential solution to this challenge as something that we could and would use ourselves. Moreover, much of the web information technologies project is fundamentally based on creativity and design, and so we saw this challenge as a perfect match for what we wanted to achieve with the project.

Why this challenge is important

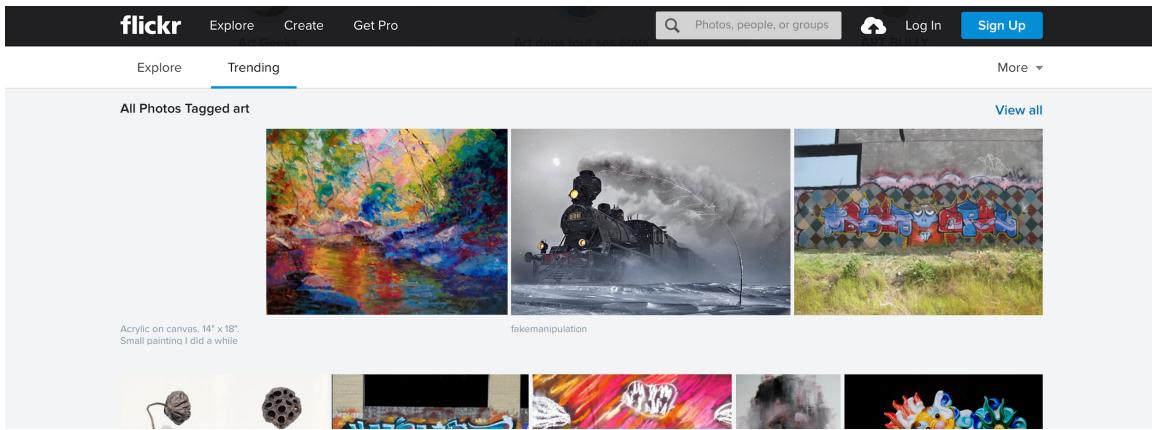
For this to be a meaningful project, we had to make sure that our chosen topic was also a meaningful challenge. As we began our initial research process, it quickly became clear that 'inspiring creative confidence' amongst young people is a critical task that has far reaching implications in the fields of education, the arts and innovation as a whole. For example, a study by Throsby and Zednik (2010) estimates that a third of artists bring their creative skills to other industries, while a study by Runco (1991) found that training in creative thinking leads to better problem solving and creativity amongst young children. Even from individual intuition and experience alone, it is clear that many of the things that we personally find to be inspiring, exciting and joy-inducing in life are the products of creative work. To inspire creative confidence amongst young people is a challenge that could have a positive effect on society as a whole, and thus also a challenge that we believe is worth pursuing.

Design Process

Stage I - examining current solutions

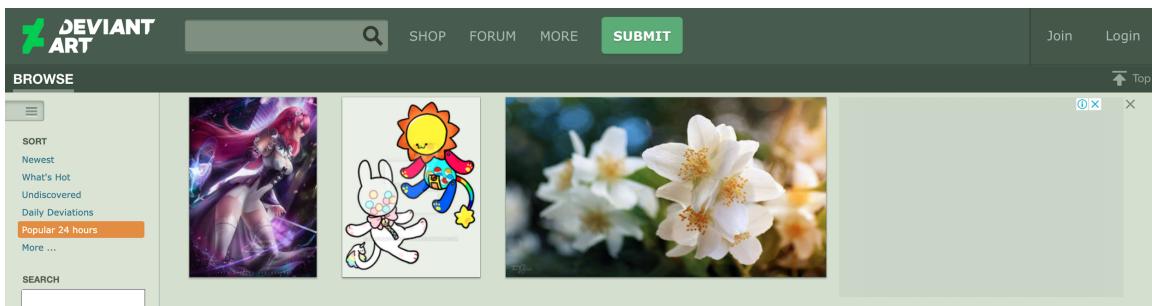
We began the design process by assessing the main art-sharing websites that are popular in 2019. There are three websites that we will discuss in the following section: flickr, instagram and deviantart.

