Applied Research Project

Zyp Art Gallery Social Media Dashboard Application

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Presentation

Problem I am trying to solve

- Help Zyp Art Gallery to visualize and derive insights from its extracted social media data
  - Deriving more insights from social media data will allow the organization to make more strategic decisions to acquire more donations and make a greater impact on its surrounding community.
- As it is a non-profit organization, Zyp Art Gallery does not have the funds to acquire a Microsoft Power Suite or Tableau license.
  - Power BI is free but without the license, we do not have the ability to use Power BI service to share dashboards to other members/volunteers of the organization.
  - Tableau may have a free public version but the dashboards are saved online (NOT locally), and the published dashboard's community portal is not known to keep sensitive data safe.
  - It is challenging to teach non-tech savvy people how to install these softwares.
  - Not every volunteer will have a powerful computer running the appropriate operating system to run these softwares.

Problem I am trying to solve (cont.)

- Google Data Studio was considered due our use of G Suite.
  - The platform is not powerful enough to process, aggregate & analyze our large social media datasets which leads to an error being thrown.
- Pre-existing dashboard softwares tend to have some operational drawbacks
  - Limited interactivity (to a certain degree)
  - Fixed dimensions
  - Runs slow or incompatible with older devices
  - Challenging install process for those that are not tech-savvy
  - Free versions have less features to best-assist the needs of organization (including a non-profit)
- *Thus, this project's end result is to construct a custom dashboard application that is free, accessible, and easy-to-use.*

Target Audience

- Zyp Art Gallery volunteers
  - **Analytics team (my team)**
  - Marketing team
  - Maybe the Business Analyst team
- Zyp Art Gallery members (i.e., paid employees)
  - **Executive Director**
- Calmar Art Society
  - Founder/President
  - Chair/s
  - Secretary

Significance of Research Project

- Significance to the organization
  - Assisting it to derive social media insights will better inform them what strategic business decisions need to be taken to widen its outreach in terms of endeavors to showcase artwork of local artists, help its surrounding community, provide meaningful experiences to its volunteers, etc.
  - Understand what more it needs to do increase its social media presence, as this can encourage current/prospective followers to get involved and make donations, in turn, maintaining/improving the financial longevity and positive impact of the non-profit.
- Significance to me
  - Make an positive contribution to organization that's intent is provide a “voice to the voiceless”, and providing selfless-service to help those in need.
  - Application of knowledge & skills gained from PBD CSIS Data Analytics
    - Getting to apply my software development knowledge to create a multi-layer application
    - Getting to apply my data analytics knowledge to clean, aggregate, filter, analyze, and visualize data to derive meaningful insights

