Coding Challenge - Computer Vision (1st round):

Duration: 15th Mar 2024 12:00 (noon) to 18th Mar 2024 12:00 (noon)

Objective: To develop a neural network model capable of segmenting stones from the background in a given set of images.

Requirements:

1. **Dataset:** The dataset of 20 images ((Imagexx.jpg)) and it's corresponding Image true labels (Imagexx_label.jpg) containing stones with background can be found at the link.
2. **Coding language:** Python
3. **Libraries:** You are free to use any open-source libraries or frameworks you find suitable for this task.
4. **Model Architecture:** Design a neural network architecture or utilize open-source pre-trained models. However, you must fine-tune them on the provided dataset.
5. **Evaluation metric:** Use any suitable metric or use IOU score.

Submission:

Submit the following (Either in a single zip file or share the link for these files):

- **Code file** (.ipynb format). List all libraries with versions in the starting of the code file.
- **Serialized model file**: Necessary for evaluation.
- **Documentation (**provide a separate .ppt / .doc file or integrate Markup cells in the notebook)**:**
    1. Explaining your approach with results
    2. Model architecture and reason for selecting this architecture, and
    3. Hardware requirements for running the code.
    4. Any other specific installations required.

Submission Deadline: Email the submission before 18th March 12:00 PM (noon)

Limitations:

- You must not use any external datasets for training. Use only readily available open-source pre-trained models. However, you must fine-tune them on the provided dataset.
- **Don't use any trail version, paid or proprietary models, libraries, formats, and software.**
- Your final submission must include all source code and documentation.

Evaluation Criteria:

- **Accuracy:** Ability of the model to accurately segment stones from the background in each of these images.
- **Efficiency:** The model's performance in terms of computational resources and time.
- **Creativity:** The innovative aspects of your approach and problem-solving skills.
- **Clarity:** The quality of your documentation and code readability.

Video Interview (2nd round):

After 18th Mar 2024 12:00 (noon) – based on the submission of coding challenge, selected students will be sent an intimation for video interview.

1. **General questions**
2. **Technical questions** – Data Science / ML / AI
3. **Question on Coding challenge:**
    a. Explain your approach to solving the coding challenge.
    b. Evaluate the model on its ability to segment stones in two new images that will be provided during the video interview.
    c. Bonus point: Give an approach to estimate the approximate volume of segmented stones from the 2-D images.
4. **Question on any Data Science Project:**

    Briefly discuss one Data Science, ML, or AI project related to the **upstream Oil & Gas domain**. You may refer to projects from various sources (online, journals, books, etc.). During the interview, you have up to 10 minutes to explain the project, and you can use any self-prepared or online resources.