1. A bank wants to predict whether a loan applicant will default based on credit score, income, and past loan history. What type of ML problem is this, and what steps would you take to solve it?

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**Problem type**: Classification

**Steps**:

1. **Data collection**: Loan applicant past history details like credit score, income and loan are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding and normalization are done.
3. **Input/ output split**: Separate input and output variables.
4. **Train & test set split**: Categorize the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict for new data.
8. A retail store wants to predict the demand for different products to optimize inventory levels. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Regression

**Steps**:

1. **Data collection**: Historic product demand data are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding and normalization are done.
3. **Input/ output split**: Separate input and output variables.
4. **Train & test set split**: Categorize the dataset into train and test sets.
5. **Model creation**: Use regression algorithms like linear regression, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Use R2 score for evaluation.
7. **Prediction**: Predict the product demands for new products.
8. A factory wants to detect whether a manufactured product is defective based on sensor readings and quality control data. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: Past labeled data of sensor readings and quality data are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding and normalization are done.
3. **Input/ output split**: Separate input and output variables.
4. **Train & test set split**: Categorize the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict for new data.
8. A healthcare provider wants to analyze patient symptoms and classify them into different disease categories. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: Past patient details and their symptoms of diseases like headache, stomach pain, nausea are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding and normalization are done.
3. **Feature selection**: Many features could be collected so the most important features are selected for model creation. SelectKBest, Recursive Feature Elimination, Forward and Backward selection methods are used.
4. **Input/ output split**: Separate input and output variables.
5. **Train & test set split**: Categorize the data into train and test sets.
6. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
7. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
8. **Prediction**: Save the best model and predict for new data.
9. An e-commerce company wants to identify and remove fake reviews posted by bots or fraudsters. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: Data like user profile, comments posted by users, length of the comments, sentiment in the comments are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding are done.
3. **Input/ output split**: Separate input and output variables.
4. **Train & test set split**: Categorize the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict the fake reviews posted by bots.
8. A financial firm wants to predict stock price movements based on historical price data and market indicators. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Regression

**Steps**:

1. **Data collection**: Historical stock price data are taken from database.
2. **Data preprocessing**: Any missing values, categorical data encoding are done.
3. **Input/ output split**: Categorize input and output variables.
4. **Train & test set split**: Split the data into train and test sets.
5. **Model creation**: Use regression algorithms like linear regression, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Use R2 score for evaluation.
7. **Prediction**: Predict the stock prices for future levels.
8. A social media platform wants to detect fake user accounts based on user activity and profile data. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: User data are collected and labelled as fake and not fake for past data.
2. **Data preprocessing**: Any missing values, categorical data encoding are done.
3. **Input/ output split**: Categorize input and output variables.
4. **Train & test set split**: Split the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict the fake accounts for new data.
8. A marketing agency wants to segment customers into different groups based on their purchasing behavior. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Clustering

**Steps**:

1. **Data collection**: Gather customer details like spending behavior, income, products purchased.
2. **Data preprocessing**: Preprocess the data for normalization, encoding categorical data.
3. **Model creation**: Use K-Means or Hierarchical algorithms for model creation, and elbow method to determine the optimal number of clusters.
4. **Train model**: Apply the algorithms to segment customers into different groups.
5. **Analyze clusters**: Analyze the clusters and deliver the ads for the groups.
6. A geospatial research team wants to analyze satellite images to classify different land types (forest, water, urban). What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: Different satellite images with labels are collected.
2. **Data preprocessing**: Any missing values, categorical data encoding are done.
3. **Input/ output split**: Categorize input and output variables.
4. **Train & test set split**: Split the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict the land types for new data.
8. A streaming service wants to predict which users are likely to cancel their subscriptions. What type of ML problem is this, and what steps would you take to solve it?

**Problem type**: Classification

**Steps**:

1. **Data collection**: Subscribers historic data are gathered.
2. **Data preprocessing**: Any missing values, categorical data encoding and normalization are done.
3. **Input/ output split**: Separate input and output variables.
4. **Train & test set split**: Categorize the data into train and test sets.
5. **Model creation**: Use algorithms like Logistic Regression, KNN, Naïve-Bayes, Support Vector Machine, Decision Tree, Random Forest to create models.
6. **Evaluation**: Evaluate the models using F1-score, accuracy, classification report to find the best model.
7. **Prediction**: Save the best model and predict for new data.