

Project: Knowledge Extraction & Machine Learning and Artificial Intelligence 2023-2

Team Members:

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Project Topic:

- Dataset: EEG Dataset for Stress Detection
- Development of an emotion prediction model (label field) based on EEG signals.

Introduction

The project focuses on developing an emotion prediction model based on EEG signals. The data includes 2132 records with 2549 features and an emotion label. The labels are categorized as 'NEUTRAL,' 'NEGATIVE,' and 'POSITIVE'.

Objective

To develop an emotion prediction model that categorizes emotions into 'NEUTRAL,' 'NEGATIVE,' and 'POSITIVE' based on EEG signals.

Data Preprocessing

1. Label Conversion to Numerical Values: LabelEncoder was used to convert the labels to numerical values.
2. Data Splitting: The data was split into training and testing sets with an 80%-20% ratio using the train_test_split function.
3. Data Normalization: StandardScaler was used for feature normalization.

Model Development and Training

The Random Forest Classifier was used to develop the model.

```
model = RandomForestClassifier(random_state=42)
```

```
model.fit(X_train, y_train)
```

Model Evaluation

Model Accuracy: Accuracy is calculated as the percentage of correct predictions.

```
accuracy = accuracy_score(y_test, y_pred)
```

Classification Report: Shows precision, recall, and f1-score for each category.

```
classification_report_text = classification_report(y_test, y_pred)
```

Confusion Matrix: Shows the number of correct and incorrect predictions for each category.

```
confusion_matrix_values = confusion_matrix(y_test, y_pred)
```

Conclusions

The model performs exceptionally well in predicting emotions from EEG signals with high accuracy.

Evaluation metrics indicate that the model has a good balance between precision, recall, and f1-score for all categories.

We have full comments in the folder with the code file, which has been implemented in Visual Studio Code. For any questions, contact us at email: znkr_project@icloud.com.