# MACHINE LEARNING PROJECT 3

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* **Model Reporting**

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* + **This section presents a brief description, objective and main results of the project.**
  + **Purpose:**
  + The goal of this project is to measure student performance, such as mental health history,

is to create a machine learning model to predict their anxiety level based on depression, academic performance, bullying, stress level.

* + **Main Results:**
  + The model successfully predicted students' anxiety level based on the indicators.
  + The Random Forest Model was chosen because it effectively captures the relationships between the data

learns in a way

* **General Information About Data**
  + **This section provides an overview of the dataset, its structure, and the features used in the model.**
  + **Dataset Used:**
  + This dataset contains around 20 features that create the most impact on the Stress of a Student. The features are selected scientifically considering 5 major factors, they are Psychological, Physiological, Social, Environmental, and Academic Factors
  + **Features**:
  + Anxiety Level, Self Esteem, Mental Health History, Depression, Headache, Blood Pressure, Sleep Quality, Breathing Problem, Noise Level, Living Conditions, Safety, Basic Needs, Academic Performance, Study Load, Teacher Student Relationship, Future Career Concerns, Social Support, Peer Pressure, Extracurricular Activities, Bullying, Stress Level
  + **Key Features:**
  + Psychological Factors => mental health history, depression,
  + Physiological Factors => headache, blood pressure, sleep quality,
  + Environmental Factors => noise level, living conditions,
  + Academic Factors => academic performance, study load, teacher student relationship,
  + Social Factor => social support, bullying
  + **Data Analysis:**
  + We determined the remaining values and filled them with the mean
* **Model Development**
* **Machine learning model, training process and evaluation selected in this section describes.**
* **Selected Model: Random Forest.**
* **Reason for selection:**
  + Random Forest often delivers high predictive accuracy due to its ensemble approach, where multiple decision trees are combined to make decisions, reducing the risk of overfitting and bias from any single tree.
* **Training:**
  + The model was trained by dividing the data set into 70%, 15%, 15%.
  + K-flod cross validation setup was performed to optimize the model.
* **Libraries Used in the Model:**
  + **Pandas** library was used for data manipulation
  + We visualized the results through

the ÿ **Pyplot** class from the **Matplotlib** library

* + **Seaborne**
  + **Sklearn.**
    - * + We used **the standard scaler** functions belonging to **the preprocessing** class
        + From the **RandomForestRegressor** functions belonging to **the Ensemble** class
        + we used **train\_test\_split, RandomizedSearchCV** belonging to **the model\_selection** class ,
        + We used **cross\_val\_score, KFold** functions
        + **Make\_scorer, r2\_score, mean\_squared\_error** belonging to **Metrics** class we used functions
* **Model Evaluation:**
  + Mean\_squared\_error,
  + R2\_score
* **Feature Importance:**
* The Random Forest model is used to predict students' Anxiety Level was used to evaluate the importance of features.
* The 5 most important features: depression, headache, living conditions, teacher student relationship, bullying.
* **Positioning the Model**
* **The integration and deployment process of the model into the development environment is described.**
* **Placement Strategy:**
  + Model deployed via web application.
  + The model is embedded in [Platform] and can be extended according to user requests

possible

* **Endpoint of the model:**
  + URL: [Deployment URL].

### Reporting and Visualization

* Anxiety Level **of students in different hotels** was predicted:
  + Anxiety Level **of students in different hotels** was predicted, its causes were studied, and various factors were shown through graphs.
* **Summary**
* **The overall success of the model and opportunities for future improvement generalization.**
* **Summary:**
  + **Random Forest Model** is effective and stable in predicting students' Anxiety Level

presented the results.

#### Future Improvements:

#### Adding additional features to improve forecasting accuracy.

* + Testing deep learning models to improve model accuracy.