Flickr



Flickr is a popular photo sharing website that many artists use to exhibit their art. While the website has a clean design and some good features like the ability to add comments directly onto specific parts of a photo, it isn't necessarily the best place to find 'creative confidence' because of the way it highlights only the best works. To an amateur artist, going on flickr can be potentially intimidating rather than inspiring. We believe that a good art sharing website needs to not only highlight amazing artwork, but also the individual journeys of the artist and how they have progressed over time to be able to produce those works in the first place. This is something that flickr fundamentally lacks.

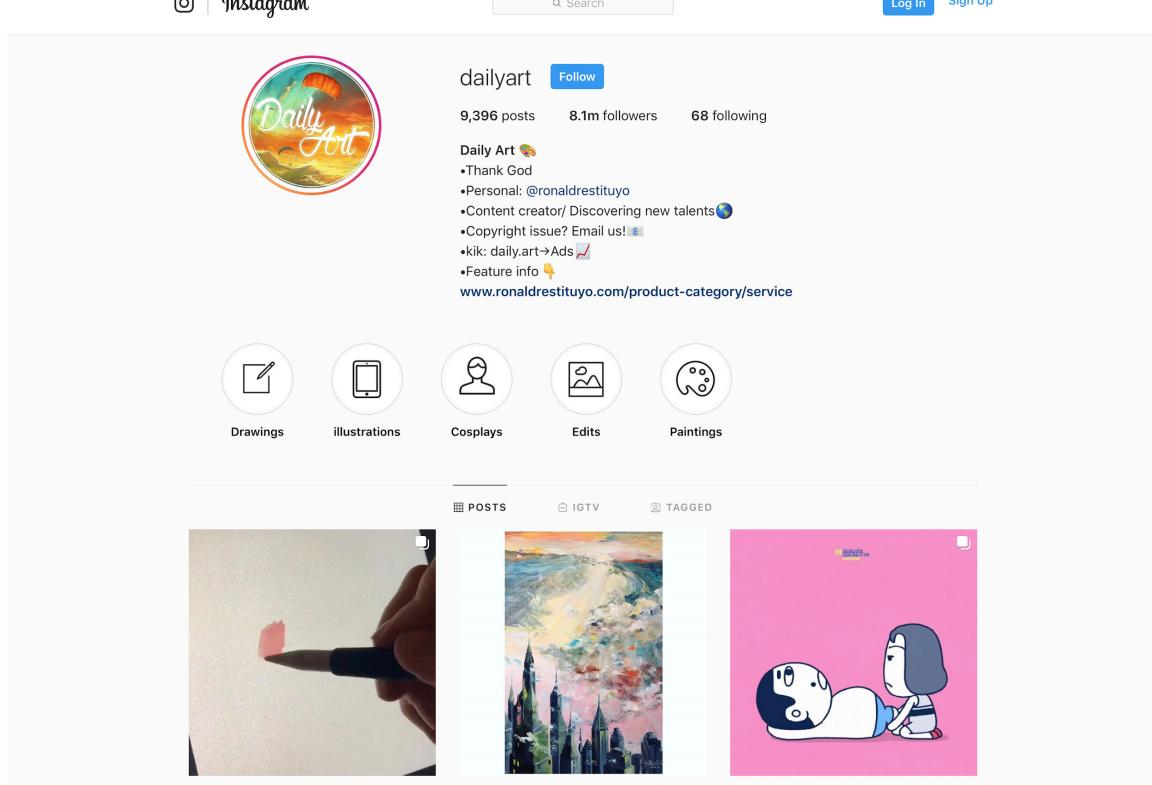
Deviantart



Deviantart is the only website on this list that is specifically tailored to the art community. We see two major flaws with deviantart - first, its community and artists are too niche, and a lot of the content on the website is somewhat questionable (eg. overly sexualised

cartoons), and second, like flickr it lacks a sense of ‘artist progression’. These two simple reasons make it clear that deviantart does not solve the problem that we want to solve.

