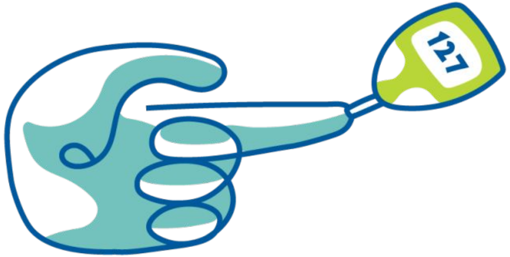


Diabetes Prediction

By : Gloria Pintado

The problem

Company

For Better Health is a new organization and is recruiting members. I have been hired by this nonprofit organization that wants to help communities far from cities that need medical support.

Problem

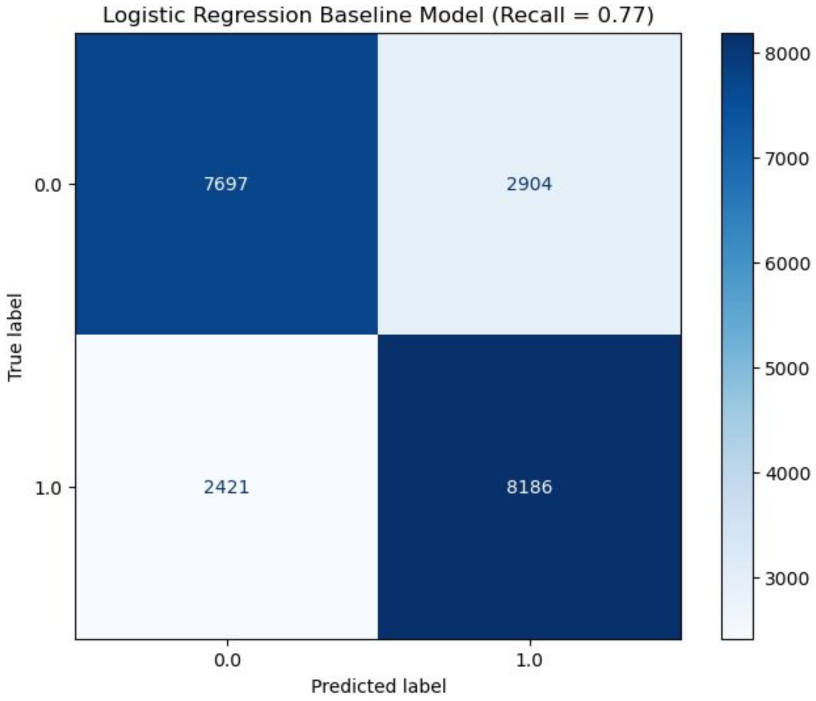
Which model is best to predict if they have diabetes or not? Can playing with hyperparameter tuning get us a better model? Getting a solution will reduce not only the risk of having diabetes but also other health problems such as heart disease, vision loss, and other diseases associated with having diabetes.

Data Source

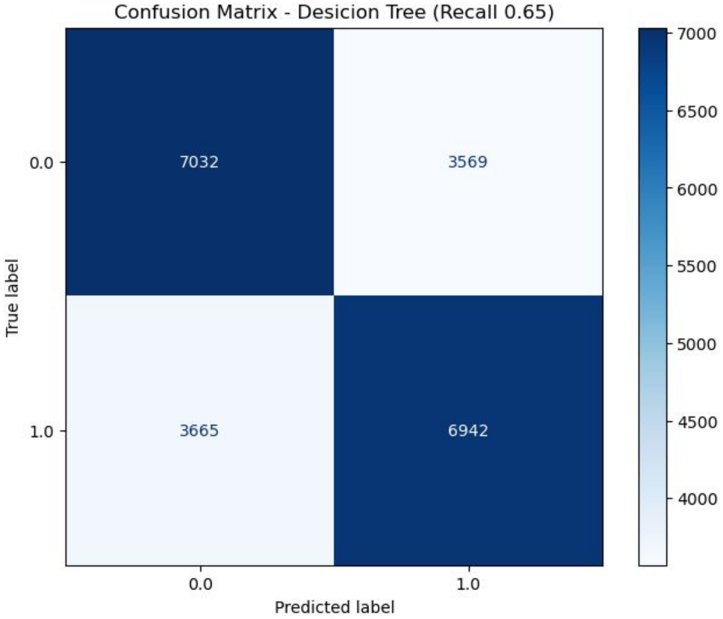
- Diabetes Health Indicator Dataset from Kaggle
- It contains 70692 rows and 22 columns (features).
- It is a balanced dataset.
- Our target variable is the diabetes binary.
  Where :
  0 is for no diabetes
  1 is for prediabetes or diabetes

