Visual Analytics Project

Building visually driven analytical Shiny application for emocraticing data and analysis.

Contents

Overview

The purpose of the project is to provide students first hand experience on collecting, processing and analysing large business data using real world data. A project may involve developing new methods or implementing visual analytics system to support analytic tasks in specific domains. Alternatively, a project may be in the form of application development by integrating analytical tools within a visual analytics environment. Students are encouraged to focus on research topics that are relevant to their field of study. It should address a concrete visual analytics problem and should propose a novel and creative solution.

The project is team work. Students are required to form a project team of **2-3** members by the first week of the academic term. Each project teams must start thinking about their project ideas after the first lesson. They are expected to discuss their project topic and scope of works with the instructor before the end of **Week 6**. A project proposal in the form website edited using either **blogdown** or **distill for RMarkdown** on **Netfily** will be prepared and the link must be provided on eLearn by the end of **Week 7**.

The project proposal should describe the motivation of the project, problems or issues that the project will address, the relevant related work, the approach the team plans to take to solve the problem, and early prototypes or storyboards. The project teams should take advantage of this proposal as a chance to get feedback on the direction of the project from their peers.

Students are required to update their project websites with all the details including the final application, user guide, poster, practice research paper by **the end of week 14**.

Project Milestone

- Brainstorming project ideas and consulting with course instructor between **Week 2 to Week 6**.

- Editing and publishing project proposal by the end of **Week 7**.

- Submission of final application, user guide, project poster, practice research paper and artifacts: **15th August 2021 by 11:59pm (mid-night)**

Project Deliverables

Project Website

PROJECT GITHUB

At the beginning of the project, project teams are required to create a project Github. The project Github should include all the materials used to develop the project and the written materials such as proposal, poster and practice research paper. It must be used to maintain a complete project versioning including the application and project documents. The Github link must be included in the project proposal. By the end of the project, the project team must pack the final version of the Github repository and upload onto eLearn for final submission. The Github link also must be provided on eLearn.

PROJECT WEBSITE

Each project team are required to create the project website by using either blogdown or distill for RMarkdown. It will be disseminated by using webserver such as Netfity.

As a first step, you should create a project summary at the course wiki that includes:

- The title of your project,

- A short description of not more than 350 word summarising the motivation, objectives, main features of the application your team are going to build, and

- The project proposal. This should in a webblog page (remember to provide a link at the wiki)

Poster

The project poster should provide an overview of your project. It should include, but not limited to the following information:

- Issues and problems - A clear statement of the issues or/and problems your project addresses.

- Motivation - An explanation of why the issues and/or problems are interesting and what make them difficult to solve.

- Approach - A description of the techniques or algorithms you used to solve the problem.

- Results - Screenshots and a working demo of the system you built.

- Future Work - An explanation of how the work could be extended.

The dimensions for the poster must conform to the International Standards Organization (ISO) poster size format (A1).

- Size = ISO A1 (594 × 841mm or 23.39 × 33.11inci)

- Resolution = 300dpi or above

- File format = jpeg or pdf

Please ensure that the poster is in high resolution.

Project teams are encouraged to use posterdown to design your poster.

Note: The poster will be considered a final deliverable, so don't forget to apply good visual design and data visualisation principles and best practice to your poster.

Visual Analytics Practice Research Paper

The research paper should be in the form of Visual Analytics Application practice and research. In particular it should contain the followings:

- Motivation of the application

- Review and critic on past works

- Design framework - A detail description of the design principles used and data visualisation elements built (Refer to Section IV: Interface of this paper.

- Demonstration - Use case

- Discussion - What has the audience learned from your work? What new insights or practices has your

system enabled? A full blown user study is not expected, but informal observations of use that help evaluate your system are encouraged.

- Future Work - A description of how your system could be extended or refined.

The research paper should include an abstract of **not more than 300 words**. The actual research paper itself should **not more than 6 pages** excluding figures, tables, formula and references. The practice research paper must be edited by using **R Markdown** and the **ACM: Association for Computing Machinery** template of **rticles** should be used.

SAMPLE PRACTICE RESEARCH PAPERS

- DIVAD: A Dynamic and Interactive Visual Analytical Dashboard for Exploring and Analyzing Transport Data

- MEPHAS: an interactive graphical user interface for medical and pharmaceutical statistical analysis with R and Shiny

- SpatialEpiApp: A Shiny Web Application for the Analysis of Spatial and Spatio-Temporal Disease Data

- Developing web-based data analysis tools for precision farming using R and Shiny

- EHDViz: clinical dashboard development using open-source technologies

- Health Equity Assessment Toolkit

- Interactive Pharmacometric Applications Using R and the Shiny Package

Final Deliverables

The final deliverable will include:

- artifact including the ShinyApp, data and all r modules.

