

## **Experiment 1 — Breast Cancer Detection (Data Preprocessing)**

### **Algorithm**

1. Start
  2. Import libraries (pandas, numpy, matplotlib).
  3. Load the Breast Cancer dataset.
  4. Check dataset shape and information.
  5. Handle missing values (mean/median).
  6. Encode categorical data.
  7. Perform correlation analysis.
  8. Split dataset into train & test.
  9. Scale the numerical features.
  10. Apply Logistic Regression.
  11. Evaluate accuracy and performance.
  12. Stop.
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## **Experiment 2 — EDA on BraTS MRI Dataset**

### **Algorithm**

1. Start
  2. Import required libraries (nibabel, matplotlib, itkwidgets).
  3. Load the .nii.gz MRI scan.
  4. Check scan dimensions.
  5. Extract random slice from 3D MRI.
  6. Plot and visualize the slice.
  7. Load segmentation mask.
  8. Separate tumor regions.
  9. Display tumor classes using color maps.
  10. Stop.
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## Experiment 3 — MRI/X-ray Based CNN Diagnosis

### Algorithm

1. Start
2. Import TensorFlow, Keras, OpenCV, NumPy.
3. Load X-ray dataset (train/val/test).
4. Preprocess images (resize, normalize, grayscale).
5. Apply data augmentation.
6. Build CNN model (Conv → Pool → Flatten → Dense).
7. Compile model using Adam + binary crossentropy.

8. Train the CNN model.
  9. Evaluate using accuracy & confusion matrix.
  10. Predict on new images.
  11. Stop.
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## **Experiment 4 — Heart Disease Prediction**

### **Algorithm**

1. Start
  2. Import dataset (heart.csv).
  3. Preprocess data (missing values, encoding).
  4. Split into train and test.
  5. Train Logistic Regression, Decision Tree, Random Forest, SVM, KNN.
  6. Test each model.
  7. Compare accuracies.
  8. Identify best model.
  9. Stop.
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## **Experiment 5 — Medical Entity Extraction (NLP)**

## Algorithm

1. Start
  2. Import spaCy/scispaCy model.
  3. Load medical text/report.
  4. Preprocess text (clean, tokenize).
  5. Apply NLP model (nlp(text)).
  6. Extract entities (doc.ents).
  7. Classify entities into labels (Disease, Drug, Test).
  8. Store output in structured format.
  9. Stop.
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## Experiment 6 — Disease Risk Prediction (ML Models)

### Algorithm

1. Start
2. Load patient dataset.
3. Check and remove missing/invalid data.
4. Split features (X) and target (Y).
5. Perform EDA (plots, correlations).
6. Split into train and test sets.
7. Train Logistic Regression & Random Forest.

8. Predict on test data.
  9. Evaluate using accuracy & confusion matrix.
  10. Compare results.
  11. Stop.
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## **Experiment 7 — Medical Review Sentiment Analysis**

### **Algorithm**

1. Start
  2. Load social media review dataset.
  3. Clean text (remove stopwords, punctuation, URLs).
  4. Tokenize and lemmatize text.
  5. Convert text to vectors using TF-IDF/BoW.
  6. Apply sentiment analysis model (VADER/TextBlob/ML).
  7. Classify sentiment: Positive/Negative/Neutral.
  8. Visualize results (bar/pie chart).
  9. Stop.
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## **Experiment 8 — Explainable AI (XAI) using SHAP/LIME**

## Algorithm

1. Start
2. Load dataset.
3. Train a ML model (Random Forest/Logistic Regression).
4. Import SHAP & LIME libraries.
5. Create explainer (TreeExplainer/KernelExplainer).
6. Calculate SHAP values.
7. Display global explanation (summary plot).
8. Display local explanation (force plot).
9. Use LIME for individual instance explanation.
10. Stop.