**Project Problem Statement: Improving the performance of seismic fault detection using Convolutional Neural Network.**

**Team:** Himanshu Badera, Abhishek Goyal, Damilola O Abe, Subhash Mekapati, Nikhil Gorantia, Praveen Dasari, Danilo Meza.

**The goal from a business value point of view or restate the data analysis question.**

The main goal is to reduce the time, resources, and costs that it takes to map seismic faults when finding prospects for hydrocarbons by implementing a Convolutional Neural Network (CNN) to automate these processes.

**Opportunities to be realized or problem to be solved.**

The main problem is that the current process is inefficient. It’s a manual process that takes time and companies are limited in the amount of work or datasets that can take at once.

**How is it done today? What are the challenges and limitations of current practice?**

Currently this process is done by a seismic interpreter by manually going through all the seismic images and use different techniques to connect and optimize the different fault planes.

Challenges and limitations: The manual process of interpreting the faults, in which there is a possibility of oils and gases being trapped and can be extracted, is laborious and takes much time.

So, to avoid this, we are looking into automatic processes in which faults are automatically detected with most precision possible. Here, we try to look into the seismic images and analyze those images using the deep learning method for image processing (Convolutional Neural Network) which helps in separating the fault structures from different rock structures.

**Identify the end goal in terms of impact or estimated value. Examples (reduce cycle time, generate revenues, reduce cost, promote health and safety)**

* Reduction of costs
* Significantly reduce cycle time
* Increased data volume (more projects at once), so more revenue

**Identify the data you should collect, data resources, and data quality**

3D seismic data. Raw data and completed analysis with faults detected.

**Identify your business partners, collaborators (roles and responsibilities), and stockholders.**

This analysis is geared toward companies that provide geological services such as seismic mapping.

**Outline the analysis that you will do.**

* Train the CNN with real field data that has been processed.
* Use the model to predict fault detection using raw data.
* Evaluate the accuracy and time for the CNN data.
* Retrain if needed until desired outcome is reached.
* If model is functional, calculate the business model.

**Vision of success and how will success be measured?**

Success will be measured by the accuracy of the reports versus the reports by the seismic interpreter and could also be cross checked with well logs to check for accuracy in the field.