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# AI-powered Disease Prediction using Random Forest
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score, confusion_matrix, classification_report

# Load dataset
url = "https://raw.githubusercontent.com/plotly/datasets/master/heart.csv"
data = pd.read_csv(url)

# Show basic info
print("Sample Data:")
print(data.head())

# Correlation heatmap
plt.figure(figsize=(10, 6))
sns.heatmap(data.corr(), annot=True)
plt.title("Feature Correlation Heatmap")
plt.show()

# Split features and target
X = data.drop("target", axis=1)
y = data["target"]

# Train-test split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
random_state=42)

# Train model
model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)

# Predictions
y_pred = model.predict(X_test)

# Evaluation
print("\nModel Accuracy:", accuracy_score(y_test, y_pred))
print("\nClassification Report:\n", classification_report(y_test, y_pred))
print("\nConfusion Matrix:\n", confusion_matrix(y_test, y_pred))

# Example prediction
sample = X_test.iloc[0]
predicted_class = model.predict([sample])
print(f"\nSample Input:\n{sample}")
print(f"Predicted Disease Risk: {'High' if predicted_class[0] == 1 else 'Low'}")

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