FRAMEABLE

Final Report

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CMPT 390.01

Abstract

In an increasingly mobile and fast-paced society, Facebook, Instagram, Pinterest and Snapchat are evidence of the power of images to create a sense of community over great distances and across time zones. The proliferation of mobile phones with built-in cameras makes it possible to share experiences with those near and far like never before. Where do we keep the images that we treasure and want to hold onto? Most of us have them in our devices and in cloud storage solutions. These photos are often seen only occasionally after being taken, and features like the "throwback" images now surfaced in Facebook remind us that images can bring back great memories and affect us positively in an instant. Consistent with the current trend of computing bringing our digital lives together seamlessly with our physical ones, I constructed an ecommerce website to offer photo printing and framing. Customers are able to take their most meaningful moments, upload photos, select a frame, and provide a shipping address for the order. After the order is placed, I then print, frame, and ship the finished piece according to the customer's specifications in a timely fashion ensuring a high quality experience. Appreciating the sheer volume of images floating through the void, Frameable is the only online option that allows customers to upload and print their photos.

Introduction and Background

The idea

Frameable is an ecommerce site born from a forgotten photograph in a cheap, cardstock frame from a vacation I took two years ago. The photograph is of my fiancée and I having dinner in a restaurant on our first night in Hawaii. I tucked the photo inside a souvenir coffee table book to keep it safe on the trip home and forgot about it. Upon rediscovering the photo, I decided to reinvent it by scanning it in to my computer, touching up the redeye, and slightly enlarging and reprinting it on photo paper. I framed it using a pre-matted frame I purchased from Costco. This small project gave me the idea for an online service, called Frameable, where a consumer could frame a moment instead of leaving it online. After researching the competition, I discovered there was no site that made the process easy or affordable, or that bundled photo printing with framing. Frameable is the affordable bridge to carry the digital, cloud photographs of our digital lives to the walls and mantels of our daily existence.

Project connection to interests and goals

I returned to school to earn a bachelor's degree in the computer sciences because not having one created a glass ceiling above which I could not rise, regardless of the quality of my work. I also hoped to use my education to fill skill gaps. Prior to coming to Westminster, I had the opportunity to work for a tech company, as an individual contributor in Google Maps and as a manager in Niantic Labs, to implement details of projects conceived by others. My roles emphasized the importance of timely execution on project deadlines and attention to detail. While in Maps, I learned the importance of being flexible and dexterous, as the subject matter could change hourly. At Niantic, I managed the operation process of consolidating user generated data and content into useable data for both the FieldTrip and Ingress gaming apps. The Niantic experience gave me considerable knowledge of the development pipeline as well as the process necessary for distilling usable content from raw information.

As a Computer Information Systems major at Westminster College, I have sought to build knowledge that will allow me to transition from a role on a technical team focused on developing and maintaining content to the role of a project manager who knows how to bring an idea from concept to reality. My only real-world experience with this to date was with my internship this past summer at TEGNA in Seattle, Washington where I developed two product concepts for King5 Broadcasting (a TEGNA company). Unlike with my senior project, where I had identified the customer need that I wanted to solve and had a reasonably good idea of what I wanted the end product to be, at TEGNA, we had a product (35 years of televised content) that I was tasked with leveraging towards the OTT (Over-the-Top Television) marketspace without a clear idea at the outset what that product would look like. The eventual project, "In or Out Seattle," was my first real world experience with project managing an idea from the concept stage. TEGNA gave me experience taking vague concepts and iterating toward an end product that would solve customer needs (even when the customer didn’t yet know s/he had that need).

For this project, I aimed to build out the skills needed to be a general project manager (building on my experience at Google) but starting from an easier, more concrete place (avoiding the challenges I saw at TEGNA with defining the product). Frameable is built on the concept of taking something everyone has (digital photos in the cloud or on a device) and converting them into something tangible. It was important for me to leverage not only my previous work experience, but also to build on the learning goals of the CIS program emphasizing software development and project management. In other words, Frameable offered me the opportunity to take my experience with project implementation and consider how I could build a well-defined product from concept to finished product.

The mechanism I developed with Frameable will not only generate an untapped revenue stream in the online marketspace, but will bridge the gap between the photos we take, and the objects that become keepsakes.

Connection to the field of computing

Handheld computers (that also happen to be phones) are with us nearly every waking minute of our lives, with increasingly sophisticated abilities to capture images and video. These devices, which have revolutionized communication in so many ways, allow an interconnectedness that we could scarcely imagine even 20 years ago. Family and friends all over the country and the world feel like they are with us on vacation or in our living room when our children or pets do something cute. Increasingly, computing is turning towards integrating our digital lives more seamlessly into our physical world. For example, the “Internet of Things” aims to bring the benefits of information management and automation into our homes, with refrigerators that automatically order groceries when we need them, or watches that allow us to display text messages as well as boarding passes. Likewise, Frameable aims to bring our digital world more meaningfully into our physical world. I want customers to be able to harness those truly special moments captured in our digital lives and bring them into their physical existence. Now, the picture with a loved one is not just a moment on a timeline or newsfeed, or the background behind the icons on our computer screen, or one of a series in a digital frame. These important images are isolated and made present in physical form in our homes, offices, vanities, or vehicles – no recharging necessary.

Methods

Frameable has been an evolution of ideas. Ultimately, it was a test of my own flexibility and ability to embrace change. In this section I describe the evolution of Frameable from January to April, noting the significant changes, roadblocks, and technology choices I made along the way. This project began as a way for me to stretch my project management muscles, but ultimately morphed into a routine that worked not only my PM skills, but pushed my technical expertise to the limits.

Frameable asks the customer three questions:

1. What size frame you like?
2. Which frame would you like us to place your photo in?
3. Where in the United States would you like your item(s) shipped?

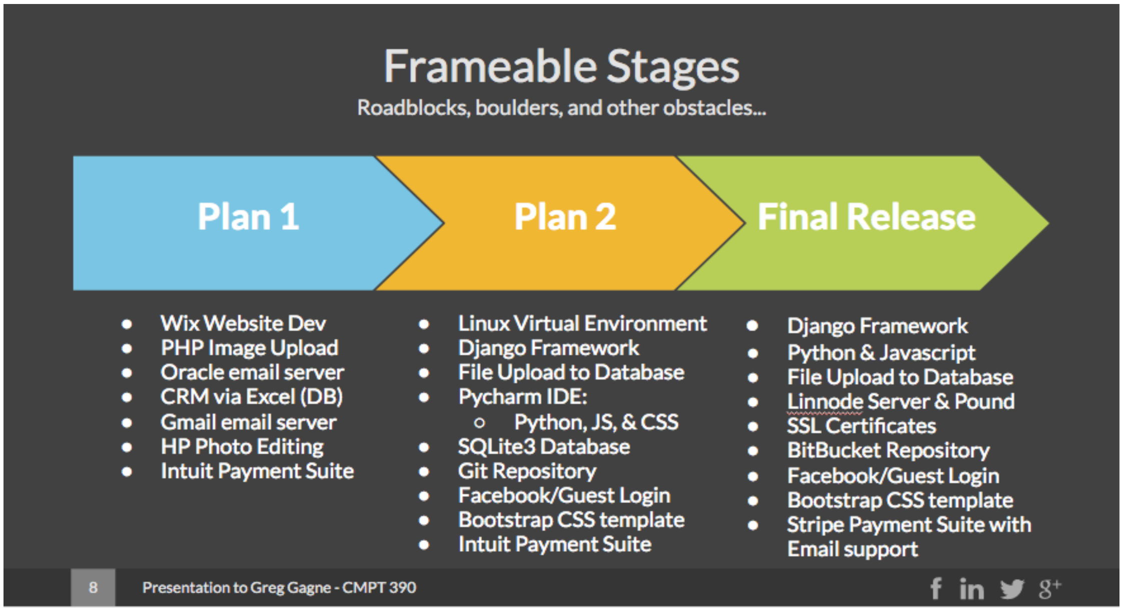
These questions allow the customer to generate the perfect framed photo, converting a memory captured in the cloud to a tangible, framed memory.