Instagram



Instagram is easily the most popular website that we assessed, with over 1 billion monthly users. While it has a strong user experience, this experience isn't art focused, and again only tends to focus on trending works of high quality, so like deviantart and flickr there is no focus on artist progression. Moreover, instagram contains too much other content like influencers, models and other enthusiast pages for it to be considered as a true art sharing website. A user on instagram is likely to end up viewing a lot of content that isn't art related at all, and thus we also don't consider it as a true solution to inspiring creative confidence.

Stage II – target audience

An important part of our design stage was determining exactly who we were creating this website for. We narrowed down our target audience to three core groups of people, each representing a different type of artist:

1. Complete amateur artists – people who want to learn art, but are daunted by the difficulty and their lack of experience, and need productive forms of inspiration

2. Professional artists – people who create amazing artwork that they want to showcase and share
3. ‘In between’ artists – those who are good but not great, and want a place to find feedback and discuss their work with likeminded people

Stage III - mockups

Once we had assessed the existing potential solutions on the market and knew who our target audience was, we got to work brainstorming ideas for our own website. The main thing that we wanted to ensure that we had was the ability to see the overall journey of progress for any individual artist. This was something that we felt that all of the websites that we looked at lacked, despite it being a core part of inspiring creative confidence, since it allows amateur artists to understand at a deep level that everyone starts with little skill. During this stage we also came up with the name ‘drawer’ for the website. ‘Drawer’ is supposed to have two interpretations - it is a direct reference to our potential user base (people who like to draw), and it is also a reference to the idea that our website is a place to store past art (like a physical drawer).

drawer

A random drawing that I made yesterday.
Acrylic, canvas

profile upload

Wow!

Thanks!

Great work

- tags and search
- following other users
- layered comments?
- download images?
- folder image comments?
- Share to facebook/twitter

another user's profile and gallery

Enter website

Home page

Sign in

Sign up

Upload a new work

Select a new Image from Local file

Write a description

personal profile and gallery

We started off by drawing rough sketches of the potential website design, which allowed us to have in depth discussions about how we wanted it to function and look (bottom left image). Next, we narrowed down exactly which features we wanted to try to build into the website

alongside the ‘artist progression’ feature (top right image). Once this was completed, we got to work formalising the design of our website, and created a functionality map that we could reference during the rest of the development process (bottom right image). This map aided us immensely when the time came to divide our roles and responsibilities. Finally, we created some basic aesthetic mockups (top left image) to help guide the direction of our frontend design. These mockups helped us decide aesthetic features such as colour palette, mood and typography. In the end we decided to go with a subtle, subdued colour palette and mood (so the actual artworks could be displayed more prominently) and a modern typography style.

Stage IV - interviews

In the final stage of our design process, we interviewed friends, fellow artists and classmates to assess the effectiveness of our planned solution. This was achieved by presenting them with our functionality map, and walking them through the website’s various use case scenarios. By doing this, we gained valuable feedback on what features our users wanted and didn’t want, as well as some helpful ideas for further exploration. One thing that became clear from our interviews was that our potential users all really wanted some sort of search or tagging feature to organise art, which was something that we were considering but weren’t sure about including. In this way, the interviewing process helped to inform our decision making during the design process, and our findings from this stage are reflected within the design of the final website itself.

Development Process

Allocating roles and responsibilities

When the time came for us to begin development in earnest, we began by first clearly dividing up our roles and responsibilities. In accordance to each group member’s interests and prior experience, we split the workload as fairly and evenly as possible. In the end, it was decided that Dongdong would work on the website’s ‘skeleton’, setting up much of the backend infrastructure, Cheng would focus on the website’s home page and video production, Rowan would work on setting up the website’s image storage functionality, and Jerome would work on the profile page, as well as implement the search, tagging and sorting functions.

