Data Visualisation and Insight

Final Data Visualisation Project

Summary

This continuous assessment will contribute 60% towards the final mark for this module.

The working files, links and screencast must be submitted through Moodle before midnight on 1st May 2021. A short presentation will take place on Thursday 29th April 2021 in front of the class.

Outline

For the main project in Data Visualisation and Insight you are required to create an interactive multipage dashboard app written in python to allow a general user to thoroughly explore an interesting data set of your choice. Each page should certain around one key performance indicator (KPI). The app should function for desktop users and should be deployed online to support general access.

Crucially, the purpose of this project is allow students to demonstrate the ability to design, develop and apply standard and advanced visualisation strategies and to critique such visualisation. This is the overarching basis on which the application will be assessed.

There will be a short presentation before submission of the project to the class. Here you will demonstrate the final app to give insight to the dataset you selected. You must complete the interview, failure to do so will result in a mark of 0 for this element.

You are required to complete a 10 minute screencast which details the purpose and functionality of the application. In addition, you should complete a short report that provides additional information for assessment purposes.

Description

You first need to choose an appropriate data set/analytics problem that you feel would be interesting for a general user to investigate. You should then perform the following steps:

1. Import and clean the data. You can if you like use real-time data through an appropriate API.

2. Investigate the data to decide the key information, features and analyses that would be of interest to the general audience. It is important to research what other visualisations have been used to convey information relating to the data set. You might also include standard statistical techniques such as Cluster Analysis, PCA, etc. to highlight features of the data.

3. Design a suitable interactive application to present the functionality selected above to allow the user to thoroughly explore and understand the data. In designing the application you should ensure that your application contains a landing page that explains the data and the purpose and the interactivity for the visualisation. Your application should contain multiple pages with each page highlighting a KPI.

4. Develop the application using the Dash technology in python. It is anticipated that the application will include a combination of dynamic and static visualisation elements. You may include a landing page to explain your application to users.

   You can use any of the features in python that have been looked at through the course and you can include any other libraries in python or technologies including HTML, CSS and Javascript that may add value.

   However, the core app must be built using the Dash and plotly technology. In building it you should clearly demonstrate knowledge of Dash App layouts and styling, reactive functions and user input widgets.

   It is important to include titles, scales, labels and supporting text you feel would be of value. You should of course thoroughly test the application.

5. Deploy the application online. Options include pythonanywhere.com, AWS or even Google Firebase.

Once the Dash App is complete you should record a screencast with audio of no longer than 10 minutes which explains the purpose and functionality of the application. It should essentially be a walk through that describes all the features and highlights the key displays and characteristics that the tool serves to visualise.

Finally, it is important to include a short report which explains the following

- Summary: a short summary of the project (no more than 200 words) including the aim(s) of the visualisation and the target audience.
- Background Research: including any other applications you reviewed related to your problem domain. Include screenshots where necessary and links.
- Data source and brief description of data. Details of any data cleaning activities completed and short summary of any data wrangling performed within R prior to visualisation.
- A short criticism which provides an honest review of the work. In this review you should highlight the key challenges you had to overcome in the work. You should also detail two key strengths of the visualisation and the main weakness of the work. Importantly, you should explain any technical issues with the visualisation.
- A link to a server hosted version of the application.
- Any additional information you feel might be of value in the assessment of the project

including details of testing completed or review by real users.

- A basic version history which outlines progress on the application.

Additionality

There are a number of additional elements you may consider for this project including, but not limited to the following:

- Development of a realtime application using appropriate API to pull in the required data.
- Customisation of visualisation for mobile use.
- Inclusion of Google Analytics functionality to monitor usage of your application.
- Inclusion of user feedback within the application possibly through a Net Promoter score.
- User evaluation through real trials.

Deliverables

You are required to submit the following:

1. A complete project in a repository like github including main application folder and any subfolders including
    1. Python code with appropriate comments to help a reader understand the logic
    2. All data or links to data.
    3. A readme file if it is unclear how to set up and run the Dash App.

2. A screencast of no longer than 10 minutes which explains the purpose and functionality of the application. It should essentially be a walk through that describes all the features and highlights the key displays and characteristics that the tool serves to visualise.