I originally intended to build Frameable as a secure e-commerce website which would be hosted through GoDaddy and designed using Wix.com. Customers would upload photos using a script written in PHP that could pull from a customer's cloud storage service or device. I intended to use Google Forms to build a form allowing the customer to indicate a desired print size, frame choice, and shipping information. The form would then save the order information to a corresponding excel document stored in Google Drive. As a function of the form, an automated email would then be sent to the customer thanking them for their Frameable order and provide other information on shipping times and payment method. Barring any complications with the image, I would print and frame the image to the specifications and send the customer an invoice using Intuit Payment Software. Upon the receipt of payment from Intuit, I intended to ship the order via a UPS prepaid shipping method. All of these choices for Frameable banked on utilizing technology that was familiar to me. Trouble arose in the form of compatibility issues, which was something I didn't consider carefully enough when I began scoping the build for Frameable.

My problem centered on the use of Wix to build the site. Wix is essentially a closed system end to end, the way Apple computers used to be. There is no functionality to allow for Facebook customer accounts, external databases, Google forms, or any other technology I had intended to use. After discussions with people in my network, I made the decision to start over in the second week of February. Following advice, I settled on a Django framework as a one stop shop. The Django framework would locally manage a MySQLite3 database, a server, and allow me to build a site from scratch using JavaScript and CSS. There was, however, another problem - my skills in Python and JavaScript were not at a level where I was confident I could obtain the experience I wanted for customers.

I changed my development environment from OSX to Linux through a virtual machine. I used Ubuntu, which I had used exclusively working at Google and my IDE was PyCharm. For customer security I purchased an SSL certificate from SSLS.com and I set up my server through Linode and my database shifted to postgres. The front end is supported by the Django (where I utilized CSS and Bootstrap styling). I switched from Intuit payment suite to Stripe as it was supported on Wix and Django, offered a customer friendly dashboard, stored order information, and offered an email server solution.

After the course corrections described above, Frameable was ultimately built in PyCharm using JavaScript with Python (See Image 2).



Frameable Stages

Roadblocks, boulders, and other obstacles...

Plan 1

- Wix Website Dev
- PHP Image Upload
- Oracle email server
- CRM via Excel (DB)
- Gmail email server
- HP Photo Editing
- Intuit Payment Suite

Plan 2

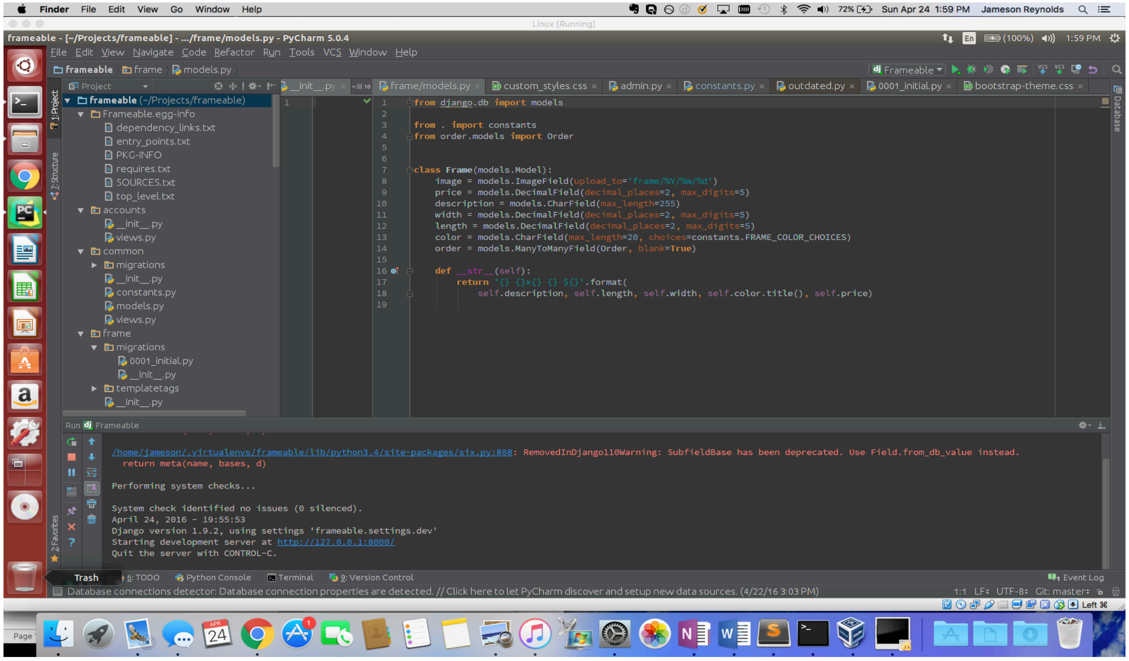
- Linux Virtual Environment
- Django Framework
- File Upload to Database
- Pycharm IDE:
  - Python, JS, & CSS
- SQLite3 Database
- Git Repository
- Facebook/Guest Login
- Bootstrap CSS template
- Intuit Payment Suite

Final Release

- Django Framework
- Python & Javascript
- File Upload to Database
- Linnode Server & Pound
- SSL Certificates
- BitBucket Repository
- Facebook/Guest Login
- Bootstrap CSS template
- Stripe Payment Suite with Email support