While the official subject deliverables seemed to suggest that we work on each stage of the project together, we decided from the beginning that we would mostly ignore the subject’s suggested timeline and work ahead of it. Instead of working on every single feature together as a group, we mostly worked independently on our own parts of the project, discussing our progress with one another during weekly meetings. This allowed us to stay well ahead of the submission dates for each deliverable, and made development a smooth and stress-free process. It also allowed everyone to make a solid contribution to the project’s success. By the final few weeks of the semester, all that we had to do was integrate our work and make the user interface consistent across different pages, a task made easy through our reliance on git.

Tools and frameworks



Aside from allocating roles and responsibilities, one of the first things that we did during the development process was determine our tech stack. For the most part these were easy decisions to make as we were limited by the requirements of the subject - node.js and express were chosen for the backend API, MongoDB was chosen to store data, html and css were used for front end presentation, js was used for behaviour, heroku was chosen for hosting, and github was chosen for git and collaboration.

In addition to the subject's required tools and frameworks, we also used a few of our own. We chose firebase to store the image data (because MongoDB has a 16mb document size limit), Google Cloud Platform's Vision API for automated image tagging and ejs (embedded javascript) to make some of the development simpler and faster. In addition, we occasionally relied on bootstrap for fast prototyping and occasional templating.

Repository management

To easily collaborate, we relied on github for this project. Because of the way we allocated roles and responsibilities, repository management was quite straightforward as there were rarely any conflicts. Each of us worked with a private branch during development, and then met up to merge our branches into the master branch and solve potential conflicts once we were ready.

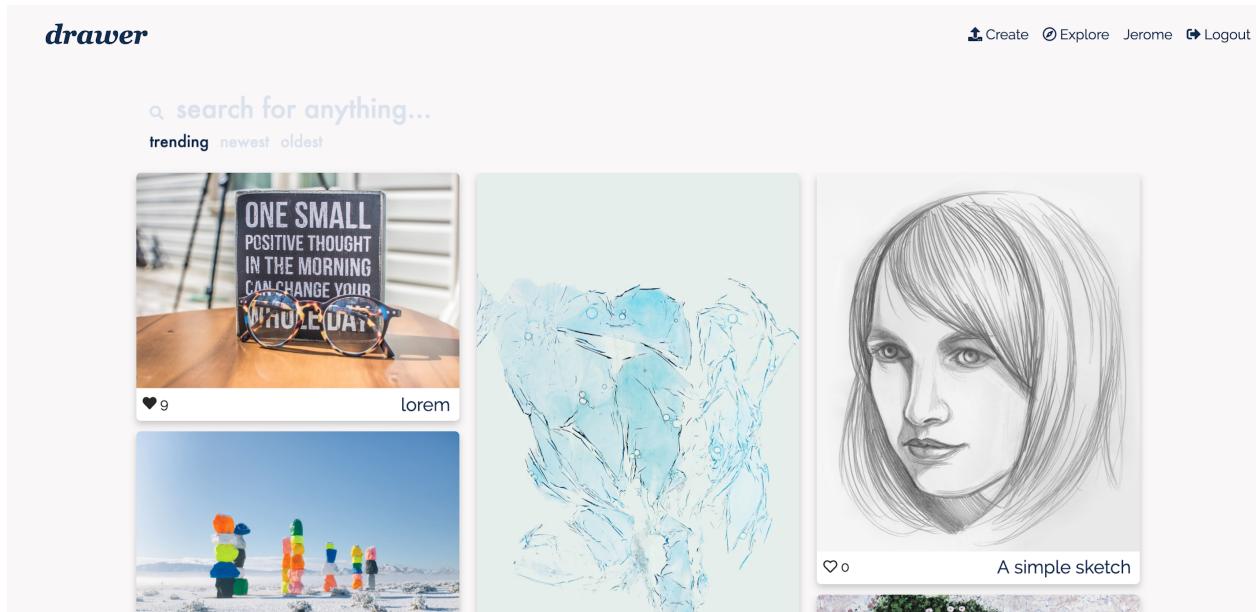
Communication

During the development process we used Slack extensively for communication. We also met at least twice a week – once during the weekly workshop, and another time at a pre-booked room at one of the libraries. This enabled us to maintain clearly defined roles and responsibilities, and also allowed us to easily work together to solve specific problems that any one person was unable to address on their own.

