Individual and Group Projects

You will be asked to work on an individual remote sensing data analysis project of your choice, as well as participate in a group project focused on an assigned machine learning data analysis challenge.

LEARNING OBJECTIVE

The primary objective of these course projects is to bridge the gap between theory and practice by applying the methods and concepts learned in this course to real remote sensing data. The secondary objective is to develop both independent and collaborative work skills, while gaining experience in presenting your research and providing constructive feedback on your classmates' work.

EVALUATION

Your projects will be evaluated in terms of the soundness of the problem formulation, the quality and effort of remote sensing data analysis research, and the quality and clarity of presentations. You are requested to participate in peer evaluation, which will be counted towards the course grade. Your group project evaluation will be prorated by the assessment by your team members regarding your contributions to the group work.

INDIVIDUAL PROJECT OUTLINE (1-2 pages) – Due on November 15

Provide a brief description of each of the following elements: (1) motivation and goal, (2) background, (3) characteristics of the remote sensing data, (4) data analysis methods, and (5) expected outcomes. The outline is required but not graded. Make sure to discuss it with the instructor and/or TA before finalizing the project outline.

INDIVIDUAL PROJECT POSTER PRESENTATION – Due on December 17 (est.)

The target audience for the presentation is other students in ASEN 6337 - someone with a background in machine learning and inverse methods with some exposure to real-world remote sensing data analysis applications. You should not assume that your audience and readers are experts in the field of your project topic, however, so be sure to provide background and motivation.

Poster presentation grades will be weighted as below:

The poster should have introduction and background with literature cited, objective of the study, data sets and methods, results and discussion, and significance to the field. Poster displays must be self-explanatory. The accompanying video must be able to give a high-level overview of the data analysis conducted.

- **Poster Display and Organization (50%)**
  - **Overall appearance (10 pts)** – The poster looks professional and is aesthetically pleasing.
  - **Text/graphics balance (10 pts)** – Space is used effectively, and neither text nor graphics dominate the poster. Figures serve a purpose (not just

filling space), and are appropriately titled and captioned. The text is legible when the poster is viewed at full size.
    - **Organizational flow (10 pts)** – The poster has appropriate headings and clearly defined sections. All of the information is provided in a logical order.
    - **Main points & Summary (10 pts)** – The fundamental points of the project are clearly identified, with little redundancy of information.
    - **Presentation style (20 pts)** – The video summarizes all the parts of the poster in a concise and understandable manner. Does the video enhance the poster?

- **Content (50%)**
    - **Abstract (5 pts)** – The abstract is informative. It is well-written and coherent, clearly stating the goal and key outcomes of the project.
    - **Motivation and Goal (5 pts)** –What is the purpose of the project? Does the poster explain the significance of the project?
    - **Background (10 pts)** – Does the poster set the context for the project?
    - **Characteristics of Data (20 pts)** – Does the poster explain adequately how data are collected and potential sources of uncertainty in data?
    - remote sensing data?
    - **Data Analysis Methods (20 pts)** – The poster clearly and informatively explains how the remote sensing data analysis was conducted. Is the data analysis approach rigorous?
    - **Finding and Conclusions (10 pts)** – The poster clearly states the results of the project. The poster explains why the results are meaningful and important.

GROUP PROJECT WRITTEN REPORT– Due on November 22
(10 pages not including references)

The report itself should be written in the style of a scientific or engineering research paper. Pay attention to spelling, grammar, and syntax. Also, pay close attention to the accuracy and completeness of references. If you use figures, make sure they have captions and are referenced appropriately in the text. Any equations you use should likewise have numbers and references in the text.

Written reports must contain the following sections, which will be weighted for grading as below.

- Abstract (5%) – A concise (200 words or less) summary of the paper
- Introduction (25%) – An introduction to your paper. You can describe the objectives and motivation of your project (*10/25*). Articulation of data sets analyzed (*15/25*).
- This is also a good place to describe the structure of your paper.

- Approach and Methodology Section (25%) – This is where you should describe the data analysis approach. Formulate your remote sensing data analysis problem using methods and concepts you learned in the class.
- Result and Discussion Section (25%) – This is where you should provide critical interpretation of the data analysis results. Make sure that you discuss uncertainty of your analysis results. You should back-up all of your assertions with critical arguments. This is a good place to put any tables or plots.
- Conclusions and Recommendations (10%) – Summarize your findings and state your conclusions. What would you recommend for the future work? Any recommendations should be backed up by analysis from the previous section.
- References (5%) – All material that has come from an external source should be referenced here. This not only includes printed and web based material, but if you have any meaningful discussion with someone about your project, they should be referenced. Please review the plagiarism discussion in the course syllabus.
- (5%) – Grammar, formatting, quality of figures, etc.

Oral presentation grades will be weighted as below:

- **Oral Presentation (50%)**
  - (10 pts) Soundness of the problem formulation
  - (10 pts) Quality and effort of research and analysis
  - (10 pts) Visuals
  - (10 pts) Effective use of allotted time
  - (10 pts) General style, organization, clarity, liveliness, and stage presence

- **Content (50%)**
  - **Objectives (10 pts)** – Does the presentation clearly state the goals of the project?
  - **Background (20 pts)** – Does the presentation set the context for the study (10/20) and explain adequately how data are collected and potential sources of uncertainty in data (10/20)?
  - **Methods (20 pts)** – The presentation clearly and informatively explains how the remote sensing data analysis was conducted. Is the data analysis approach rigorous?
  - **Finding and Conclusions (10 pts)** – The presentation clearly states the results of the project. The presentation explains why the results are meaningful and important.