8 Presentation to Greg Gagne - CMPT 390

Image 1



```
from django.db import models

from . import constants
from order.models import Order


class Frame(models.Model):
    image = models.ImageField(upload_to='frame/%Y/%m/%d')
    price = models.DecimalField(decimal_places=2, max_digits=5)
    description = models.CharField(max_length=255)
    width = models.DecimalField(decimal_places=2, max_digits=5)
    length = models.DecimalField(decimal_places=2, max_digits=5)
    color = models.CharField(max_length=20, choices=constants.FRAME_COLOR_CHOICES)
    order = models.ManyToManyField(Order, blank=True)

    def __str__(self):
        return '{} {}x{} {} ${}'.format(
            self.description, self.length, self.width, self.color.title(), self.price)
```

```
/home/jameson/.virtualenvs/frameable/lib/python3.4/site-packages/six.py:808: RemovedInDjango110Warning: SubfieldBase has been deprecated. Use Field.from_db_value instead.
  return meta(name, bases, d)

Performing system checks...

System check identified no issues (0 silenced).
April 24, 2016 - 19:55:53
Django version 1.9.2, using settings 'frameable.settings.dev'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

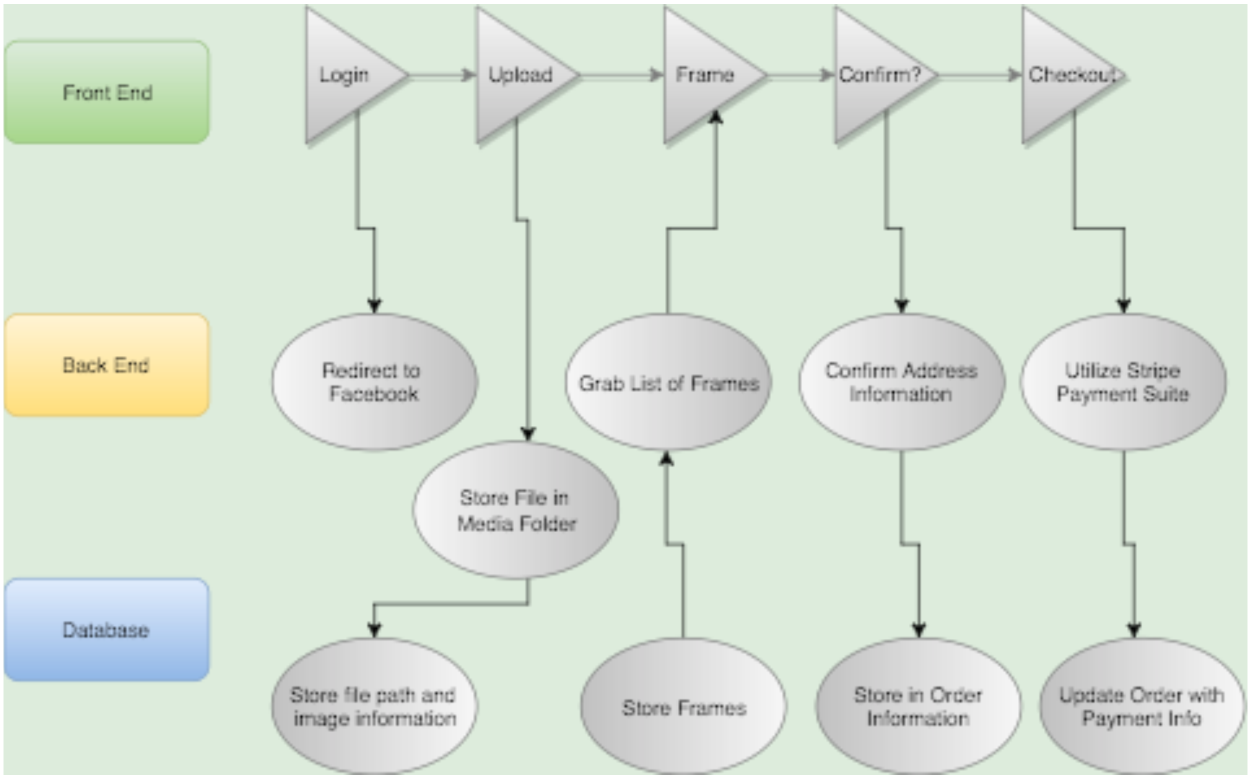
Database connections detector: Database connection properties are detected. // Click here to let PyCharm discover and setup new data sources. (4/22/16 3:03 PM)

Image 2

Results

Building a website is challenging even when the developer is familiar with the tools he or she intends to use. Originally, I intended to hone my project management skills with this capstone project. Instead, most of my time was spent developing technical skills in Python and JavaScript. Before this project I could not explain the difference between a model and a view.

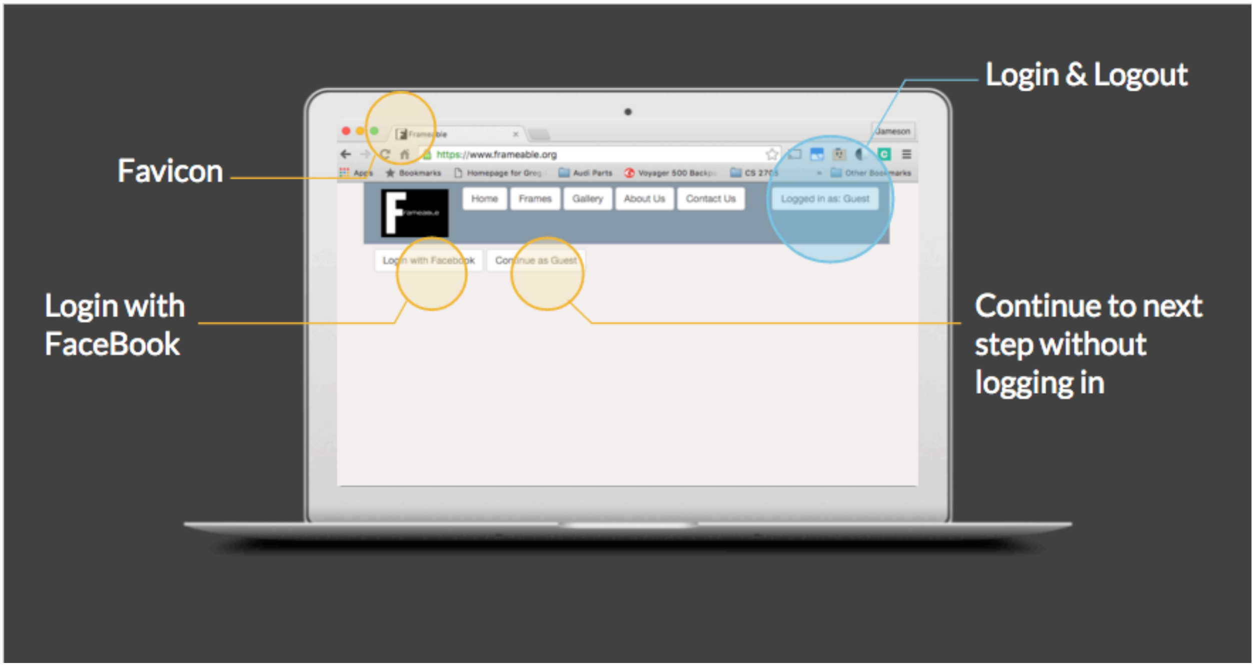
I successfully created a secure ecommerce website specializing in photo printing and semi-custom framing. The professional look of the site occurs due to bootstrap and CSS styling while backend site stability is made possible with a Django framework. Customers can choose from four frame options. The customer is taken through a straightforward, five step process to print and frame his or her photo.


Front End
Back End
Database
Login
Upload
Frame
Confirm?
Checkout
Redirect to Facebook
Store File in Media Folder
Grab List of Frames
Confirm Address Information
Utilize Stripe Payment Suite
Store file path and image information
Store Frames
Store in Order Information
Update Order with Payment Info

Adhering to the five step process ensures a smooth and simple process for the customer.

Step One:

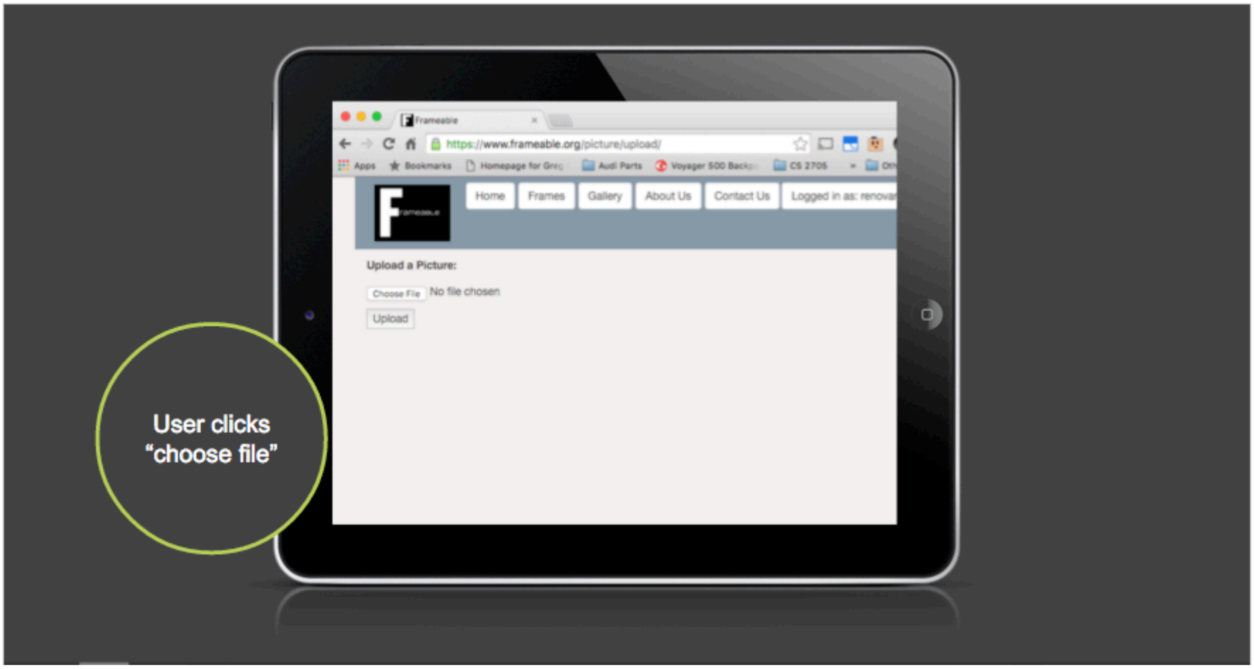
After arriving at www.frameable.org, the customer is met with the choice of logging in with his or her Facebook account, or proceeding through the process as a guest.



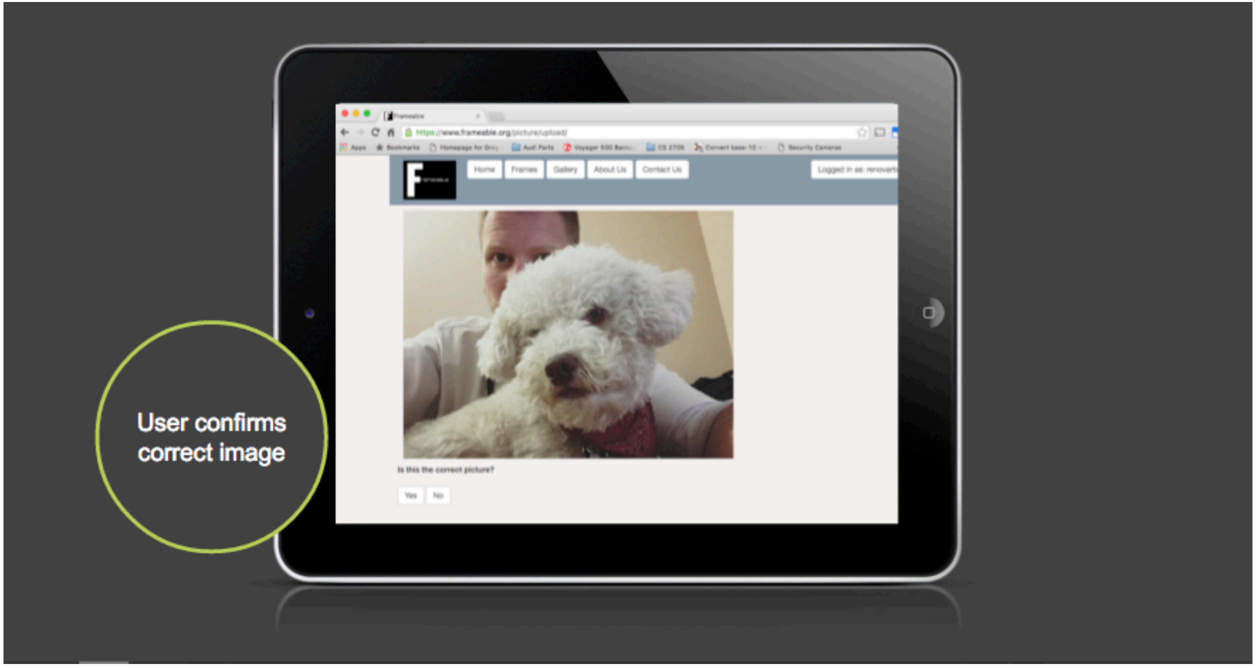
Step One

