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Project Hypothesis

A collection of past patient vitals and their heart attack outcomes can be used to create a predictive model that can accurately assess a new patient's risk of experiencing a heart attack based on their current vitals.

Product Accuracy

The current KNN model is 92% accurate.

Previous Product Model Testing

During initial testing, various models were tried, and KNN displayed strong results out of the gate:

```
Logistic Regression Accuracy: 0.8525
K-Nearest Neighbors Accuracy: 0.9180
Random Forest Accuracy: 0.8361
Support Vector Machine Accuracy: 0.8689
Naive Bayes Accuracy: 0.8689
Decision Tree Accuracy: 0.7541
```

The models were all placed into a dictionary and looped through so they could all be tested:

```
models = {
    'Logistic Regression': LogisticRegression(),
    'K-Nearest Neighbors': KNeighborsClassifier(n_neighbors=5),
    'Random Forest': RandomForestClassifier(n_estimators=100, random_state=42),
    'Support Vector Machine': SVC(probability=True),
    'Naive Bayes': GaussianNB(),
    'Decision Tree': DecisionTreeClassifier(random_state=42)
}
```

After playing with various parameters, KNN just seemed like the clear winner, and a few other numbers were tried for the number of neighbors, but the best performance seemed to be 6, which boosted the accuracy to 93%

```
KNN Accuracy: 0.9344262295081968
KNN Classification Report:
              precision    recall  f1-score   support

           0       0.90      0.97      0.93        29
           1       0.97      0.91      0.94        32

    accuracy                           0.93        61
   macro avg       0.93      0.94      0.93        61
weighted avg       0.94      0.93      0.93        61
```