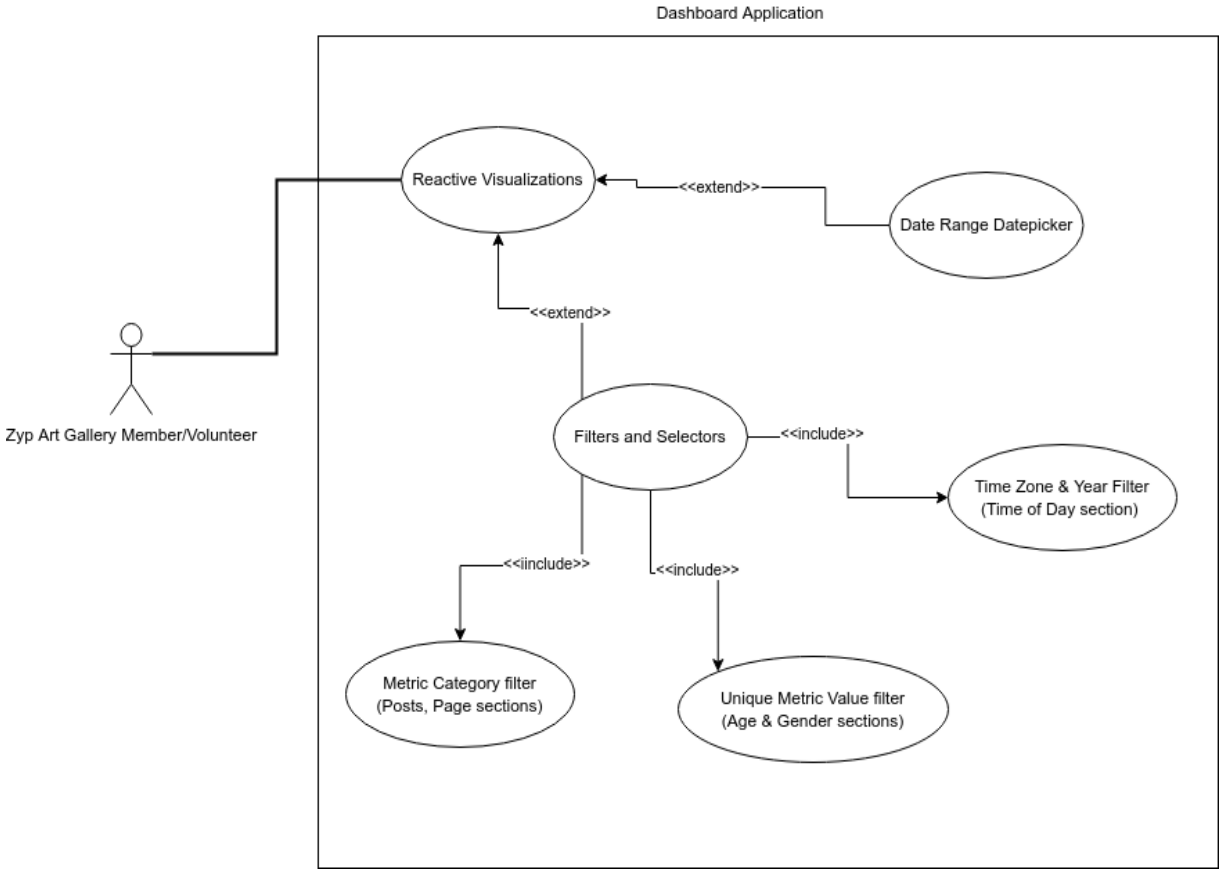
Overview of plans to develop project

- Technologies below would be used to create a custom multi-page dashboard web application:
  - Programming language = Python 3.8.9+
  - IDE = Microsoft VS Code
    - Development = Python scripts in a multi-layer file structure
    - Prototyping of both analysis and visualization = Jupyter Notebook
  - Important packages = gspread, pandas, datetime, numpy, plotly, dash, gunicorn, flask
  - Data source = Social Media data files in CSV file format ~~in Google Sheets file format from organization's Google Drive (accessible via Google Drive & Google Sheets API using a Google Service Account private key)~~
    - Social media extraction code is separate from project but necessary to get up-to-date social media data
  - Version control = Git
  - Hosting & Deployment = GitHub & Heroku
    - Performing first time deployment using PyCharm Community Edition

