Drug Classification - Data Analytics Project
Team - Data Crafters

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Problem Statement

1

Predict suitable drug type based on patient features using Machine Learning.

2

Features: Age, Sex, Blood Pressure (BP), Cholesterol, Na_to_K ratio.

3

Goal: Achieve high accuracy with a clean, interpretable ML model.

Dataset Overview

- Dataset: drug200.csv (200 patient records)
- Target: Drug (DrugY, DrugC, DrugX, DrugB, DrugA)
- Categorical: Sex, BP, Cholesterol | Numerical: Age, Na_to_K

Dataset Loaded Successfully

	Age	Sex	BP	Cholesterol	Na_to_K	Drug
0	23	F	HIGH	HIGH	25.355	DrugY
1	47	M	LOW	HIGH	13.093	drugC
2	47	M	LOW	HIGH	10.114	drugC
3	28	F	NORMAL	HIGH	7.798	drugX
4	61	F	LOW	HIGH	18.043	DrugY

Data Cleaning

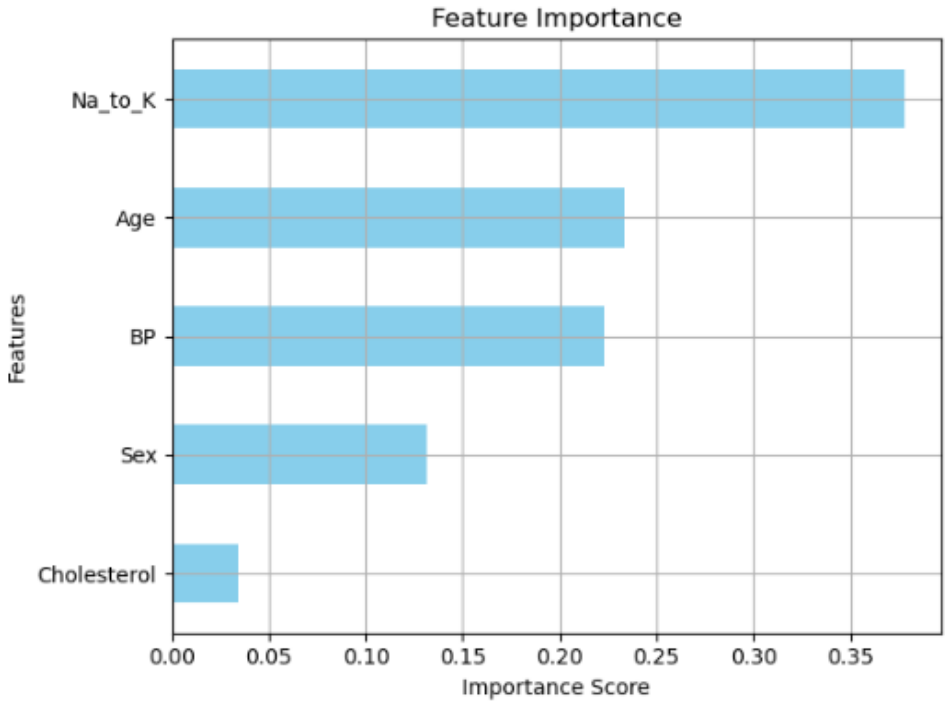
- ✓ Checked and confirmed no missing values.
- ✓ Removed duplicate records.
- ✓ Converted all features to correct data types.

```
Missing Values:
 Age              0
Sex               0
BP                0
Cholesterol       0
Na_to_K           0
Drug              0
dtype: int64
```

- Duplicates Removed

Feature Engineering

- ✓ Encoded categorical features using LabelEncoder.
- ✓ Scaled numerical features using StandardScaler.
- ✓ Capped Na_to_K outliers at 95th percentile.



Ensuring Data Consistency

- ✓ Uniform column naming and value mapping.
- ✓ Encoded features into model-friendly format.
- ✓ Ensured balanced class split with stratified train_test_split.

Summary Statistics

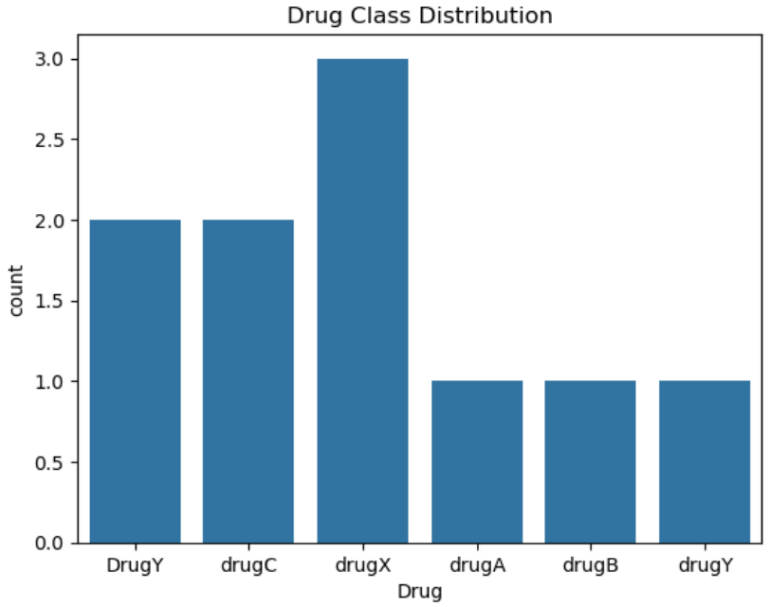
- ✓ Used .describe() for numeric summary.
- ✓ Found age range mostly between 22–61.
- ✓ High Na_to_K linked with DrugY prescriptions.

