**Principal Strains Prediction Using Inertial Measurement Units**

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This document provides detailed instructions on where and how to save the necessary data and run the machine learning model for predicting principal strains using inertial measurement units (IMUs).

**Folder Structure Setup**

1. **Create a Directory on Google Colab**
   * In your Google Colab environment, create a folder structure as follows:
     + InputData/: This folder will store all the input files required for the project.
     + OutputData/: This folder will store the output files generated after running the code.
2. **Save the Following Files in the InputData Folder**:
   1. **code.ipynb**: The main Python code file that runs the machine learning pipeline. Ensure this is the same file you use in Google Colab.
   2. **Data.mat**: A MATLAB data file that contains the IMU data and strain data. This file is crucial for input data processing.
   3. **labels.csv**: A CSV file that contains the labels for each trial. These labels must be in the same order as the trial data in Data.mat.
   4. **Trained Models**: Include the following pre-trained machine learning models in the folder:
      * model\_e1\_XCM.pk1: The model for predicting e1 principal strain.
      * model\_e3\_XCM.pk1: The model for predicting e3 principal strain.

**Running the Code**

1. **Load the Script**:
   * Open the code.ipynb file in Google Colab.
   * Verify that all paths in the script point correctly to the InputData and OutputData directories you created.
2. **Execute the Notebook**:
   * Run each cell sequentially, starting with library installations and mounting Google Drive.
   * Ensure the script accesses the input files correctly and processes the data as intended.
3. **Output Files**:
   * Once the code executes successfully, the output files will be saved in the OutputData/ folder. These files include predictions, evaluation metrics (e.g., RMSE), and any intermediate results generated during the process.

**Notes**

* Ensure that all file paths are correctly updated in the code.ipynb script if the directory structure is modified.
* Use consistent naming conventions to avoid confusion.
* For assistance or further information, contact Dr. Zainab Altai at z.altai@essex.ac.uk.