Step Two:

After making a decision to continue as a guest or login with his or her Facebook credentials, the customer is asked to upload a photo. This process consists of the customer selecting an image file from their device and uploading it to the server where it is then stored under the date and time it was uploaded. The customer is asked to confirm the image before moving to step three.



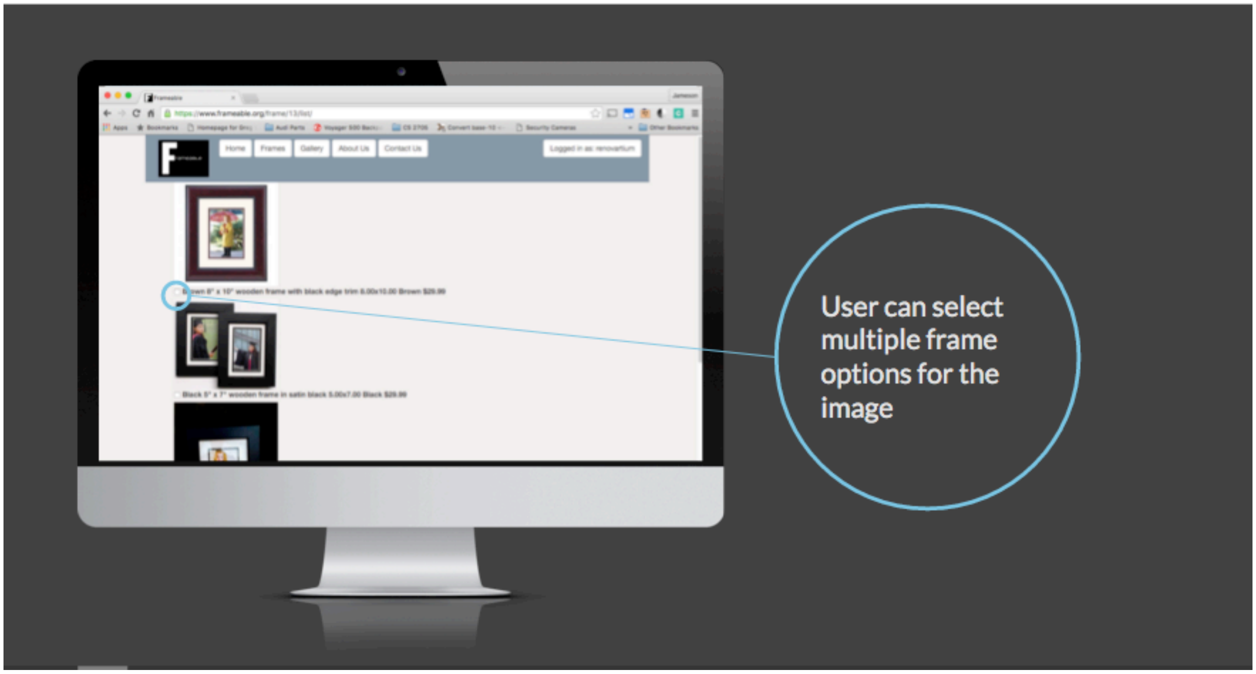
Step Two - I


Frameable
https://www.frameable.org/picture/upload/
Home
Frames
Gallery
About Us
Contact Us
Logged in as: renovart
Is this the correct picture?
Yes
No
User confirms correct image

Step Two - II

Step Three:

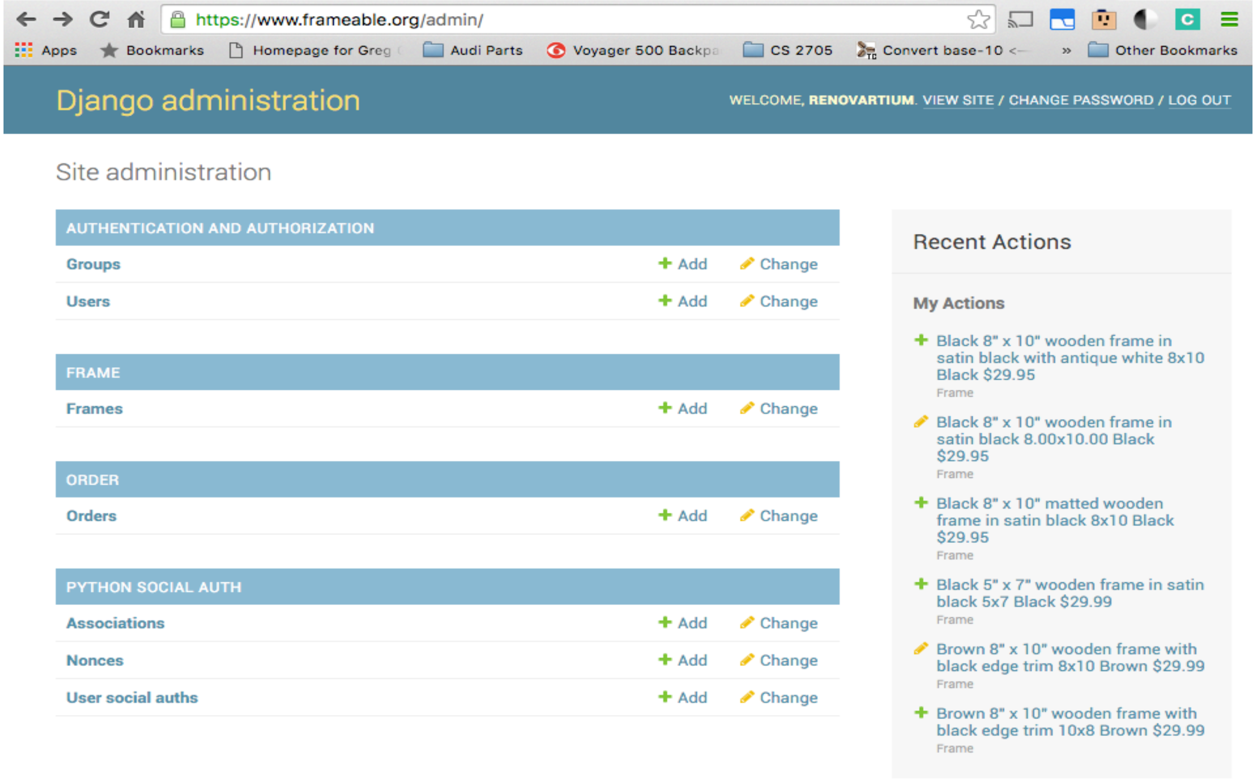
In step three the customer choses one or more frames for the uploaded image. The frames are pulled from a list of frames saved in the database and managed in the Django administration tool.


Frameable
https://www.frameable.org/frame/13/list/
Home
Frames
Gallery
About Us
Contact Us
Logged in as: renovartium
User can select multiple frame options for the image

□ Brown 8" x 10" wooden frame with black edge trim 8.00x10.00 Brown $29.99

□ Black 5" x 7" wooden frame in satin black 5.00x7.00 Black $29.99

Step Three



Django administration

WELCOME, **RENOVARTIUM**. VIEW SITE / CHANGE PASSWORD / LOG OUT

Site administration

AUTHENTICATION AND AUTHORIZATION		
Groups	+ Add	Change
Users	+ Add	Change

FRAME		
Frames	+ Add	Change

ORDER		
Orders	+ Add	Change

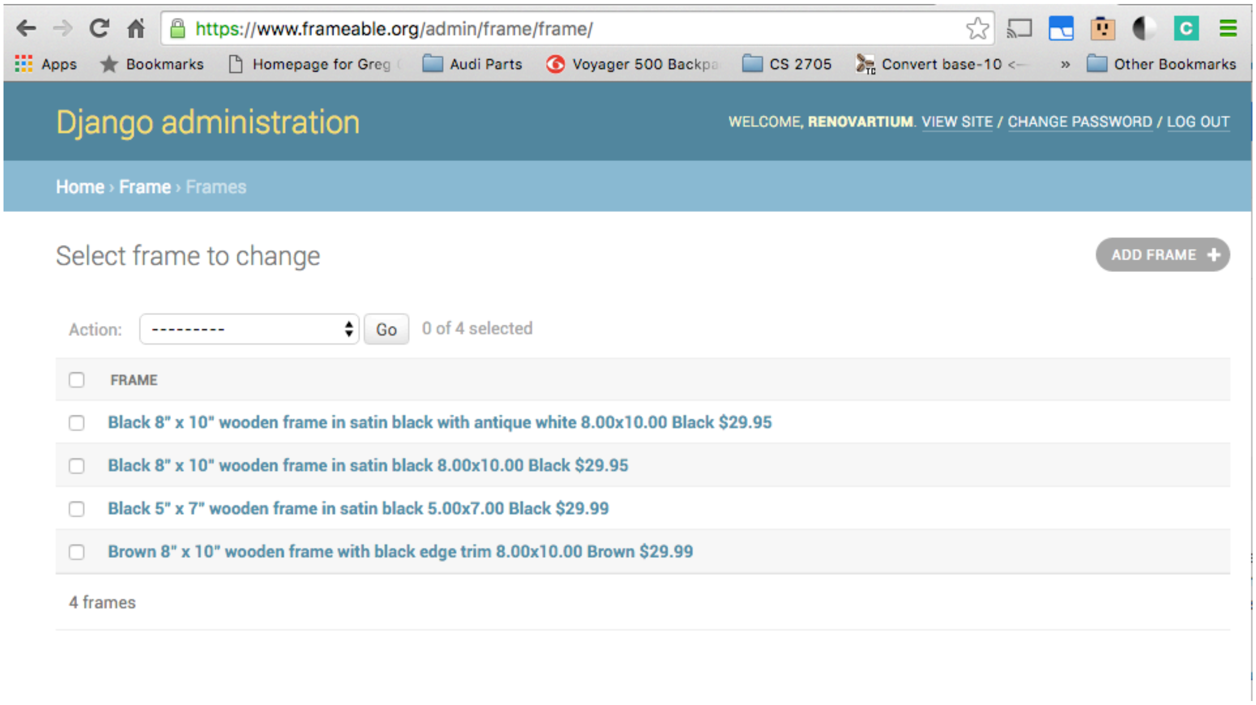
PYTHON SOCIAL AUTH		
Associations	+ Add	Change
Nonces	+ Add	Change
User social auths	+ Add	Change

Recent Actions

My Actions

- + Black 8" x 10" wooden frame in satin black with antique white 8x10 Black $29.95
  Frame
- Black 8" x 10" wooden frame in satin black 8.00x10.00 Black $29.95
  Frame
- + Black 8" x 10" matted wooden frame in satin black 8x10 Black $29.95
  Frame
- + Black 5" x 7" wooden frame in satin black 5x7 Black $29.99
  Frame
- Brown 8" x 10" wooden frame with black edge trim 8x10 Brown $29.99
  Frame
- + Brown 8" x 10" wooden frame with black edge trim 10x8 Brown $29.99
  Frame

Django Admin Dashboard



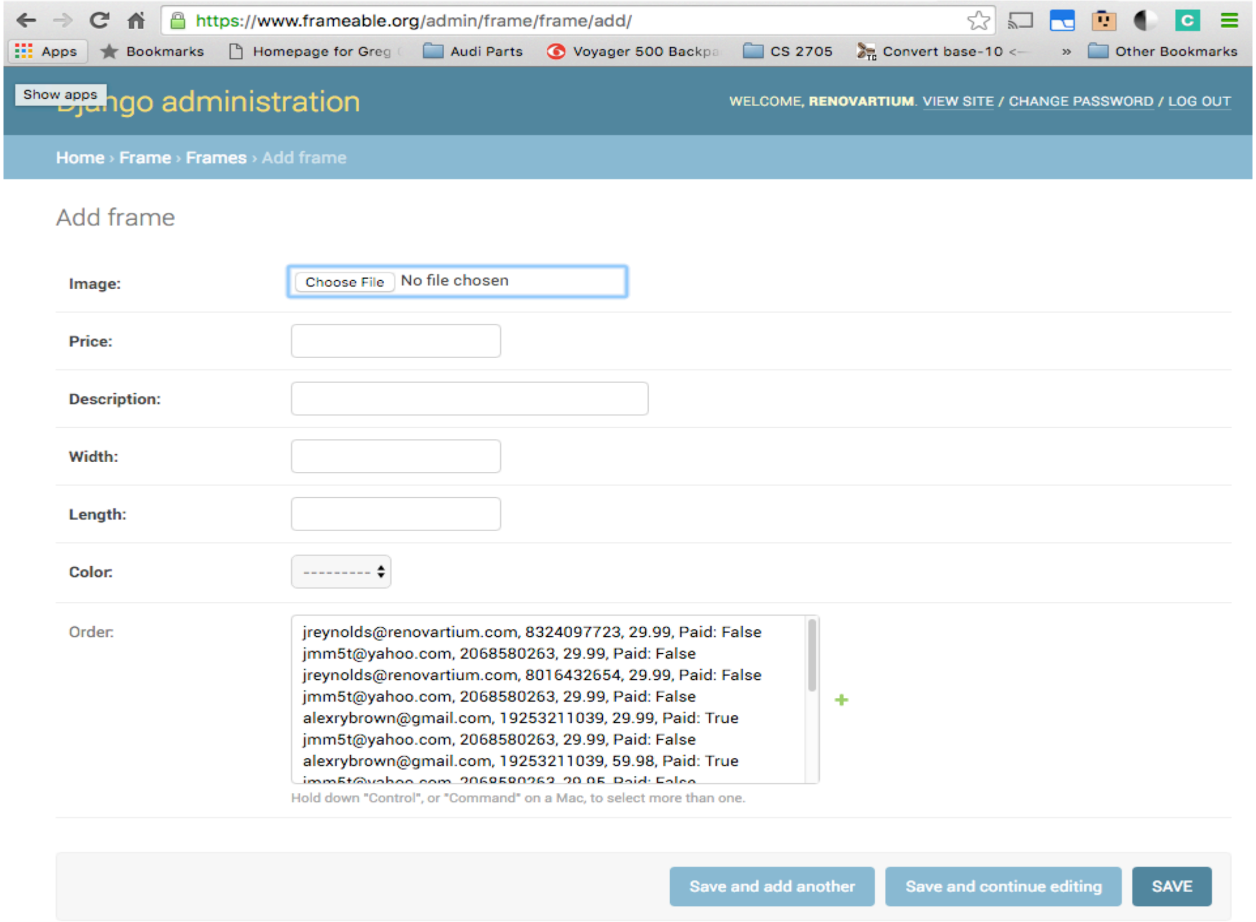
Select frame to change

Action: --------- 0 of 4 selected

	FRAME
□	Black 8" x 10" wooden frame in satin black with antique white 8.00x10.00 Black $29.95
□	Black 8" x 10" wooden frame in satin black 8.00x10.00 Black $29.95
□	Black 5" x 7" wooden frame in satin black 5.00x7.00 Black $29.99
□	Brown 8" x 10" wooden frame with black edge trim 8.00x10.00 Brown $29.99

4 frames

Django Frame Admin Page


https://www.frameable.org/admin/frame/frame/add/
Apps
Bookmarks
Homepage for Greg
Audi Parts
Voyager 500 Backpa
CS 2705
Convert base-10 <—
Other Bookmarks
Show apps
Django administration
WELCOME, RENOVARTIUM. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Frame › Frames › Add frame
Save and add another