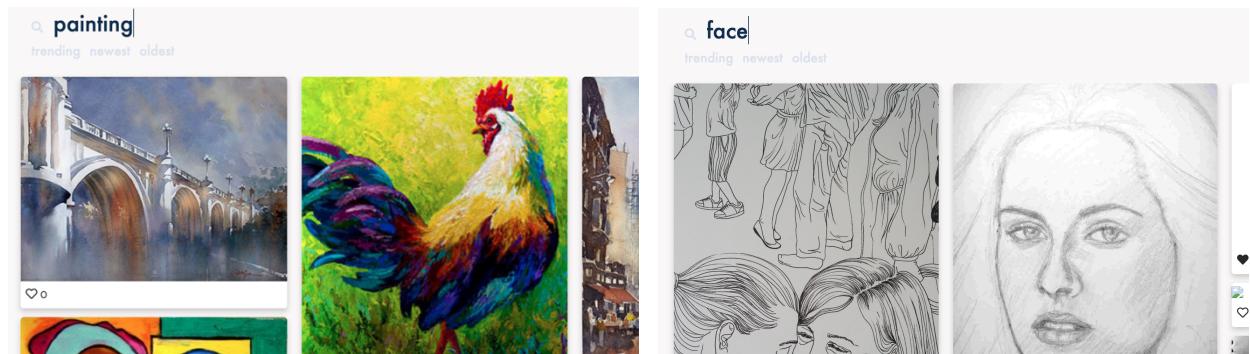
System Description

The following section will present each of Drawer's core functionalities, discussing what it achieves and why.

Home Page



Drawer's homepage displays a gallery of all user works, sorted by likes or upload date. In this sense it is quite similar to existing websites like flickr and deviantart, since the focus here is on highlights from across the website. For users, the homepage is a place to explore and discover new artists and their artwork. Users can also favourite artworks from this page by giving out likes!



What sets our homepage apart from other websites is its advanced search feature. Powered by Google Cloud Platform's Vision API, images that are uploaded to drawer are automatically tagged according to their content. This allows us to create a search function where users can

not only search by username and title, but also by an artwork's medium and even its subject matter!

Profile page

The screenshot shows the profile page for an artist named Jerome. The top navigation bar includes links for Create, Explore, Jerome, and Logout. The main content area is titled "drawer" and features a profile picture of Jerome. Below the profile picture, there are sections for "About", "Age", "Sign up date", and "Location". The "About" section contains a detailed bio where Jerome describes his passion for music, art, and design, mentioning his recent hobby of drawing buildings and cows. The "Age" section shows he is 20 years old. The "Sign up date" is listed as May 29, 2019. The "Location" is Melbourne, Australia. On the right side of the profile page, there is a grid of six artworks, each with a like count and a year it was created. The artworks are sorted by year: 2019, 2018, 2017, 2016, 2016, and 2014. The 2019 drawing is a watercolor sketch of a modern building, while the others are pencil or charcoal sketches of various buildings.

The profile page is what makes drawer special. Here, artists can share their artworks and their journey of progress in a clearer, more intuitive way than any other website. Crucially, users viewing an artist's profile can choose how they want to view their work - either as a 'journey' of yearly highlights, a complete gallery sorted by number of likes, or a complete gallery sorted by upload dates. By default we enable the 'journey' sorting method, which we hope will make it clear to all users that mastery and skill come at the cost of time and practice. By doing so, the profile enables creative confidence, as it steps away from only highlighting the most amazing artworks and ignoring the context of an individual artist's journey of gradual progress.

