**AI/ML Assignment**

**Hexagon capability center India (HCCI)**

1. Building a question-answering system

Stanford question answering dataset (SQuAD) consists of questions posted by crowd-workers on a set of Wikipedia articles, where the answer to every question is always a part of the text.

Example from SQuAD:

Paragraph: Apollo ran from 1961 to 1972 and was supported by the two-man Gemini program which ran concurrently with it from 1962 to 1966. Gemini missions developed some of the space travel techniques that were necessary for the success of the Apollo missions. Apollo used Saturn family rockets as launch vehicles. Apollo/Saturn vehicles were also used for an Apollo Applications Program, which consisted of Skylab, a space station that supported three manned missions in 1973–74, and the Apollo–Soyuz Test Project, a joint Earth orbit mission with the Soviet Union in 1975.

Question: What space station supported three manned missions in 1973-1974

Answer: Skylab

Task is to build a question-answering model. The two attached files (from the SQuAD dataset) contains the train/test dataset. You are free to use any information at your disposal to build the model. When possible, please provide a reference to the sources.

Submission:

1. Submit a test code file (in the language of your preference), which upon running, calls a function where a user can enter the paragraph and a related question, and the function returns an answer which is always a subphrase of the input paragraph.
2. In addition, submit a brief report describing your proposed model: the algorithm, features, pre-processing steps, metrics for final evaluation and assumptions made during the design process.

2. Evaluating a simulation model

The attached file has data from a modelling experiment, where the task is to assign a credibility score to the results from a simulation model.

The input to the simulation model is the *type of test* and *stacking sequence* (orientation of different fibre layers, stacked on top of each other, that makes up a material under testing). The output of the simulation model is the tensile strength of the material under test (floating number).

For all the 3845 simulations in the attached file, we have recorded the tensile strength of only 18 stacking sequences when they were fabricated and tested in real life (ground truths). The discrepancy between the simulation results and the ground truths ranges between a few % to ~140%.

The task is to design and implement a machine learning model, which given the *type of test*  and corresponding *stacking sequence* of the material under testing, can predict how erroneous the simulation result for that input configuration will be.

Submission:

1. Submit a test code file (in the language of your preference), which upon running, calls a function where a user can enter the *type of test* and a *stacking sequence* (maximum length being 32), and the function returns a value predicting how erroneous the simulation result for that input configuration will be.
2. In addition, submit a brief report describing your proposed model: the algorithm, features, pre-processing steps, metrics for final evaluation and assumptions made during the design process.

Note: With only 18 ground truths available, describe the potential challenges in building such a prediction model, and ways for overcoming it.