

BICS 2303

INTELLIGENT SYSTEM

FRUIT CLASSIFICATION USING SUPERVISED LEARNING

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OVERVIEW

- The Fruit Classifier is a project that implements Machine Learning specifically Supervised Learning by applying classification.
- The model is first trained, then it will predict fruit names based on its features
- The model is evaluated for accuracy
- An application was deployed to deliver the project's output

BACKGROUND

- Fruit sorting is the process of classifying fruits by size, color and weight
- In the agricultural industry, accurate sorting is required for quality control
- Traditionally, it is done manually

PROBLEM STATEMENT

- Manual fruit classification and sorting processes are prone to human error, inconsistency, and inefficiency, especially when handling large quantities of produce

PROJECT GOALS

- To implement a supervised learning algorithm to classify datasets and evaluate its performance

- To ease the process of identification of fruit varieties based on physical datasets sourced from Kaggle

METHODOLOGY

Techniques

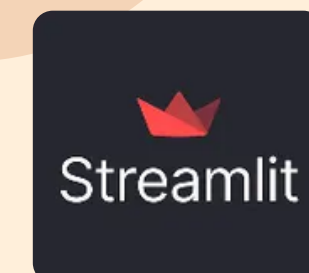
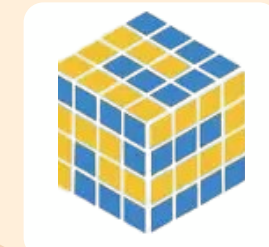
- 1) Our team used Decision Tree Classifier for supervised learning
- 2) Confusion Matrix, Classification Report are used to evaluate model
- 3) Pickle is used to save get the Model Persistence
- 4) Streamlit is used to deploy the application

Data Preparation

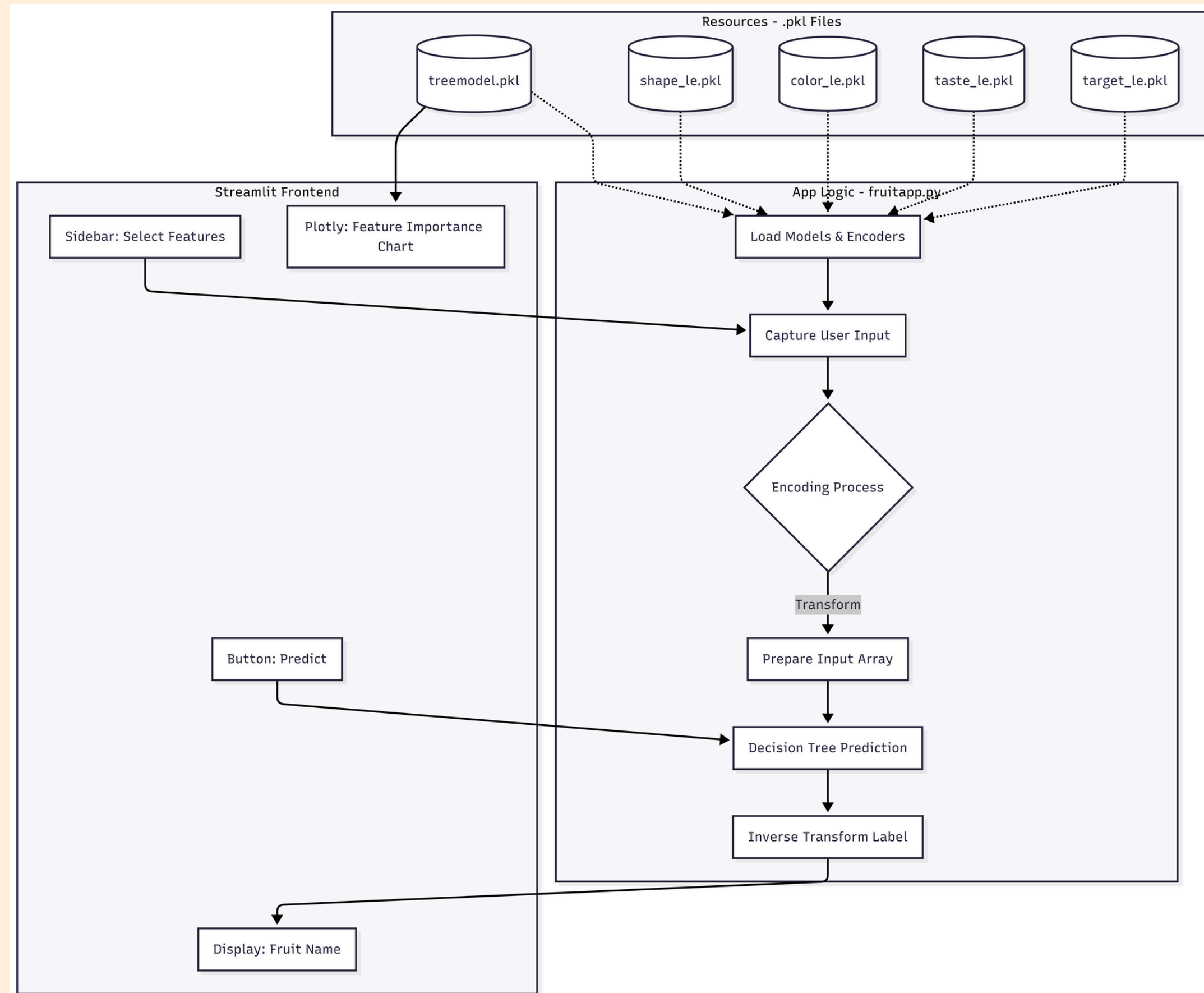
Our team used Label Encoding to convert from categorical text to number