Viewing art

The screenshot shows a painting of a young woman with red hair, identified as a portrait by Jerome. The interface includes a navigation bar with 'Create', 'Explore', 'Jerome', and 'Logout' options. Below the painting, there's a 'comments' section with several entries:

- animalFan** May 22, 2019: Wow Jerome, this is really nice! You've improved a lot over the past year!
- ddy** May 22, 2019: Lovely use of colour :)
- Jerome** May 22, 2019: Thanks guys!
- Jerome** May 29, 2019: woohoo!
- Jerome** May 30, 2019: great!!

A text input field for leaving a comment is shown with the placeholder "leave a comment...". Below the painting, a summary box provides details about the artwork:

Portrait
Edit · Delete
By Jerome
Created on May 22, 2019
I painted these yesterday and wanted to document my progress!
Tweet · 分享 434 万

Each artwork uploaded to drawer can be viewed up close on the view art page. This page forms the core of drawer's social mechanic, as it allows users to discuss and give feedback to one another by leaving comments. Users can also delete and edit comments that they posted in the past. From this page, users can view both the final artwork and a series of photos depicting its making-of process, as well as a description written by the artist about their thoughts and thinking behind the piece. This page also contains references to the twitter and facebook APIs, encouraging users to share the artwork (and therefore also drawer) on social media.

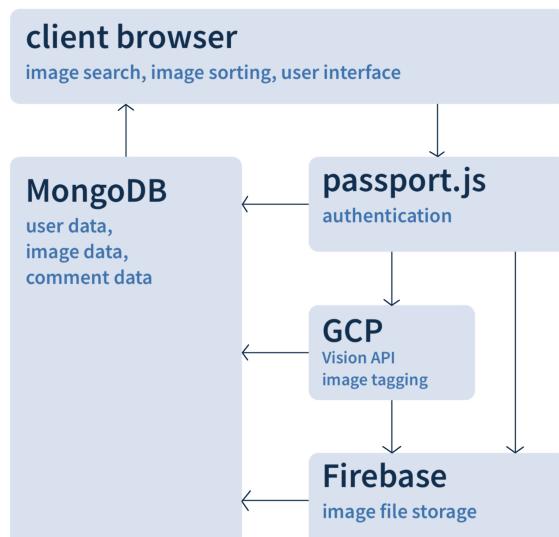
File upload and storage

drawer

The screenshot shows a user interface for uploading a new image. At the top, it says "Upload a new image!" with a placeholder image of two overlapping cards. Below this is a "Browse" button and an "Upload by URL" section with an "Enter Image URL" input field. To the right, there are three input fields: "Title" (with placeholder "Image title"), "Date" (with placeholder "dd/mm/yyyy"), and "Description" (with placeholder "Image description"). A "Submit" button is located at the bottom right of the form area.

Users can upload their own artworks from the upload page, as well as add a title, set the date that the artwork was completed (which is not necessarily the same as the upload date), and write a short description for their work. To upload an artwork, they can either choose a local file from their device, or upload using a url from another website. The url upload feature was originally intended only for debugging, but we decided to keep it because it makes it easy for users to upload works that they might already be storing on another website.

System Architecture



Component diagram

This diagram depicts how our various technologies are tied together. Functions such as sorting and search are managed at the client level. When a user uploads a photo, authentication is managed by passport.js, and the image is first passed through GCP for image tagging and Firebase for file storage before being sent to MongoDB as a Firebase link. GET requests including comments, user data and image data are all pulled straight from MongoDB.

