

The need to develop a device assembly, that scans the drill core rock sample and identify the lithology and geological discontinuities. The **AI** model will be using a combination of image processing and **machine learning** techniques. The **prototype** will function as follows:

- **Data collection:** Implementation of a core scanner system that can create high-resolution images of drill core in a unique 360-degree processing. One such example is **DMT Core-scan**. The image processing would be used to extract features from the drill core image, such as grain size, color, cementing material, sorting, packing, compactness, roundness, luster, and specific gravity.
- **Feature extraction:** The features mentioned above would be extracted from the drill core images using image processing techniques with libraries like **OpenCV**.
- **Model training:** The **AI** model would be trained on the extracted features to classify the drill core images into different lithologies and identify geological discontinuities. For training and deploying the AI model, we can employ a library like **TensorFlow**.
- **Device development:** A device assembly would be developed to scan the drill core rock sample and capture images. The AI model would then be integrated with the device to identify the lithology and geological discontinuities from the captured images.
- The proposed device assembly would consist of a camera module, a lighting system, and a processing unit. The camera module would capture images of the drill core sample, while the lighting system would ensure that the images are well-lit. The processing unit would run an AI model to identify the lithology and geological discontinuities in the images.
- **Marketing Aspect:** Our model could be further Tailored to specific needs of the industry by focusing on the specific types of lithologies and geological discontinuities that are of interest to geologists in that industry.

Example-We could train our model to identify specific lithologies that are associated with oil and gas reservoirs, such as sandstone and limestone. We could also train our model to identify geological discontinuities, such as folds and fractures, that could impact the flow of oil and gas through the reservoir.