3. A pdf report as detailed above.

Presentation of Work

You are required to present the app and insights gained from your analyses to the class. This is a live demonstration of the work and will occur before you have uploaded your final submission and allows you to take on feedback from your peers, if possible and you think would add value to the app.

Timeline for the work

For the 26th of March: Decide on the data and the research question. Source the data
For the 15th of April: Over the Easter break you should begin data importation, cleaning and exploring. You should decide the main themes, KPIs, each page of your dashboard will focus on, this can be discussed with lecturer during the lab.
For the 29th of April: All interactive/static visualisations and the app have been created with appropriate testing on the app to ensure with for demonstration. In this lab, you will demonstrate your work to your classmates.
For the 1st May at 11:59pm: Implement any changes you feel necessary after the demonstration, record the screencast and deploy app to web and Please upload all materials to moodle.

Indicative Marking Scheme

Visualisation: clarity of aims and target audience: 5%
Overall visual design: 10%
Layout and choice of visualisation and interactive elements: 15%
Quality of technical Implementation: 35%
Online deployment: 5%
Report & Critique: 15%
Screencast: 7.5%
Presentation: 7.5%

Rubric(TBC)

Grade (%)	Description
80+	Project element demonstrates mastery of subject matter with novel/original work applied to a complex problem. Data is imported correctly and has been appropriately structured. Visualisation of data is accurate, complete, thoroughly explained, and appropriate with clear link to aims. Functionality in interactive dashboard shows original thinking and implementation beyond what was learned in course. Application is well tested and stable. Technical implementation shows mastery of technology with research conducted beyond material provided in lectures. Application updates in real time. Document is well-structured, with complete and honest review and includes a detailed version history. Very clear and engaging presentation of the work.
70-79	Report demonstrates thorough understanding of subject matter. Analysis is accurate, complete, thoroughly explained, and appropriate with clear links to theory. Analysis clearly addresses application of theories to critique of visualisation. Research is thoroughly explained with obvious relevance to problems. Improvements are clearly presented and substantially address the key deficiencies with the visualisations. Document is well-structured and writing is of a high standard. Clear and engaging presentation of the work.

60-69	Project element demonstrates good understanding of subject matter. Data is imported correctly and has been appropriately structured and manipulated. Visualisation elements and interactions are effective and largely deliver on the aims of the project. Technical implementation is to a large extent based on example applications provided in lectures but is well coded demonstrating clear understanding of concepts and application. May be missing some appropriate analysis and may be minor technical issues. Document is reasonably structured, substantially complete and well delivered. Clear presentation of the work.
50-59	Project element demonstrates reasonable understanding of subject matter. Data has been imported, treated and structured in a manner which is effective but with minor issues. Visualisation and interaction is linked to aims but contains some ineffective or inappropriate elements and misses some key objectives. Technical implementation is very closely related to applications provided in lectured. Document is adequately structured, mostly complete and reasonably well delivered. Adequate presentation of the work.
40-49	Project element demonstrates partial understanding of subject matter and is largely based on applications provided by lecturer. Functionality is relatively simple allowing very basic exploration. Basic but incomplete visualisation with significant omissions. Poor link to aims and objectives. Document missing some key elements. Presentation skills need improvement
30-39	Project element demonstrates very little understanding of subject matter and is largely or wholly based on applications provided by lecturer. Little evidence of exploration of problem Incomplete visualisation based entirely on functionality provided in class with weak links to aims. Documentation poor and missing significant elements. Poor presentation skills.
0-29	Project element demonstrates almost no understanding of subject matter and is entirely based on applications provided by lecturer. No serious attempt to address the problem.

Plagiarism

PLEASE PAY SPECIAL ATTENTION TO THE ISSUE OF PLAGIARISM. The DkIT policies are available at https://www.dkit.ie/system/files/academic_integrity_policy_and_procedures.pdf

in summary, all work submitted by learners for assessment purposes, or for written or oral publication, must be their own work. Where this is informed by the work of others, the source must be properly referenced using the accepted norms and formats of the appropriate academic discipline.

Late Submission

The policy for late submission is available at the link below. However, there is a strict cut-off of May 1st for submission of projects.

Any legitimate late submission must be accompanied by explanation and supporting documentation as per the policy.

https://www.dkit.ie/system/files/continuous_assessment_procedures_document_v4.pdf