COSC3000 Visualization, Computer Graphics & Data Analysis

Visualisation Project

1 Aims and overview

For your data visualisation and analysis project you are expected to create a visualisation that investigates some aspect(s) of real data. You will need to find a scientific multidimensional dataset (e.g., online scientific data repositories). You must use scientific data (e.g., collected from census, surveys, experiments or simulations), not a mathematical expression. You may use more than one dataset if you wish. You cannot use datasets provided with Matlab or other software packages.

For the visualisation project, you will be showing that you can apply methods such as we cover in the lecture to analyse, understand, and/or communicate or teach about data. This means that the data matters! If your data is too simple, you won't be able to show much use of visualisation or data analysis. Look for data that has some (or all) of these features:

- **Multiple independent variables.** In this case, you will be interested in correlations, dimensionality reduction (e.g., principal component analysis), etc.
- **Multiple dependent variables.** You might be interested in correlations, in trying to display the data in a way that the viewer can understand it, etc.
- **Complex behaviour over space.** You might be interested in how data in regions correlates with neighbouring regions, etc. If your data is geographical, you can usually find other dependent variables where possible correlations are interesting.
- **Complex behaviour over time.** You will be interested in looking for patterns: are there long term trends, cycles, etc.?

Pick a subject area that you are really interested in: you could also approach a UQ researcher in that area to see if they could provide you with data.

You can use a computer language and visualisation tools of your choice.

The project is assessed based on 3 components:

- Proposal (pass/fail)
- Either a presentation or a question on the final exam:
  - Presentation (inadequate/poor/good/excellent)
  - Exam (inadequate/poor/good/excellent)

  If you do both the presentation and the exam question, the better of the two marks will be used to determine your project grade.
- Report (1–7)

The proposal and report will be submitted electronically via Blackboard. A timetable for presentations will be organised later in the semester.

2 Proposal

You are expected to submit a proposal detailing the "what", "why" and "how" of your project, by 4 pm Friday 13th March. You should identify a source for the data, how you will obtain the data, and, if possible, provide a sample of the data. We will give feedback on whether your selected topic is too big or too small, and negotiate an appropriate topic.

2.1 Criteria & Marking

Your proposal must include:

- **What**—what is the topic and goal of your project?
- **Why**—why is your project important and/or interesting?
- **How**—how will you go achieve the goal of your project?
- **Data**—what is your data source, how you will obtain it, and, if possible at this stage, provide a sample (e.g., in a table or screenshot).

Also,

- **Clarity**—your proposal should be clear, concise and legible.

The proposal is graded as pass/fail. A pass is required to obtain a grade of more than 1 for the project. If the above points (what, why, how, data) are described adequately, and the proposal is sufficiently clear and understandable, it will obtain a mark of **pass**.

1/2 to 1 page of text should be sufficient. Longer is acceptable, but note that concise is good. If you include tables or figures, your proposal will probably be longer.

2.2 Submission

Your proposal will be submitted electronically via Blackboard.

3 Presentation

You must either give an oral presentation or answer the exam question for the project (see next section for details about the exam). You do not have to do both. If you do both, the higher mark will count.

Presentations will be held in week 7, in the regular lecture and computer lab times. The number of presentations will be limited by the available time, and it might not be possible for all students who wish to to give presentations.

The short ($\sim 10 - 15$ minutes) presentation should briefly cover the "what", "why" and "how" of your project, as well as showing and discussing a selection of your visualisations. A projector and computer will be available; you will also be able to connect your own laptop to the projector (check beforehand for compatibility!).

Your presentation should include:

- Problem Statement (the what and why)
- Methods, techniques, execution and results (how)

Students and teaching staff will have an opportunity to ask questions at the end of your presentation.

3.1 Criteria & Marking

The presentation will be marked as:

- Excellent (equivalent to grades of 6–7)
- Good (equivalent to grades of 4–5)
- Poor (equivalent to a grade of 3)
- Inadequate (equivalent to grades of 1–2)

A mark of **poor** or better is required to obtain a grade of above 1 for the project. The mark will be determined by the coverage of the "what, why, how", and by the quality of the presentation and performance on Q&A.

3.2 Submission

Your presentation will be delivered as an oral presentation in our timetabled class time.

4 Exam

You must either give an oral presentation or answer the exam question for the project (see previous section for details about the presentation). You do not have to do both. If you do both, the higher mark will count.

The exam question for the project is a reflection. The main part of the question will be "Discuss your visualisation project" or similar, with some further specific questions. See past exams for examples.

Your reflection should cover the "what", "why" and "how" of your project, and discussion of your visualisations. Make sure you answer the further specific questions.

4.1 Criteria & Marking

The exam question will be marked as:

- Excellent (equivalent to grades of 6–7)
- Good (equivalent to grades of 4–5)
- Poor (equivalent to a grade of 3)
- Inadequate (equivalent to grades of 1–2)

A mark of **poor** or better is required to obtain a grade of above 1 for the project. The mark will be determined by the coverage of the "what, why, how", and the knowledge and insight demonstrated by your reflection.

4.2 Submission

The exam will be held in the exam period at the end of the semester.

5 Report

Your report should include: a short introduction, description of where you found the data, any data preparation (statistical or other) and methods/analysis used; and discussion of how the visualisation facilitates your understanding of your data. Include figures (attractive presentations of your visualisations), as well as references to sources.

There is no word or page limit, but we encourage concise reports.

The report should be provided as a document file (e.g., doc, pdf, html) that can be easily read by the marker. Additional files (e.g., data, code to generate figures, etc.) can be included, but the main report should include all essential visualisations and discussion.

Examples reports by past students are provided on the course Blackboard site.

5.1 Criteria & Marking

The report is given a grade from 1–7. The report must include:

- Problem Statement (the what and why)
- Methods, techniques, execution and results (how)
- Discussion

The grade is based on the coverage of these items, and also the quality of presentation of the report, and demonstrating creativity, diversity of skills/approaches and judicious application of course material.

If no report is submitted, a grade of 0 will be given for the report.

5.2 Self-evaluation

You are encouraged to include a self-evaluation as part of your report, as a section or appendix at the end. In your self-evaluation, you can state what grade (or range of grades) you believe your report deserves, and justify this in terms of skills/techniques you have demonstrated, achievement of learning objectives, and so on.

5.3 Submission

Your proposal will be submitted electronically via Blackboard.

6 Grade for project

In order to obtain a grade of more than 1 for the project, a **pass** is required for the proposal, and a mark of **poor** or better for the presentation.

If these requirements are met, the overall grade for the project depends on the report grade and the presentation mark, as given in the table below:

		Report grade							
		0	1	2	3	4	5	6	7
Presentation	Poor	0	1	1	2	3	4	5	6
or exam	Good	0	1	2	3	4	5	6	7
mark	Excellent	0	2	3	4	5	6	7	7

7 Final grade for course

The final grade for the course depends on the grades received for the two projects. The final grades for different combinations of project grades are given in the table below:

		Graphics project grade							
		0	1	2	3	4	5	6	7
	0	0	1	1	2	2	3	3	3
	1	1	1	2	2	3	3	3	3
Visualisation	2	1	2	2	3	3	3	4	4
project	3	2	2	3	3	4	4	4	5
grade	4	2	3	3	4	4	5	5	6
	5	3	3	3	4	5	5	6	6
	6	3	3	4	4	5	6	6	7
	7	3	3	4	5	6	6	7	7