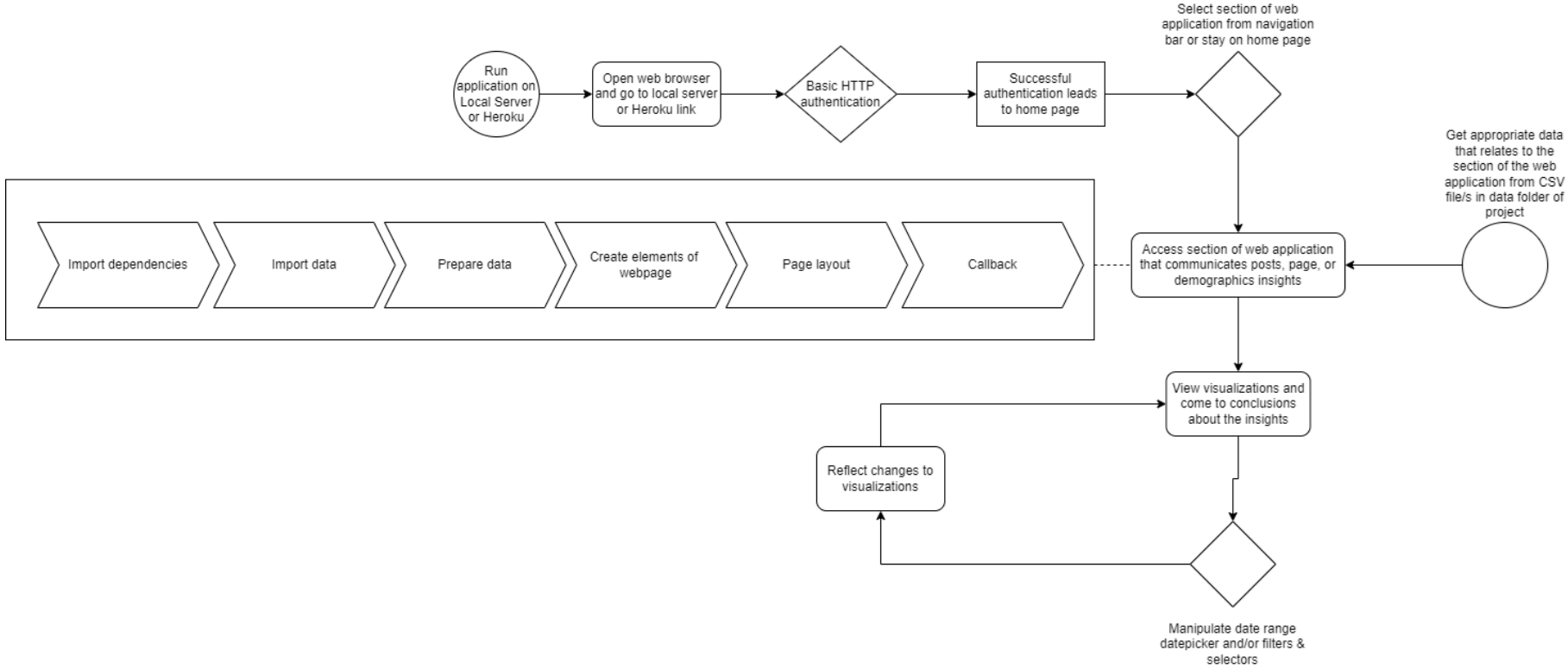
Project Demonstration

Link: https://zyp-social-media-dash-app.herokuapp.com/

Software Design Architecture - UML (Use Case Diagram)



Software Design Architecture - UML (Activity Diagram)



Software Design Architecture - Design Pattern

- Three features of Dash app
  - Layout (involve rendering of web elements and structure)
  - Components (involve rendering and managing interactivity of web elements)
  - Callbacks (enact the action to enable interactivity of web elements)
- Project file structure
  - Assets folder
    - Google Service Account private key (authenticates retrieval of data)
    - googleService.py (contains function to retrieve username & password data as a pandas dataframe)
    - Country code ISO CSV
    - Canadian Cities & Towns CSV (contains name, province, longitude, and latitude information)
  - Data folder: Holds social media data files that are in CSV file format
  - Apps folder: Scripts dedicated to showing the main content (i.e., visualizations and related-interactive web elements) using files from assets & data folder
  - App.py
    - Instantiates the Dash application, server, and authentication as variables
  - Index.py
    - Imports the variables from “app.py”
    - Creates a general skeleton of application
    - Connects all scripts in apps folder via a navigation bar
    - Dedicated to running Dash app on local server and/or Heroku

In-Person Defense

Brief Description of Project

- Help derive insights of Zyp Art Gallery's Facebook and Instagram data in the form of a custom dashboard application that is accessible online via a web browser and is easy-to-use
- Primary target audience = Zyp Art Gallery Analytics Team
- The application is built using Python, and Plotly Dash (as well as other related packages)
- Each section of the application is divided into two parts: one part is dedicated to Facebook and the other part is dedicated to Instagram
- The application attempts to visualize posts, page, and audience insights per social media platform
- The data source of the application are CSV files that contain social media data
    - I have a separate collection of scripts designed to extract data from Facebook Graph API

Proof Objectives were met (myself) – Part 1

- Is the application easy to access by those that are part of the Zyp Art Gallery organization?
  - Yes the application is easy to access as it is deployed to Heroku
  - The application uses basic HTTP authentication for security, but login credentials would be provided by me
- Is the application easy to use even for a non-technical person?
  - Yes it is as it is a web application, thus it functions like one as well
  - Filtration options and navigation use common interactive web elements
  - User experience suffers due to large processing time of Canadian City sections; at times, request would timeout (as processing time > 30 seconds) and not render at all
- Is the application overall aesthetically pleasing?
  - Yes it is (at least to me)
  - There has not been any major comment of aesthetics from the Zyp Analytics team; they are all mostly satisfied with it
  - LUX theme = similar to Zyp Art Gallery logo theme

