### **1. Predicting Loan Default**

**Scenario:** A bank wants to predict whether a loan applicant will default based on credit score, income, and past loan history.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect customer Data like financial history, credit scores, and loan repayment records.
* Preprocess the data handle missing values, standardize numerical features, and encode categorical variables.
* Divide the dataset into training and testing sets.
* Choose Algorithm like Logistic Regression, Decision Trees, or Random Forest.
* Fit the model using training data.
* Evaluate Performance using ROC-AUC and F1-score.
* Predict loan default for new applicants and deploy the best model.

### **2. Forecasting Demand for a Retail Store**

**Scenario:** A retail store wants to predict the demand for different products to optimize inventory levels.

**Problem solution :*Supervised Learning-******Regression***

**Step-by-step procedure:**

* Collect product data like past sales data, seasonal trends, and product demand.
* Preprocess Data handle missing values, normalize numerical data, encode categorical variables.
* Divide the data into training and testing sets.
* Choose Algorithm like Linear Regression, Random Forest Regression, or XGBoost.
* Fit the model using training data.
* Evaluate Performance using R² score.
* Make Predictions for upcoming product sales.

### **3. Detecting Defective Products in Manufacturing**

**Scenario:** A factory wants to detect whether a manufactured product is defective based on sensor readings and quality control data.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data product production details, and defect labels.
* Preprocess Data like handling missing values, normalize numerical values, and encode categorical features.
* Divide the data into training and testing sets.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model using training data.
* Evaluate Performance using ROC\_AUC and F1-score.
* Predict the result for new input and deploy the model.

### **4. Classifying Medical Diagnoses**

**Scenario:** A healthcare provider wants to classify patient symptoms into different disease categories.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data -patient with symptoms and diagnoses.
* Preprocess Data – Handle missing values, normalize medical test results, and encode categorical features.
* Divide the data into training and testing sets.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model using training data.
* Evaluate Performance using ROC\_AUC and F1-score.
* Predict the result for new input and deploy the model.

### **5. Identifying Fake Online Reviews**

**Scenario:** An e-commerce company wants to detect fake reviews posted by bots or fraudsters.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data - dataset of real and fake reviews.
* Preprocess Data – Tokenize text, remove stop words and vectorize using TF-IDF.
* Feature Engineering – Identify suspicious patterns like repetitive words, unnatural phrasing, and review frequency.
* Divide the data into training and testing sets.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model using training data.
* Evaluate Performance using ROC\_AUC and F1-score.
* Predict the result for new input and deploy the model.

### **6. Predicting Stock Market Trends**

**Scenario:** A financial firm wants to predict stock price movement based on historical price data and market indicators.

**Problem solution :*Supervised Learning-******Regression***

**Step-by-step procedure:**

* Collect Data like historical stock prices and economic indicators.
* Preprocess Data – Handle missing values, normalize price changes and engineer features like moving averages.
* Divide the data into training and testing sets.
* Choose Algorithm like Linear Regression, Random Forest Regression, or XGBoost.
* Fit the model using training data.
* Evaluate Performance using R² score.
* Predict the result for new input and deploy the model.

### **7. Detecting Fake Social Media Accounts**

**Scenario:** A social media platform wants to identify and remove fake user accounts.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data like account details, activity logs and engagement patterns.
* Preprocess Data – Handle missing values, engineer features like average post frequency and follower ratio and encoding categorical features.
* Divide the data into training and testing sets.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model using training data.
* Evaluate Performance using ROC\_AUC and F1-score.
* Predict to Identify and flag fake accounts for new input and deploy the best model.

### **8. Optimizing Ad Targeting for Online Marketing**

**Scenario:** A digital marketing company wants to show the most relevant ads to users based on their browsing behavior.

**Problem solution using: Uns*upervised Learning-******Clustering***

**Step-by-step procedure:**

* Collect Data like user click behavior, browsing history information.
* Preprocess Data like convert categorical features into numerical format, handle missing data.
* Choose Clustering Algorithm like K-Means or Hierarchical Clustering.
* Use the Elbow Method/Dendrograms to identify number of clusters.
* Train Model to group users.
* Analyze Clusters to identify user browsing behavior.
* Deliver targeted ads based on cluster preferences.

### **9. Classifying Land Cover in Satellite Images**

**Scenario:** A geospatial research team wants to classify different land types (forest, water, urban) using satellite images.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data satellite images labeled with land types.
* Preprocess Data –Normalize pixel values, remove noise, and extract image features.
* Split Dataset – Train-test split.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model on the training dataset.
* Evaluate Model using ROC\_AUC score and F1-score.
* Make Predictions to classify new satellite images into land cover types.

### **10. Predicting Customer Churn for a Subscription Service**

**Scenario:** A streaming service wants to predict which users are likely to cancel their subscriptions.

**Problem solution using: *Supervised Learning-******Classification***

**Step-by-step procedure:**

* Collect Data like user engagement data, subscription history.
* Preprocess Data – Handle missing values and encode categorical variables.
* Feature Engineering – Create features like average watch time and last login frequency.
* Split Dataset – Train-test split.
* Use classification algorithm like Logistic Regression, KNN, Navie Bayes, Random Forest classification etc.
* Fit the model on the training dataset.
* Evaluate Model using ROC\_AUC score and F1-score..
* Make Predictions to identify customers likely to churn..