Tools

- Python
- Numpy
- Pandas
- Scikit-Learn
- Pickle
- Streamlit
- Google Colab



ARCHITECTURE

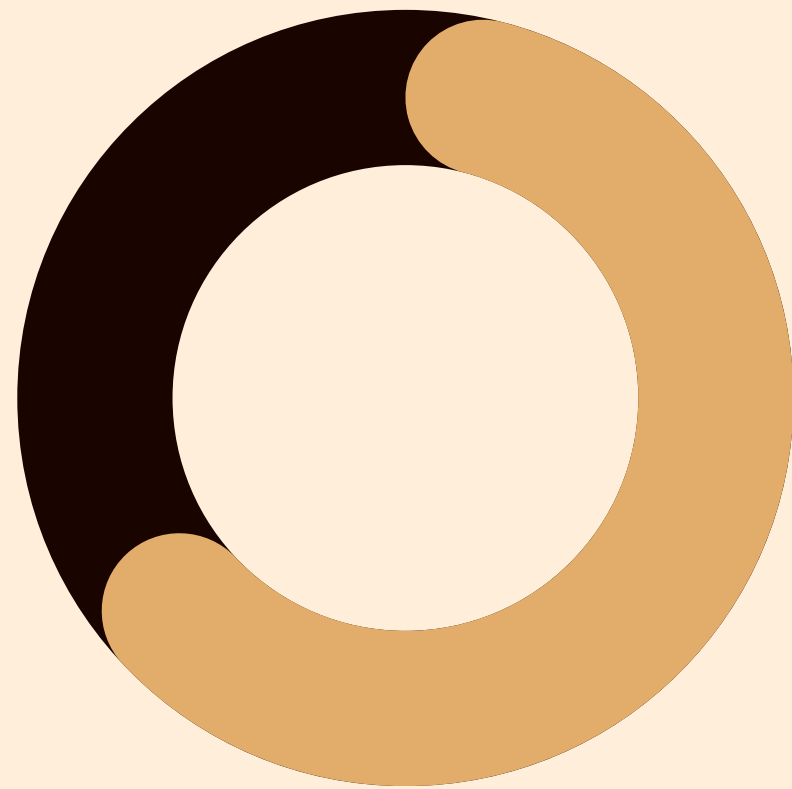