Proof Objectives were met (myself) – Part 2

- Does the application follow a logical design in regards to navigation?
  - Navigation bar is consistent through whilst moving through the various pages of the application
  - The codebase also follows a logical design as the application centers around the “index.py”
- Are the visualizations detailed & informative, yet easy on the eyes?
  - Inspired by visualizations from ‘Later’ and ‘Facebook for Business’
  - Inspired by dashboards made by other team members
  - Tried to enhance the visualizations based on filtration options and granularity
- Do the visualizations have a good degree of interactivity in terms of date range, category, and/or any other identifier?
  - Canadian City sections may render slowly so it affects the idea of speedy interactivity; also the dataset size has been greatly reduced
  - All other sections have maximum possible interactivity (in my opinion)

Proof Objectives were met (Zyp Analytics Team Meeting on July 22nd 2022) – Part 1

	Jaime	Tanmay	Sandeep
Is the application easy to access by those that are part of the Zyp Art Gallery organization?	Yes it is	Yes it is. Good job! August 4th 2022 update: Facebook Canadian City section not rendering Lifetime Likes visualizations	Yes it is.
Is the application easy to use even for a non-technical person?	Yes. It is easy to use.	Yes. It looks easy to use.	Yes. It looks easy to use for an Analytics team member. Try to ask a parent or younger person to see if they understand the application to get a more definitive answer regarding the question the context of a non-technical person.

Proof Objectives were met (Zyp Analytics Team Meeting on July 22nd 2022) – Part 2

	Jaime	Tanmay	Sandeep
Is the application overall aesthetically pleasing?	Application is pleasing to the eyes.	Application is pleasing to the eyes.	Application is pleasing to the eyes.
Does the application follow a logical design in regards to navigation?	Yes it is good.	Yes it is good. The arrows on the Facebook & Instagram dropdown menus could be larger and more visible.	Yes it is all good.

Proof Objectives were met (Zyp Analytics Team Meeting on July 22nd 2022) – Part 3

	Jaime	Tanmay	Sandeep
Are the visualizations detailed & informative, yet easy on the eyes?	Yes all good.	All good. The Instagram Posts table should have a title. Axis labels could be in bold so the user understands the visualized data better.	Yes all good.
Do the visualizations have a good degree of interactivity in terms of date range, category, and/or any other identifier?	Interactivity is good.	Interactivity is good. The Canadian City section runs slower. Try to reduce the dataset size. The row values of older years are not necessary so they can be removed from the data file in regards to the project.	Interactivity is good.

Deployable, customizable, easy-to-use, …

- Deployable?
  - Application is already deployed to Heroku
  - Login instructions provided to target audience (via Discord & Organization Google Drive) and Instructor (via Blackboard Submission)
  - Link: https://zyp-social-media-dash-app.herokuapp.com/
- Easy-to-Use
  - Based on feedback from Zyp Art Gallery Analytics team and my design choices
  - According to Analytics team leader, the user experience could be improved; thus, the application could be designed to be more easier to use

