

SONAR Rock vs Mine Prediction

Objective:

To build a predictive system using logistic regression to classify whether a given object is a rock (R) or a mine (M) based on sonar data.

Steps Involved:

1. Data Collection and Preprocessing:

- The dataset was loaded into a Pandas DataFrame (sonar_data).
- The dataset contains 60 features and 1 target column (classification: R for Rock, M for Mine).
- Descriptive statistics and class distributions were analyzed.

2. Data Splitting:

- Features (X) and target (Y) were separated.
- Data was split into training (90%) and testing (10%) sets using train_test_split with stratification.

3. Model Training:

- Logistic Regression was used as the predictive model.
- The model was trained on the training set using the fit method.

4. Model Evaluation:

- Accuracy on the training set: Calculated using accuracy_score.
- Accuracy on the testing set: Evaluated on unseen data.

5. Prediction System:

- An input data instance was provided.

- Predictions were made to determine if the object is a rock or a mine.

Results:

- Training Accuracy: Demonstrates how well the model learns patterns from the training data.
- Testing Accuracy: Indicates the model's performance on unseen data, ensuring it generalizes well.

Predictive System:

The predictive system accepts a 60-feature input and outputs:

- Rock if classified as R.
- Mine if classified as M.

This report summarizes the workflow and evaluation for the SONAR Rock vs Mine classification project.