FINDINGS

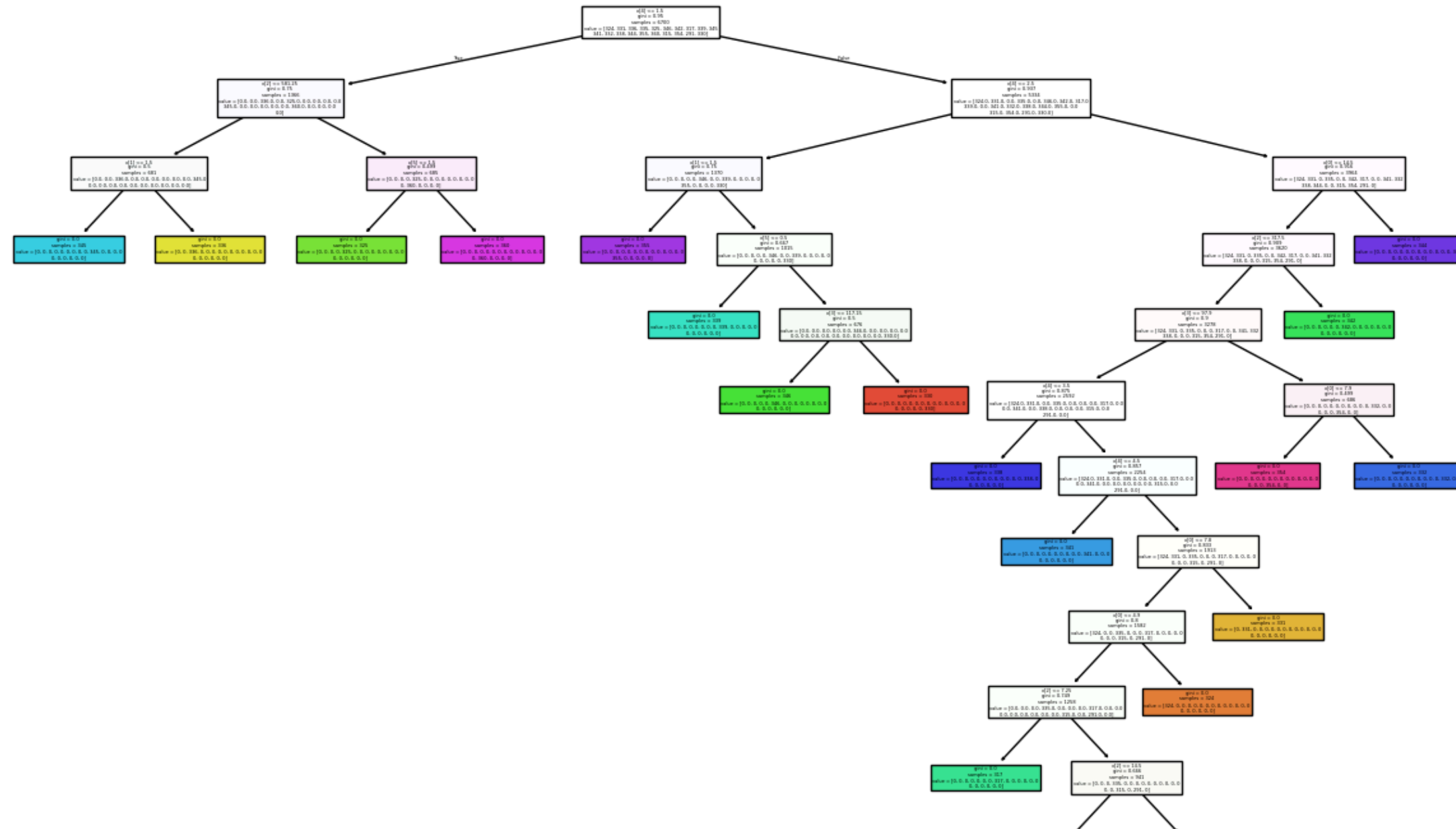
1. Accuracy- The Decision Tree model achieved 100% accuracy in distinguishing 20 different fruits