Save and continue editing
SAVE

Add frame

Image: Choose File No file chosen

Price:

Description:

Width:

Length:

Color: ---------

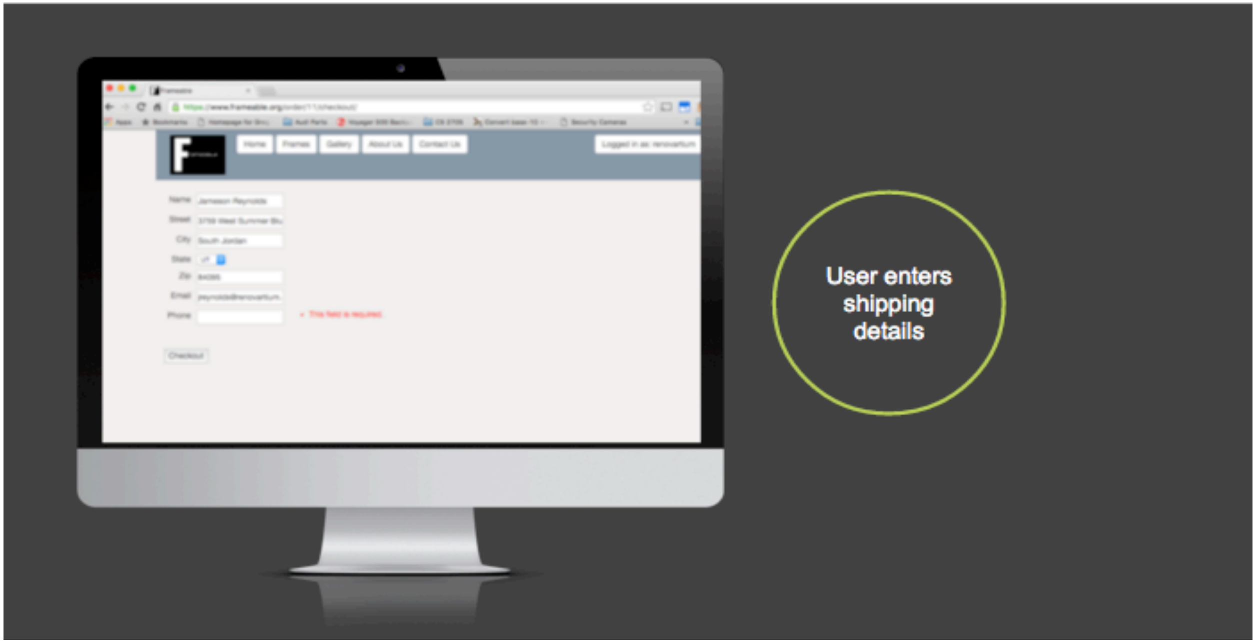
Order:
jreynolds@renovartium.com, 8324097723, 29.99, Paid: False
jmm5t@yahoo.com, 2068580263, 29.99, Paid: False
jreynolds@renovartium.com, 8016432654, 29.99, Paid: False
jmm5t@yahoo.com, 2068580263, 29.99, Paid: False
alexrybrown@gmail.com, 19253211039, 29.99, Paid: True
jmm5t@yahoo.com, 2068580263, 29.99, Paid: False
alexrybrown@gmail.com, 19253211039, 59.98, Paid: True
jmm5t@yahoo.com, 2068580263, 29.95, Paid: False

Hold down "Control", or "Command" on a Mac, to select more than one.

Django Frame Admin Page – Add New Frame

Step Four:

Step four asks the customer to provide shipping information through a simple list of fields, with each field required in order to proceed. After completing the required fields, the customer moves to step five.



Name Jameson Reynolds

Street 3759 West Summer Blu

City South Jordan

State UT

Zip 84095

Email jreynolds@renovartum.

Phone

× This field is required.

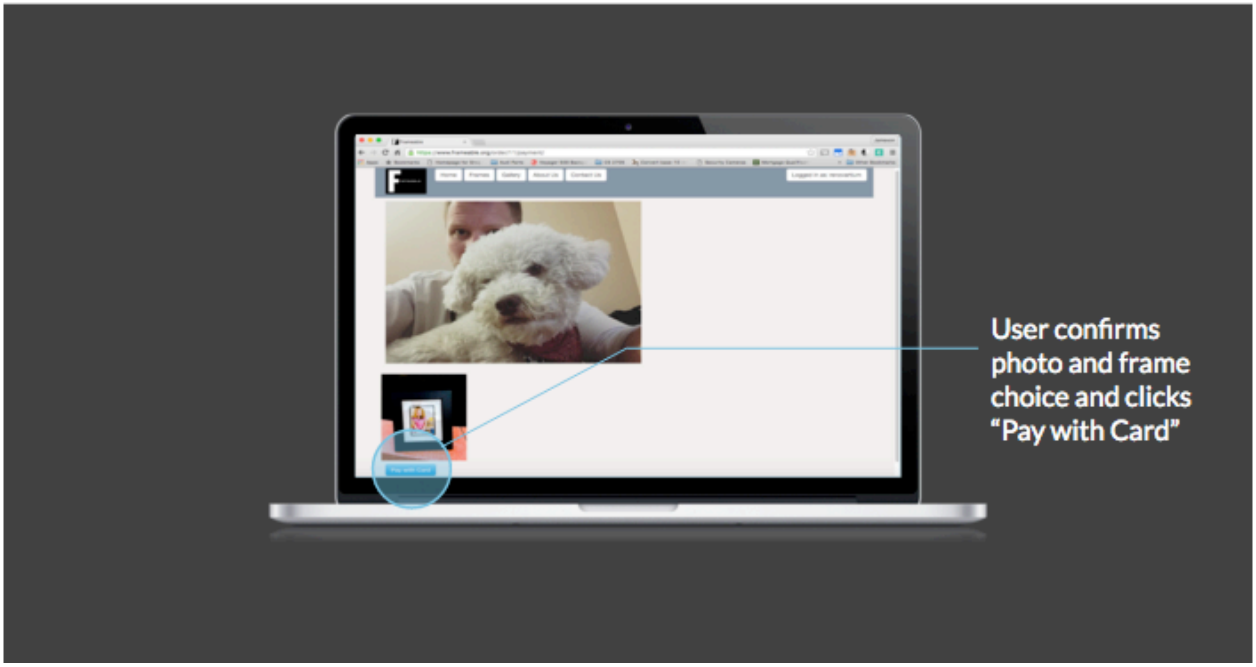
Checkout

User enters shipping details

Step Four

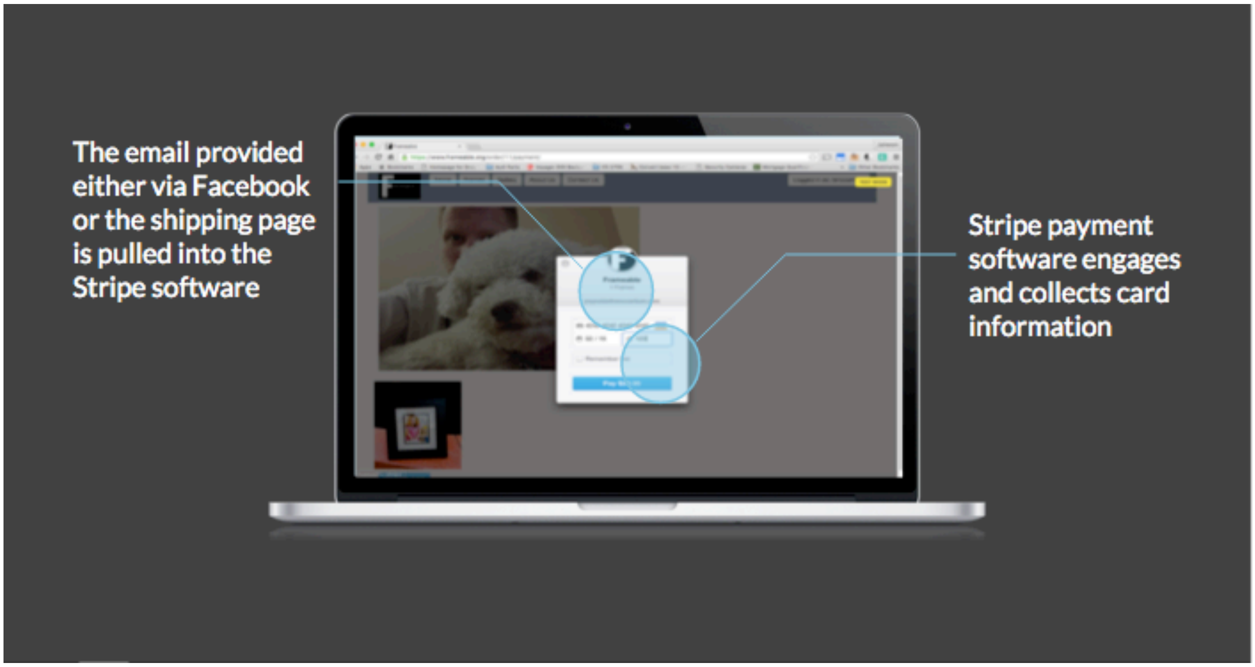
Step Five:

The customer is prompted to review both the image and frame choice before proceeding to the final checkout phase. This page was modeled after the checkout experience at online retailers like Amazon.com or Costco.com. After the customer has confirmed the image and frame are correct, they move to the final stage of the process: payment with Stripe.



User confirms photo and frame choice and clicks "Pay with Card"

Step Five – I

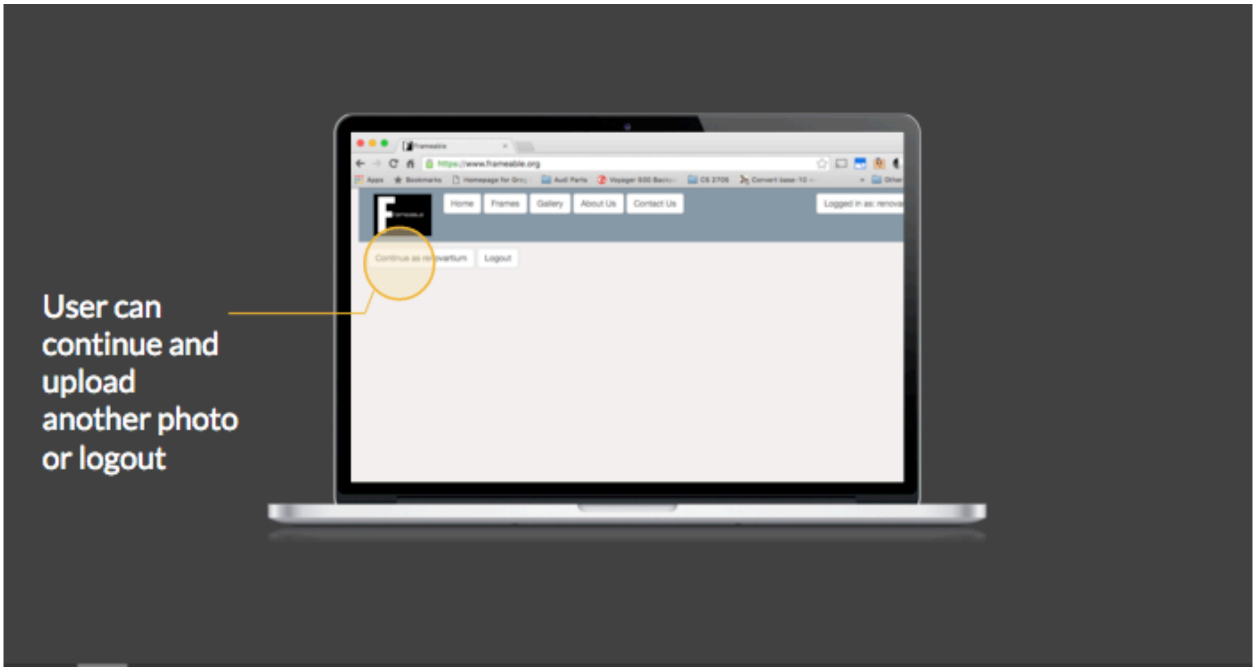


The email provided either via Facebook or the shipping page is pulled into the Stripe software

Stripe payment software engages and collects card information

Step Five – II

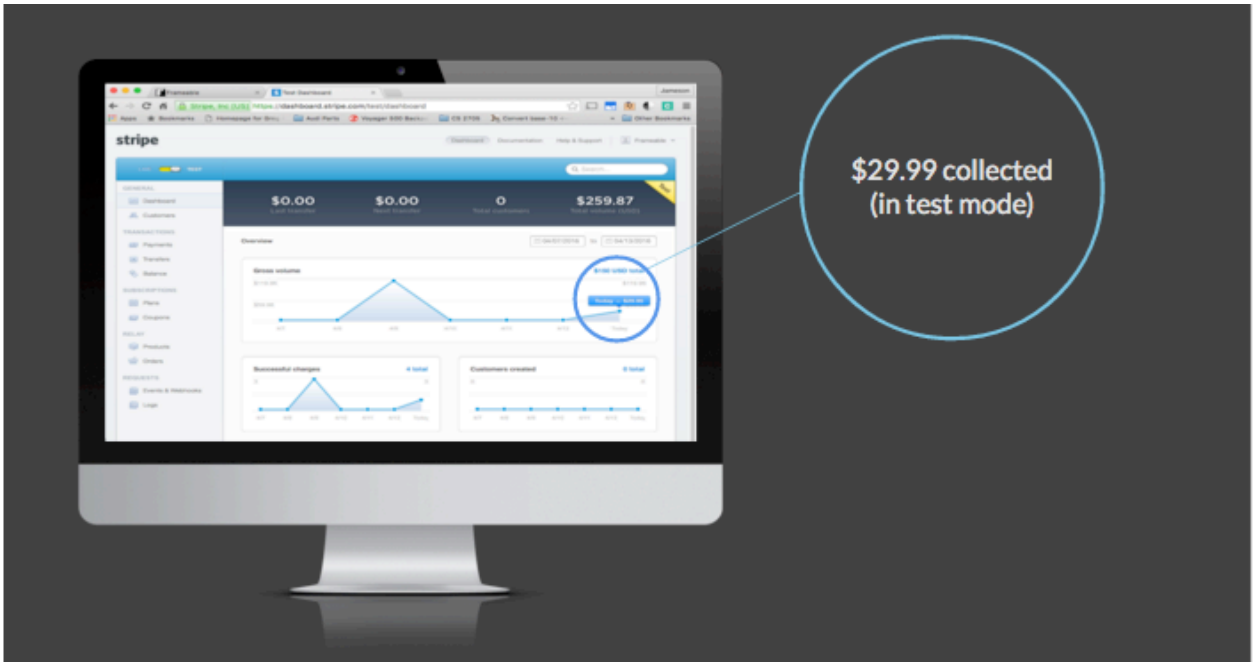
After completing the payment process the customer is redirected to the home page where he or she can continue to upload further pictures, or logout by clicking the button located at the top right.



User can continue and upload another photo or logout

Step Five - III

After a payment is collected, it can be viewed in the the Stripe payment dashboard.



Stripe Payment Suite Dashboard

Lessons Learned

What did I hope to learn in this capstone project?

I hoped to use this capstone project to develop the skills required for many project management jobs. Specifically, I hoped to practice working an idea from the concept stage to reality, managing my time effectively, and cementing my confidence in my abilities to do so. While working at Google in Maps and Niantic Labs, I primarily worked on a single function of the pipeline. Major project decisions had already been made by the time work came to me and I was responsible for ensuring my portion of the work was done