CASA0025: Building Spatial Applications with Big Data Assessment Guidelines

This module will be assessed in two main components. The first is a quiz in which students retrieve results from a database that they will have set up in the first half of the course (30% of final mark). Second, via group work in which students build an interactive web-based application using Google Earth Engine that conveys deep analysis and insights drawn from one or more datasets (70% of final mark).

Below is a description and weighting of the first assessment:

1. Database Quiz – 30%

During the first half of the course students will be learning how to set up and query a database both in lectures and in practical workshops. Administered in Week 5, students will be asked to perform various spatial queries and return results. This will both ensure that students have successfully followed along in the workshops and have set up their own databases, and that they have understood SQL syntax to perform spatial analysis. The quiz will last two hours—the duration of the workshop—and will be open book. However, students must perform the work individually.

The second component of the assessment—the groupwork based application— will apply some form of quantitative analysis and allow the user to gain a greater understanding of the subject being presented. The analysis will focus on a spatial phenomenon (e.g. a geographic or urban process), and the application should be easy to use and well designed.

The group project will be assessed in two parts:

2. Group Application – 50%

The interactive application will be the primary assessed component of the project. The application will import data and apply analysis to one of the datasets from the Earth Engine catalogue, with optional integration of third-party data. The application must allow users to interactively query results. To assess students' technical ability, the source code for the application should be provided for assessment via GitHub; the code should be well documented and demonstrate an understanding of what each section accomplishes. To ensure an equitable division of labour, students may choose from three categories: Pre-processing, Analysis, and Visualization. The number and nature of commits to the GitHub repository should demonstrate that each member of the group has contributed to the technical aspect of the project.

The application will be assessed by the following criteria:

- **Use of advanced data analysis methods to explore dataset 30%**

- o Has the pre-processing been handled correctly?
- o Are the analytical methods being deployed the most appropriate for the task at hand?
  - **Quality of the interactive user interface 30%**
    - o Is the design user friendly?
    - o Do the interactive elements function properly?
    - o Are results returned in a timely manner?
  - **Clarity of purpose 30%**
    - o Is it clear what this application is meant to convey?
    - o What problem does the application seek to solve?
    - o Who is the intended end-user of the application?
    - o How effectively does the application leverage geospatial data to solve this problem?
    - o How useful is the application?
  - **Design and aesthetics 10%**
    - o Have appropriate visualization choices been made?

A useful resource for students will be the following GitHub repository, which is a library of open access Google Earth Engine applications. Students may use these applications to draw inspiration for their own projects; however, <u>students must cite these (or any other) applications as they would any other resource, and failure to do so will be considered plagiarism.</u>

3. **Group Presentation – 20%**

Each group is expected to produce a presentation showing off the application, how the group carried out the analysis of the dataset, the limitations of the analysis and how the interactive tool works behind the scenes. This will include a technical walkthrough of the code Students should use this opportunity to elaborate on the technical aspects of the project that they worked on.

The presentation will be judged on the following criteria:
  - **Execution of the project 30%**
    - o Present the problem that your application seeks to solve.
    - o Explain how your application solves that problem, providing an overview of the data and methods.
  - **Live Demonstration 30%**
    - o Provide the assessors with a link to the application.
    - o Conduct a live demonstration of how the application is to be used.
  - **A technical walkthrough of the application's source code 30%**
    - o Students will display and explain the application's source code, and be able to answer any questions assessors might have.
  - **Clarity of presentation 10%**

The Database Quiz ensures an assessment of individual-level technical skills, covering roughly half of the course material. The group application assignment dovetails with many Term 1 modules taught at CASA; CASA0005 (GIS), CASA0007 (QM), and CASA0013 (Spatial Data Science) all of which teach analytical methods. Rather than teaching these again, this module will allow students to extend these skills through the development of an interactive online application. Ultimately, students will have a

portfolio item which showcases geospatial analysis, but also the analytical and critical thinking skills developed in other modules. Together, these assessments adequately assess student's ability to carry out spatial analysis on large spatial datasets.