☑ 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.



- 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.

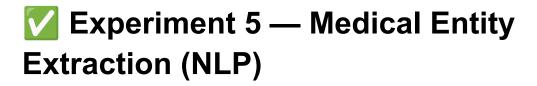
Experiment 3 — MRI/X-ray Based CNN Diagnosis

- 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 \rightarrow Pool \rightarrow Flatten \rightarrow 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.

Experiment 4 — Heart Disease Prediction

- 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.



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.

✓ Experiment 6 — Disease Risk Prediction (ML Models)

- 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.

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.

Experiment 8 — Explainable AI (XAI) using SHAP/LIME

- 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.