**Network Intrusion Detection**

1. Data Loading and Exploration

Data loading and exploration

* Loads the dataset from a CSV file located in Google Drive.
* Explores the dataset, checking for missing values, duplicates, and visualizing class distribution.
* Utilizes pie charts and count plots to understand the distribution of categorical features.

2. Data Preprocessing and Splitting

data preprocessing and splitting

- Handles missing values and duplicates.

- Encodes categorical columns using LabelEncoder.

- Selects top k features using mutual information and plots the correlation matrix.

- Splits the dataset into features and target variable, then further into training and testing sets.

3. Model Building and Training

Model building and training

* Builds three models: Basic Neural Network, Convolutional Neural Network (CNN), and Recurrent Neural Network (LSTM).
* Compiles and trains each model using the preprocessed data.
* Evaluates the models using accuracy, F1 score, and confusion matrix.
* Plots the training history for each model.

4. Model Evaluation and AUC-ROC Curve Plotting

Model evaluation and aucroc

- Evaluates models using additional metrics like AUC-ROC curve.

- Plots AUC-ROC curves for each model.

- Saves the best-performing model (Model 3) and the scaler for future use.

Additional Files

model3.h5: Saved model file for Model 3.

scaler.pkl: Saved scaler using joblib.

**Notes**

- Ensure you have the necessary Python libraries installed.

https://youtu.be/HIJWEogrAbA