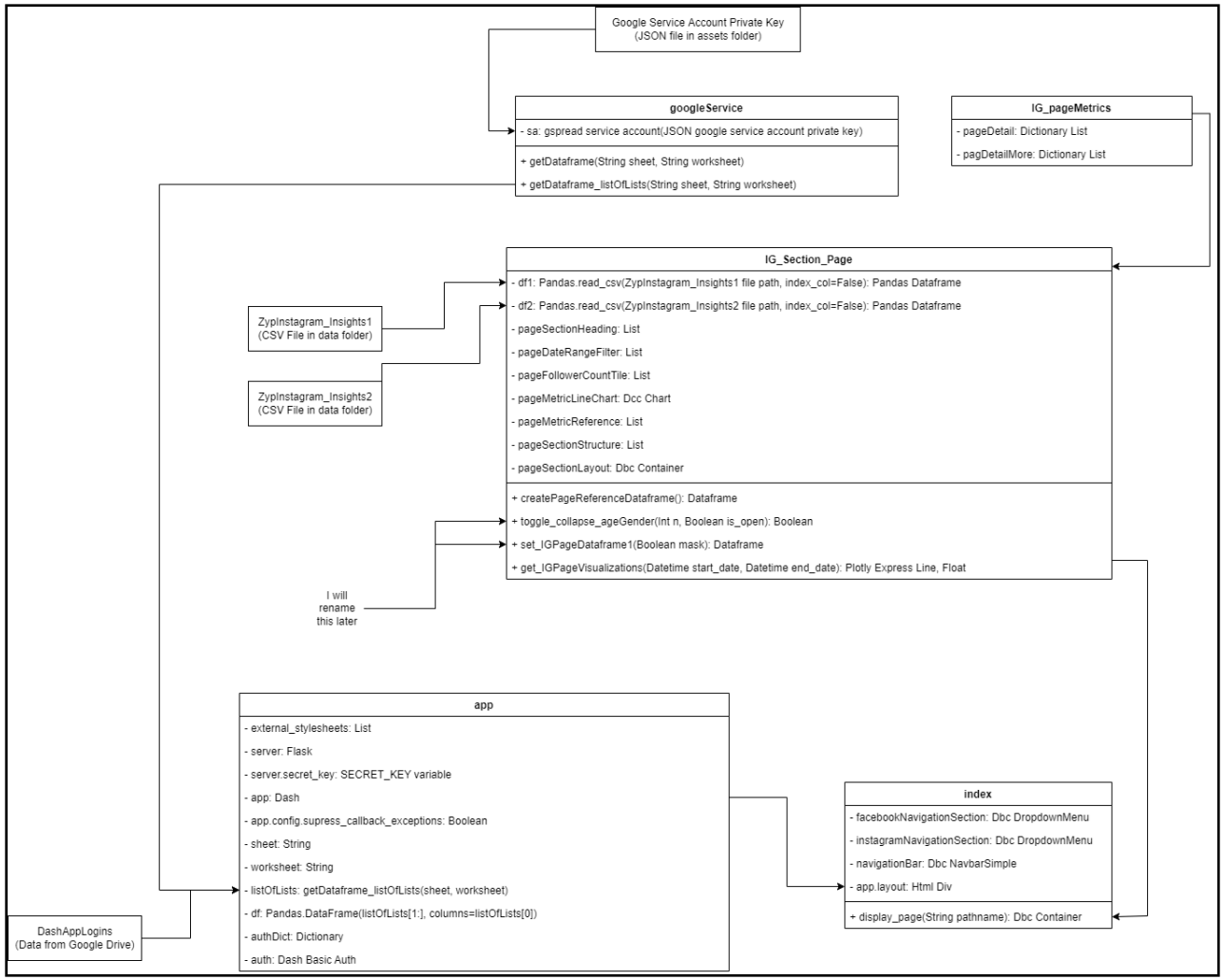
Deployable, customizable, easy-to-use, … (cont.)

- Customizable
  - Facebook
    - Posts insights: filter by date range, post metric category, and post ID
    - Page insights: filter by date range, page metric category
    - Audience Age & Gender insights: filter by date range, gender identity, age range
    - Audience Country insights: filter by date range, region scope
    - Audience Canadian City insights: filter by date range, subregion scope
    - Audience Time of Day insights: filter by date range, time zone, year
  - Instagram
    - Post insights: filter by Post ID
    - Page insights: filter by date range
    - Audience Age & Gender insights: filter by year, week, gender identity, age range
    - Audience Country insights: filter by year, week, region scope
    - Audience Canadian City insights: filter by year, week, subregion scope
    - Audience Time of Day insights: filter by year, week, time zone

Algorithms – Not really

- There are no particular algorithms used
- The highest degree of mathematics used in this application is descriptive statistics (i.e., calculating average daily reach by Age, Gender, Country, Canadian City)
- The Dash application does follow a specific design pattern (discussed in the Final Presentation Recording)
    - Import dependencies (e.g., Python packages & other Python files in project directory/sub-directory)
    - Import data (i.e., CSV files)
    - Create elements of webpage (e.g., headings, date range picker, dropdowns, checklist, visualizations) – either fully or partially
    - Create structure and layout using elements of webpage
    - Callbacks
        - Takes input of interactive web elements (i.e., date range picker & dropdowns), and then returns output (i.e., visualization)
        - Web elements identified for input & output using “id”
    - Example: https://github.com/kjeshang/ZypArtGallerySocialMediaDashboard/blob/main/SocialMediaDashboard-Zyp/apps/IG_Section_Page.py

Algorithms – Not really (cont.)



Example UML Class Diagram

This shows in a more granular way the flow of the application flows for a particular section of the application.

For more information, please kindly refer to the Final Report. If you require any clarification or have any questions, please reach out. Thank you!