on time so that the larger project could be successful. By contrast, while at TEGNA, I was tasked with developing an idea for a product based on existing assets and was making decisions to shape the direction of the product. I thought that my capstone project would bridge the gap between the beginning-stage work I did at TEGNA and the end-stage work I did at Google. Unlike at TEGNA, here, I had identified a desirable end product and (what I thought was) the appropriate direction. I anticipated that my capstone project would be an exercise in project management – pulling together existing technology into a working finished project.

What did I learn?

- Lesson #1 – Effective project scoping is crucial

I learned that detailed up-front scoping is crucial to project success, and if not done correctly it can significantly impact launch timing and overall project success. Given my limited technical skills, I scoped the project based on existing technical solutions so that little development effort would be needed from me. I learned that this is very similar to a "build vs buy" decision that companies make when determining whether to use their limited resources to build a product from scratch versus licensing or purchasing all or portion of the solution. Put simply, the scoping I did for this project was inadequate because I failed to identify that Wix would not support my intended platform. Specifically, Wix did not allow customers to create an account, did not allow me to use an external server, or allow the use of an external database. I learned that to avoid a similar scoping error in the future, I would need to map out the product function in considerable detail before beginning development. Specifically, I would diagram the technical solutions that I intended to stitch together to create the product and do more research to make sure each component worked with the others and could support the uses that I needed it to. My scoping for the capstone project was too superficial, and I did not anticipate the ways in which the pieces would need to work together, so I ended up having to figure out how to do a significant amount of technical development.

- Lesson #2 – Focused searches are critical to effective research time management

It became clear to me early on that I was spending too much time reading through and pouring over unhelpful information on the web. I learned that implementing query-based searches into Google saves time. I watched a handful of YouTube videos throughout the course of the semester to better understand how to use search terms. Because I don't perform SQL queries on a daily basis, I needed to revisit the best ways to frame a search. This not only helped with my capstone project, but it also aided with time management of my project for CMPT 322.

- Lesson #3 – Know when to do things yourself vs. bringing in outside expertise

