

AE6102 - Parallel Scientific Computing and Visualization

Project Proposal(Final)

Spring 2023

Team Name: *Sifar*

Due Date: *March 20, 2023*

Project Project(Draft) Feedback and updates

Seems good. The Github link gives a 404 error.

- The Github repository was private earlier and we added Navneet(TA) as collaborator also.
- We have also made our repository public.
- Repository README.md has been updated with the title, abstract and outline of the project.
- No major changes in the project proposal.

Requirements

- Title: **3D Visualization and Analysis of Seismic Volumes**

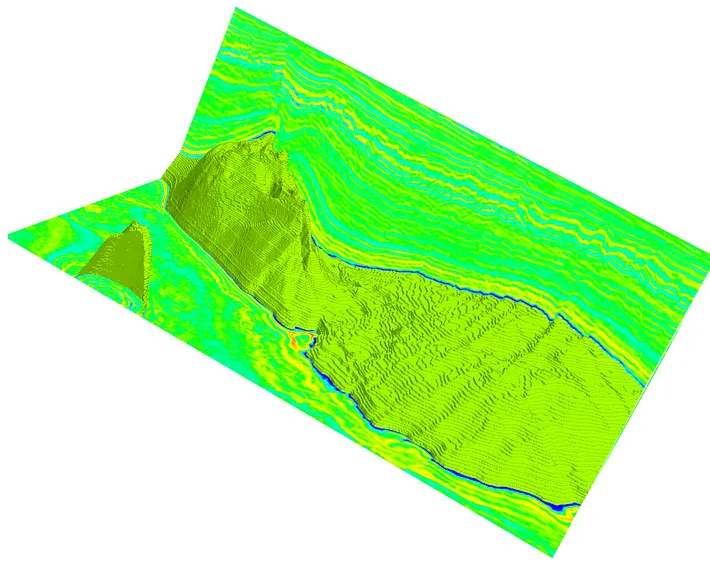


Figure 1: *3-D seismic volumes*

- Participants

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- Abstract:

The project aims to provide a comprehensive and interactive visual representation of subsurface geology by creating three-dimensional images of seismic volumes in **MayaVI** library. The project will facilitate a better understanding of subsurface geology by allowing users to interact with the data in a more intuitive and efficient manner utilizing **TraitsUI** library. Visualization of seismic volumes is a very crucial component of interpretation workflows, be it to pick salt domes, interpret horizons, identify fault planes, or classify rock facies.

- **Outline:**

The project will involve the following steps:

- Collecting seismic data and processing it to generate seismic volumes.
- Converting the seismic volumes into 3D models (**numpy** arrays) using a specialized python module **segvio**.
- Developing an interactive user interface that allows the user to visualize and manipulate the 3D models, using **TraitsUI**.
- Adding functionalities for analysis using **matplotlib** and **mayaVI** to be able to identify fault planes, classification of rock structures, etc.
- Adding features such as colouring, slicing, and annotation to enhance the interpretability of the data.
- Experiments with popular datasets and demonstration of results of our application corresponding to multiple use cases.

- **Deliverables:** The final project deliverables will include:

- A comprehensive report detailing the methodology and outcomes of the project.
- A functional 3D visualization tool allows users to interact with the seismic volumes and view them from different angles and scales, with multiple functionalities for analysis on that seismic volume.
- An annotated sample of the 3D model to showcase the features and capabilities of the tool.

- **Timeline:**

From - To (Date-Date)	Planned Progress	Status
12/02/2023 -18/02/2023	Project proposal(Draft) submission (Submitted on 18/02/2023)	Done
19/02/2023 -12/03/2023	Finalize project based on feedback received (Submission due on 20/03/2023)	Done
13/03/2023 -26/03/2023	Datasets Research, Data Collection, Research on Surface Geology for Analysis Mechanisms, Data Parsing and Transformation into numpy 3D models (Update-1 due on 20/03/2023)	In progress
27/03/2023 -09/04/2023	Models and UI Design, Logics Coding Phase using MayaVi and TraitsUI	In progress
09/03/2023 -14/04/2023	Coding Phase continued, Experimentation on Different factors and tweaks for optimization and better results	Not started
15/04/2023 -25/04/2023	Final report, demo video and optimized code as an open-source GitHub repository	Not started
26/04/2023 -30/04/2023	Final presentation with TAs and instructor	Date not finalized

- **Git repository:** https://github.com/rajagond/AE6102_sifar