- User Guide - Step-by-step guide on how to use the data visualisation functions designed.
    - Sample UserGuide 1

    - Sample UserGuide 2

- project poster

- a practice research paper

The final deliverable must be uploaded into the Dropbox of e-Learn (e.g. LMS). It must in a **single zip** file format.

Grading

The visual analytics project will account for 30% of your final grade in the course. The distribution of marks for each stage of the project are as follows:

- Project website 15%

- Poster 10%

- Practice Research Paper 25%

- ShinyApp 50%

The course instructor will consider strongly the novelty of the idea (If it has never been done before, you will get lots of credit!), how it addresses the problem at hand, the methodology you employ in doing the research, and your technical skill in implementing the idea.

In small group projects, each person will be graded individually. A good group project is a system consisting of a collection of well defined subsystems. Each subsystem should be the responsibility of one person and be clearly identified as their project. A good criteria for whether you should work in a group is whether the system as a whole is greater than the sum of its parts!

Grading criteria for poster

The poster will be graded based on the following criteria:

- Clear communication of key aspects of solution

- Clear communication of design approaches

- Clear communication of arguments for proposed solution

- Craft quality of the solution

Sample Projects

Note that the following examples are for references purposes. You are urge to use your own creativity and innovation to design the application

MITB (Analytics)

- ISSS608 Year 2013-14 Term 3B

- ISSS608 Year 2014-15 Term 3B

- ISSS608 Year 2015-16 Term 1
  - Oooh Shiny!

Q & A

Q1: Is the project a combination of the assignments by the group members? Like if the three members chose the same mini-challenge, they would need to pick the best part to combine in the project. And if the three members chose the three different mini-challenge, they would need to combine the three into one story in the final shiny app and the research paper.

> *Prof: Yes, the assignment should form the foundation of the project.*

Q2: Is there any difference in the visualisation requirements of the assignment and the project? Is shiny required for both the assignment and the project? Or we can do the assignment visualisation without the shiny?

> *Prof: For the assignment, RMarkdown should be used to prepare the answers. For the project, on the other hands, the web application should be builded by using Shiny.*

Q3: Are we only able to use R and R shiny in the assignment and the project? Can we use other tools in the data cleaning and the analysis?

> *Prof: You are expected to use R to complete the tasks given, including data import, integration, cleaning, wrangling and reporting.*

Q4: We chose mini-challenge 3 of the VAST challenge as our final project topic. During the exploration of data, we found that the data they provided is incomplete. From the file "MC3_data_readme" that describes the dataset of mini-challenge 3, it said that the data includes two types of records which are Microblog message and Call center data. However, the Call center data has not yet been provided. We also noticed that from the "Home" page of the VAST challenge website, they said, "VAST Challenge 2021 Mini-Challenge 2 is now available! Additional challenges will be available for download soon!". It seems like we still need to wait for the complete data for mini-challenge 3. Could you please tell us should we keep waiting or choose the topic from the rest mini-challenges?

> *Prof: Not true. Both data are provided in the three csv files for MC3. Please check the data carefully.*

Q5: I'm a little bit confused about our final project scope. Could you please tell me that does our final project needs to choose from the three mini-challenge from VAST or we need to find the data by ourselves?

> *Prof: This term, the visual analytics project must use VAST Challenge 2021 case(s). You do not have to look for your own data.*

Q6: Do we need to find our own dataset? Or do we solely use the data from the mini challenge?

> *Prof: You should use the data sets provided for the mini challenge*

Q7: Understand that the project is supposed to be an integration of the assignments we have completed. Can we understand what is the difference between the project and assignment? Do we just simply combine all of the individual assignments?

> *Prof: No, for the assignment you will address the questions using appropriate R packages and RMarkdown and for the Project, you are required to design and build web application using Shiny and R packages.*

Q8: Do we have to come out with a draft project proposal before scheduling a consultation?

> *Prof: Yes, you should or else there is nothing to discuss*

Project Groups

Project Groups

G1

[Group 1](#)

[Group 2](#)

[Group 3](#)

[Group 4](#)

[Group 5](#)

[Group 6](#)

[Group 7](#)

[Group 8](#)

[Group 9](#)

[Group 10](#)

[Group 11](#)

[Group 12](#)

[Group 13](#)

[Group 14](#)

[Group 15](#)

[Group 16](#)

G2

[Group 1](#)

[Group 2](#)

[Group 3](#)

[Group 4](#)

[Group 5](#)

[Group 6](#)

[Group 7](#)

Group 8

Group 9

Group 10