I learned to utilize my network to get to solutions faster. As I confronted the technical challenges that resulted from my inadequate scoping, I found myself stuck on technical questions. For example, I struggled with creating a Facebook user account in Wix until I looked here and found it was not supported. Getting over my fear of looking stupid to one of my fellow students or a previous coworker seriously hindered my progress at first. Of course, project managers must confront whether they are resourced adequately to support project needs. It is necessary to build and leverage a network within a company (and sometimes even to your network outside of your company) in order to get the information you need to move a project forward.

- Lesson # 4 – Security and privacy matter

Repository based backups are crucial to a project staying on track because they protect against lost data. However, these backups must not compromise security. During my Facebook integration I ran into trouble when I was committing my code to GitHub, as my secret keys were suddenly available for public consumption. This was a serious problem, as allowing private information to be made public was not an acceptable customer experience. GitHub offers a private repository that would prevent this from being an issue but this was something that was not part of the free services they offer. I migrated my repository to BitBucket as they offer up to 6 private repositories at no cost. This lesson, again, feeds back into lesson one regarding initial scoping. Had the scoping been more effective regarding the functions of GitHub, I could have avoided the release of private information for public consumption and more quickly identified a service like BitBucket.

- Lesson #5 – Python and JavaScript skills are sought after for a reason

I significantly under-estimate the learning curve for both Python and JavaScript. Initially, I saw the ability to do more development work as an opportunity to add experience with these languages to my repertoire, but it was unrealistic to think I would go from zero to competent in these languages for this project. This was an example of where I had to use my network to get considerable assistance on development. In a corporate context, this would have meant an unplanned resource request (due to my inadequate scoping) for either a technical resource from another team or for funds to hire appropriate technical expertise.

- Lesson #6 – Consider potential solutions carefully

After purchasing my domain from GoDaddy online, I was automatically opted out of my personal contact information remaining private. I received upwards of 20 calls in one day from what were obvious phishing scams. I migrated my hosting for Frameable to Google Domains where privacy was included. I ultimately ended up hosting with Linode for purposes of the server but I will never use GoDaddy again (I continue to receive unsolicited calls as a result of my personal information having been posted).

