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**

**Step 1: Collect Data** – Gather customer financial history, credit scores, and loan repayment records.

**Step 2: Preprocess Data** – Handle missing values, normalize numerical features, and encode categorical variables.

**Step 3: Split Dataset** – Split train and test set.

**Step 4: Choose Algorithm** – Use classification algorithms like Logistic Regression, Decision Trees, or Random Forest.

**Step 5: train Model** – Fit the model using labeled loan default data.

**Step 6: Evaluate Performance** – Use Precision, Recall, and F1-score to measure the accuracy.

**Make Predictions** – Predict loan default for new applicants.

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1. 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**

**Step 1: Collect Data** – Collect product details..

**Step 2: Preprocess Data** – Handle missing values, normalize numerical data, and remove outlier if any..

**Step 3: Split Dataset** – Divide the data into training and testing sets.

**Step 4: Choose Algorithm** – Use Regression algorithms like Linear Regression, Random Forest Regression, or XGBoost.

**Step 5: Train Model** – Fit the model using training data.

**Step 6: Evaluate Performance** – Use RMSE and R² score tomeasure accuracy.

**Make Predictions** – Predict demand for upcoming sales periods.

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1. 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**

**Step 1: Collect Data** – Gather sensor readings and control data.

**Step 2: Preprocess Data** – Handle missing values, normalize numerical values, and encode categorical features.

**Step 3: Split Dataset** – Divide the data into training and testing sets.

**Step 4: Choose Algorithm** – Use Decision Trees, Support Vector Machines, or Neural Networks.

**Step 5: Train Model** – Fit the model using labeled defect data.

**Step 6: Evaluate Performance** – Use accuracy, precision, recall, and F1-score.

**Deploy Model** – Detect whether a product is defective or not.

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1. 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**

**Step 1: Collect Data** – Gather patient records with symptoms and diagnoses.

**Step 2: Preprocess Data** – Handle missing values, normalize medical test results, and encode categorical features.

**Step 3: Split Dataset** – Train-test split.

**Step 4: Choose Algorithm** – Use Random Forest, Naive Bayes, or Gradient Boosting.

**Step 5: Train Model** – Fit the model using labeled medical data.

**Step 6: Evaluate Model** – Use accuracy, confusion matrix, and F1-score.

**Make Predictions** – Predict disease category based on patient symptoms.

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1. 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**

**Step 1: Collect Data** – Gather data of real and fake reviews.

**Step 2: Preprocess Data** – Use tokenization

**Step 3: Split Dataset** – Train-test split.

**Step 4: Choose Algorithm** – Use Naive Bayes, Logistic Regression, or Transformer models.

**Step 5: Train Model** – Fit the model on labeled review data.

**Step 6: Evaluate Model** – Use accuracy, confusion matrix, and F1-score.

**Make Predictions** – Identify fake reviews in real-time.

1. 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**

**Step 1: Collect Data** – Gather historical stock prices, trading volumes, and economic indicators.

**Step 2: Preprocess Data** – Handle missing values, normalize price changes, and engineer features like moving averages.

**Step 3: Split Dataset** – Train-test split.

**Step 4: Choose Algorithm** – Use Regression algorithms like Random Forest Regression, LSTMs..

**Step 5: Train Model** – Fit the model on historical stock data.

**Step 6: Evaluate Performance** – Use RMSE and directional accuracy.

**Make Predictions** – Forecast future stock price movements

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1. 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**

**Step 1: Collect Data** – Gather account details, activity logs.

**Step 2: Preprocess Data** – Handle missing values.

**Step 3: Split Dataset** – Divide into training and testing sets.

**Step 4: Choose Algorithm** – Use Random Forest, Support Vector Machines, or XGBoost.

**Step 5: Train Model** – Fit the model using labeled data.

**Step 6: Evaluate Performance** – Use Precision, Recall, and F1-score.

**Make Predictions** – Identify and flag fake accounts

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1. 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**

**Step 1: Collect Data** – Gather user data like click behavior, browsing history, and purchasing behaviour.

**Step 2: Preprocess Data** – Convert categorical features into numerical format, handle missing data.

**Step 3: Choose Algorithm** – Use K-Means or Hierarchical Clustering.

**Step 4: Determine Optimal Clusters** – Use the Elbow Method.

**Step 5: Train Model** – Apply clustering algorithm to segment users.

**Step 6: Analyze Clusters** – Identify user groups like "Fashion Lovers",”tradition lovers”

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1. 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**

**Step 1: Collect Data** – collect satellite images labeled with land types.

**Step 2: Preprocess Data** – Normalize pixel values, remove noise, and extract image features.

**Step 3: Split Dataset** – Divide into training and testing sets.

**Step 4: Choose Algorithm** – Use Decision Trees, Support Vector Machines, or CNN-based models.

**Step 5: Train Model** – Fit the model on labeled satellite images.

**Step 6: Evaluate Performance** – Use Precision, Recall, and F1-score.

**Make Predictions** – Classify new satellite images

1. 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**

**Step 1: Collect Data** – Gather user, subscription history, and logs.

**Step 2: Preprocess Data** – Handle missing values and encode categorical variables.

**Step 3: Split Dataset** – Train-test split.

**Step 4: Choose Algorithm** – Use Logistic Regression, Random Forest, or Gradient Boosting.

**Step 5: Train Model** – Tain the model using past data.

**Step 6: Evaluate Performance** – Use AUC-ROC, Precision, and Recall.

**Make Predictions** – Identify which users are likely to cancel their subscriptions.

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