Logistic Regression Baseline Model

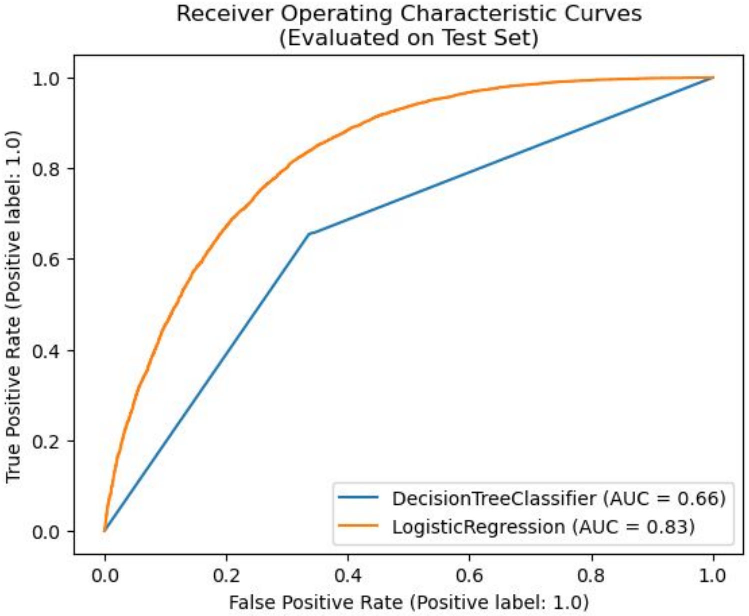
- Our metric for our baseline model is recall. We use recall because we want to reduce our false negatives.
- All features were used.



CM Decision Tree

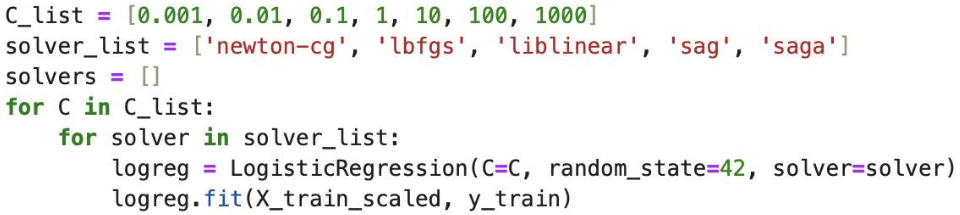


Comparing ROC Curve



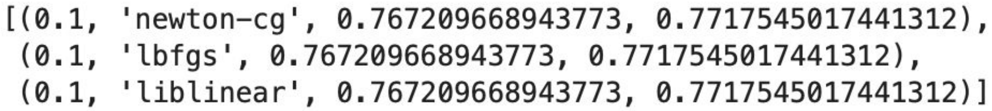
As we can see Logistic Regression was better than Decision Tree. Our next step will be tuning our hyperparameter in our Logistic Regression Model to see if it can change for better. Not doing the hyperparameter tuning in our decision tree since it did a lot worse.