2. Feature Importance- Based on the analysis, physical traits like the fruit shape played a dominant role in the process

3. Classification Report- This confirms perfect scores in precision and recall



Decision Tree Model

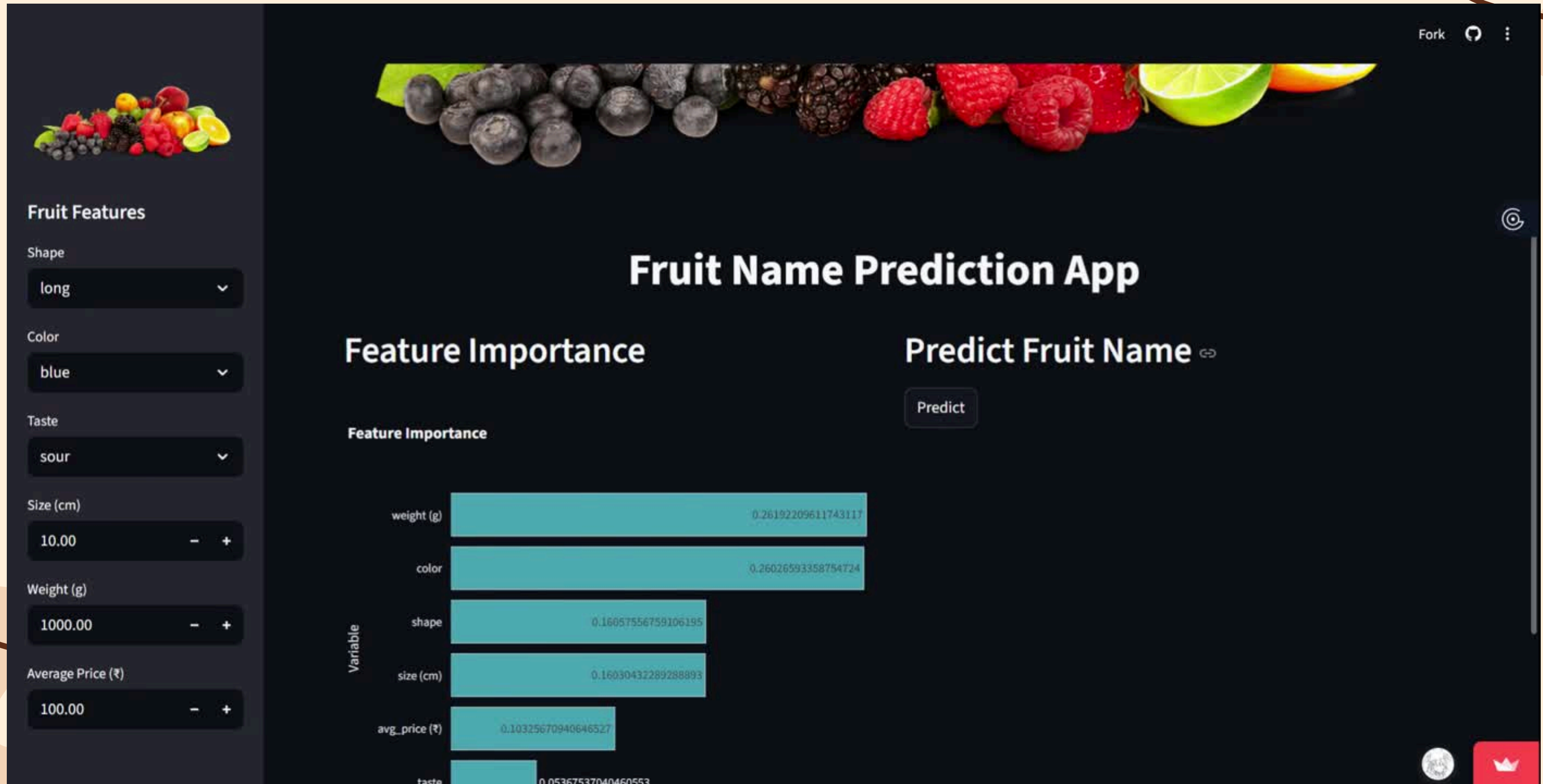


Accuracy Score

```
from sklearn.metrics import accuracy_score, classification_report
score = accuracy_score(y_pred, Y_test)
print(f"Accuracy score: {score}")
```

Accuracy score: 1.0

DEMONSTRATION OF AI APPLICATION



DISCUSSION

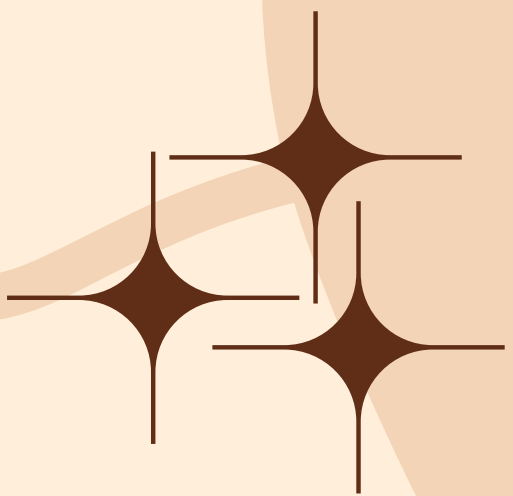
- Based on our findings, the app we deployed is able to predict fruit names based on the features that user input into the system.
- The Decision Tree model is used to analyse each features and predict a result based on its training accuracy.

Example

- Features: round, purple, sour, 4cm, 5g, 10₹
- Predicted fruit: Grape

CONCLUSION

- Each member of the team contributed in the making of this project. The initial part of the project was done in Google Colab, then transferred to Streamlit for the app deployment
- In the future, we plan to fine-tune our model so that it can handle a bigger fruit classification dataset.
- We plan to make the app more interactive and user-friendly (e.g. pictures showing predicted fruits) and also the confidence level of each predicted answers



THANK
YOU