Conclusions

Despite the scoping challenges and resulting technical obstacles, I am pleased with not only the final result of Frameable.org, but also with my improved ability to code and use languages like Python and JavaScript. Given more time and financial and technical resources, I would have expanded several portions of Frameable.org.

Given more time and resources, Frameable would do a number of things differently. The site would offer a more interactive experience:

- The home page would have an embedded video (which would start muted) and show the process from a customer's point of view very similarly to the way Wix does in this video
- I would show the customers uploaded image in the frame they selected, to allow the customer to better visualize the end product
- In the gallery I would show several completed projects with a photo slide the same way customers are greeted on the home page of Amazon.com
- The logo for Frameable would also be animated to add warmth to the site

Additionally, the present site only allows for customers to login with Facebook but does not load any of the customers' photos or liked photos. My goal in the original version of my project was to have full Facebook integration where a person could be using Facebook and be given the option of sending an image they "like" to Frameable for printing and framing. There would be several options for Frameable to make gift giving easy and straightforward. When Facebook reminds one user of a friend or family member's birthday, if both the person being reminded and the person celebrating their birthday were in photos together, Frameable could show the potential customer possible framed photos as gift ideas with a two week lead time. It is obvious to me now that my technical expertise would need to grow substantially to make this a reality, however it no longer seems out of reach. Ultimately I took a step back from this and developed the idea for a version of Frameable where the website offered a similar functionality with fewer Facebook integrations.

Still, I am content with the functionality currently in place on the site and I am proud of what I learned about Python, JavaScript, and project management during this year-long process. It was not only challenging but an exercise in confidence as well.

References

Django:

https://www.djangoproject.com/start/
https://docs.djangoproject.com/en/1.9/ref/contrib/sites/

YouTube Video:

https://www.youtube.com/watch?v=R0DQfwc72PM

Wix:

https://www.wix.com/support/html5/article/can-i-add-a-facebook-login-component-to-my-wix-site-old-editor

Build Versus Buy Article:

http://www.forbes.com/sites/chuckcohn/2014/09/15/build-vs-buy-how-to-know-when-you-should-build-custom-software-over-canned-solutions/#642059fa4849