Tuning Hyperparameters for our Logistic Regression Baseline Model



```python
C_list = [0.001, 0.01, 0.1, 1, 10, 100, 1000]
solver_list = ['newton-cg', 'lbfgs', 'liblinear', 'sag', 'saga']
solvers = []
for C in C_list:
    for solver in solver_list:
        logreg = LogisticRegression(C=C, random_state=42, solver=solver)
        logreg.fit(X_train_scaled, y_train)
```

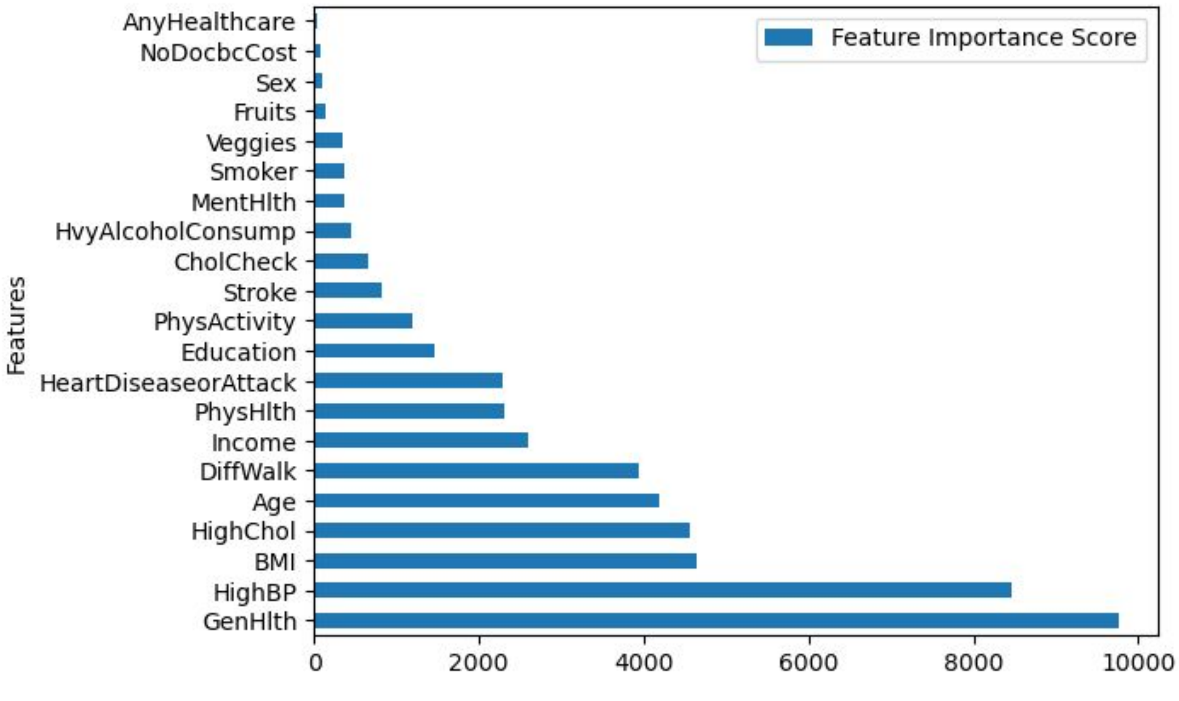
Output:



```
[(0.1, 'newton-cg', 0.767209668943773, 0.7717545017441312),
 (0.1, 'lbfgs', 0.767209668943773, 0.7717545017441312),
 (0.1, 'liblinear', 0.767209668943773, 0.7717545017441312)]
```

Tuning our Baseline model with the Penalties, C's, and Solvers did not have a significant impact in our model's performance

Feature Importance



Conclusion

- Our first Logistic Regression Baseline Model it by little difference the best model.
- Tuning our hyperparameter did not make a lot chance to gain a better model.
- Our top ten features that should be more aware to not be risk of having prediabetes or diabetes are : GenHith, High BP, BMI, HighChol, Age, DiffWalk, Income, PhysHith, HeartDiseaseorAttack.

Contact

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