**Building an Automated ML Model Selection Tool.**

**STEP 1: DEFINE PROJECT SCOPE**

**PURPOSE:** Select the best-performing machine learning tool based on a given data set.

**CRITERIA:** Accuracy, Performance, Precision, recall, F1 score.

**INPUT:** Dataset (CSV, Database)

**OUTPUT:** Recommendation of best machine learning model based on criteria

**KEY FEATURES:** Data Preprocessing Model Selection Model Evaluation Metrics User Interface Model Persistence Visualizations

**STEP 2: ARCHITECTURE RESEARCH AND PLANNING**

**PROGRAMMING LANGUAGE:** Python

**Data Preprocessing**: Pandas, NumPy, Scikit-Learn

**Model Selection**: Scikit-Learn

**Model Evaluation**: Scikit-Learn

**User Interface**: Flask/Django

**Model Persistence**: Joblib

**Visualizations**: Matplotlib, Seaborn

**STEP 3: DATA COLLECTION AND PREPROCESSING AUTOMATION**

**DATA IMPORTING:** Pandas Acceptable Formats**:** CSV Excel Database

**DATA PREPROCESSING:** Handle Missing Values Encode Categorical Variables Scaling Train-Test Split

**STEP 4: AUTOMATE MODEL SELECTION**

**MODEL CANDIDATES:** Classification Regression Clustering

**Classification:** Logistic Regression Random Forest SVM KNN

**Regression:** Linear Regression Decision Trees

**Clustering:** KMeans

**STEP 5: MODEL EVALUATION USING CROSS-VALIDATION**

**CLASSIFICATION EVALUATION:** Accuracy Score Precision Score Recall F1 Score

**REGRESSION EVALUATION:** Mean Squared Error (MSE) Root Mean Squared Error (RMSE) R2 Score

**CLUSTERING EVALUATION:** Silhouette Score Davies-Bouldin

**SELECT THE BEST MODEL**

**STEP 5: MODEL TUNING AND HYPERPARAMETER OPTIMIZATION**

**TECHNIQUE 1:** Grid Search

**TECHNIQUE 2:** Random Search

**STEP 6: MODEL DEPLOYMENT AND SAVING**

**Model Tuning**

**Save Model Using:** Joblib

**STEP 7: USER INTERFACE (WEB-BASED)**

**WEB INTERFACE:** Streamlit

**STEP 8: TESTING AND VALIDATION**

**TEST WITH DATASETS:** Large Datasets Small Datasets Edge Cases

**STEP 9: DEPLOYMENT AND MAINTENANCE**

**DEPLOY AS WEB APPLICATION USING:**  AWS Google Cloud Heroku

**REGULAR UPDATES:** Based on User Feedback