Database

Our MongoDB database handles all image, comment and user data. It relies on four main schemas – ‘user’, ‘photo’, ‘childphoto’ and ‘comment’.

```
var photoSchema = new mongoose.Schema({
  name: String,
  description: String,
  image: String,
  likes: {
    type: Number,
    default: 0
  },
  favorite: [
    {
      type: mongoose.Schema.Types.ObjectId,
      ref: 'User'
    }
  ],
  postAt: {
    type: Date,
    required: true
  },
  author: {
    id: {
      type: mongoose.Schema.Types.ObjectId,
      ref: 'User'
    },
    username: String
  },
  comments: [
    {
      type: mongoose.Schema.Types.ObjectId,
      ref: 'Comment'
    }
  ],
  labels: [String]
});

var UserSchema = new mongoose.Schema({
  username: String,
  email: String,
  age: Number,
  city: String,
  password: String,
  about: String,
  date: {
    type: Date,
    default: Date.now
  }
});

var commentSchema = new mongoose.Schema({
  text: String,
  author: {
    id: {
      type: mongoose.Schema.Types.ObjectId,
      ref: 'User'
    },
    username: String
  },
  postAt: {
    type: Date,
    default: Date.now
  }
});

var childphotoSchema = new mongoose.Schema({
  image: String,
  parent: {
    type: mongoose.Schema.Types.ObjectId,
    ref: 'Photo'
  }
});
```

The function of each of the schemas is fairly self-explanatory given its respective name – ‘photo’ is for all uploaded images, ‘childphoto’ is for images that are a part of a collection of images (ie. When users upload multiple photos at once to display the progression of an individual artwork), ‘comment’ is for comments and ‘user’ is for users. The photo schema contains a URL to a Firebase hosted image or any image hosted on another site, as well as all of the relevant data that might be displayed on the ‘view art’ page. The user schema includes some of the basic information that is displayed on their profile page, and the comment schema contains the text and date data for every comment on the ‘view art’ pages.

Firebase

Images uploaded to drawer are stored in the cloud using Firebase. Upon being uploaded to Firebase, a link to the file is generated and stored in the MongoDB database. This link is then used to load the image for future requests.

Passport.js

We use passport.js for account management. It helps us solve the problems of password encryption, photo/comment ownership authentication, page redirecting, and flashing success and error messages (which is further assisted by the connect-flash library).

Google Cloud Platform

Images uploaded to drawer are first sent to GCP's Vision API before being passed into Firebase and MongoDB. This process returns a list of semantic tags, powered by Google's computer vision technology, which allows us to automatically label images and thus make it easier for users to search for artwork.

Front end

The user interface's responsiveness relies on the bootstrap grid system. Search and sorting features are implemented at the client level using simple js functions. Icons that appear on the website use the font-awesome library, and we also created our own favicon for the website.

Discussion

How drawer solves our chosen challenge

We believe that our system manages to solve the challenge of encouraging creative confidence amongst not only young people, but also anyone who is interested in the visual arts regardless of age. There is a clear use case and functionality for each of the user types that we identified during our design stage – for amateurs, drawer is a place to find productive forms of inspiration and to see the overall journeys of experienced artists; for professionals, it is a place to showcase both their best artworks and how they have grown and developed across the span of their career; and for the 'in between' artists drawer is a great place to discuss art and to give and receive feedback. Thus, as a platform where artists regardless of skill level and experience can learn from and inspire one another, we believe that drawer is a practical and effective solution to the challenge of encourage creative confidence within society as a whole.

Future improvements

There are several things that we could do better next time –

First, we would like to implement AJAX within our website in order to turn it into a single page application. We believe that this would result in a more cohesive and intuitive user experience by cutting down the number of pages that a user must navigate.

Second, we would like to make drawer more beautiful. Although the website looks quite nice in its current state, we believe that given more time we could bring its presentation to the next

level. We briefly experimented with animating our various features, but didn't have enough time to successfully bring this idea to fruition.

Third, there are still plenty more features that we would like to implement in the future. Ideas that we discussed but didn't have time to implement include nested comments, the ability to write a comment directly on a part of the image (like flickr), and more sorting and filtering options on the home page.

Conclusions

This project has been a fantastic learning experience for each of us. We are proud of how our website looks, functions and feels, and we are even more proud of how we managed to function as a group - development went extremely smoothly, and we stayed well ahead of the official deliverable submission timeline throughout the course of the entire project. Most of all, we are proud of how we managed to genuinely solve a problem, as we believe that drawer is truly a great place for people of all skill levels to get inspiration, share art, receive feedback, and find their creative confidence.