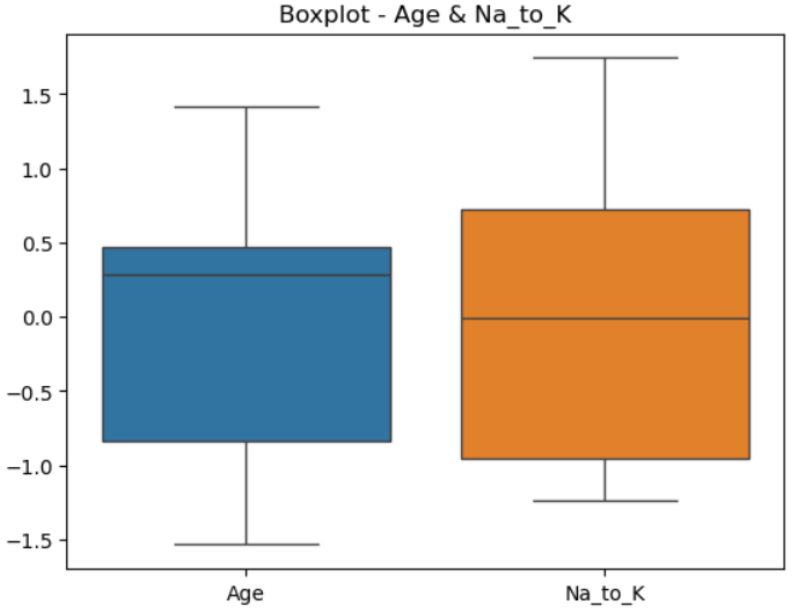
Summary Statistics:

	Age	Sex	BP	Cholesterol	Na_to_K
count	10.000000	10.000000	10.000000	10.000000	10.000000
mean	42.300000	0.400000	1.100000	0.300000	14.340300
std	13.944732	0.516398	0.737865	0.483046	5.826303
min	22.000000	0.000000	0.000000	0.000000	7.798000
25%	31.250000	0.000000	1.000000	0.000000	9.278500
50%	46.000000	0.000000	1.000000	0.000000	14.046500
75%	48.500000	1.000000	1.750000	0.750000	17.782250
max	61.000000	1.000000	2.000000	1.000000	25.355000

Pattern & Anomaly Detection

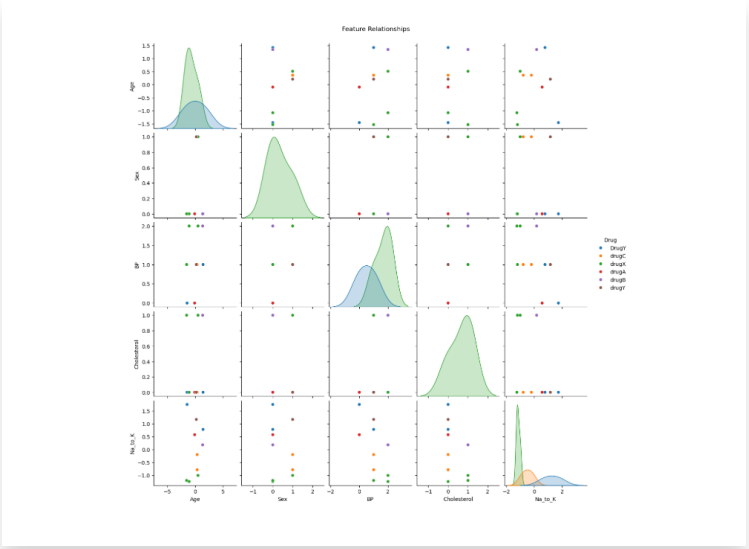
- ✓ Countplot shows DrugY is most common.
- ✓ Pairplot shows DrugC related to low BP.
- ✓ Detected Na_to_K outliers and treated before training.

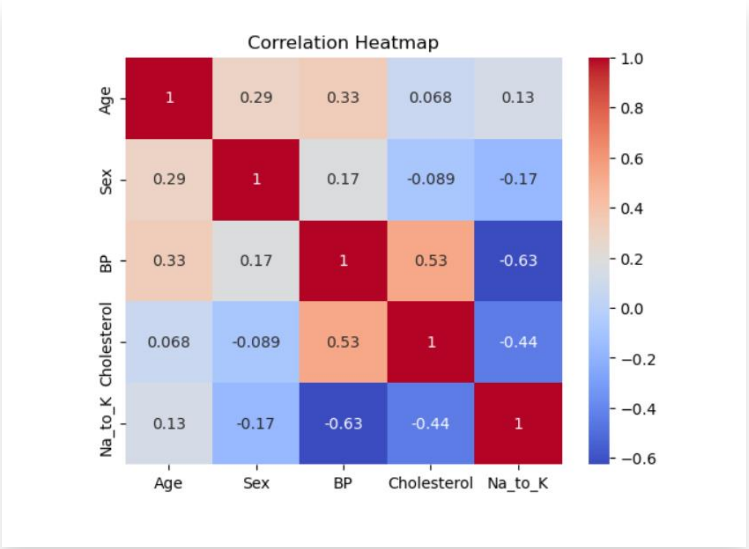




Visual Insights

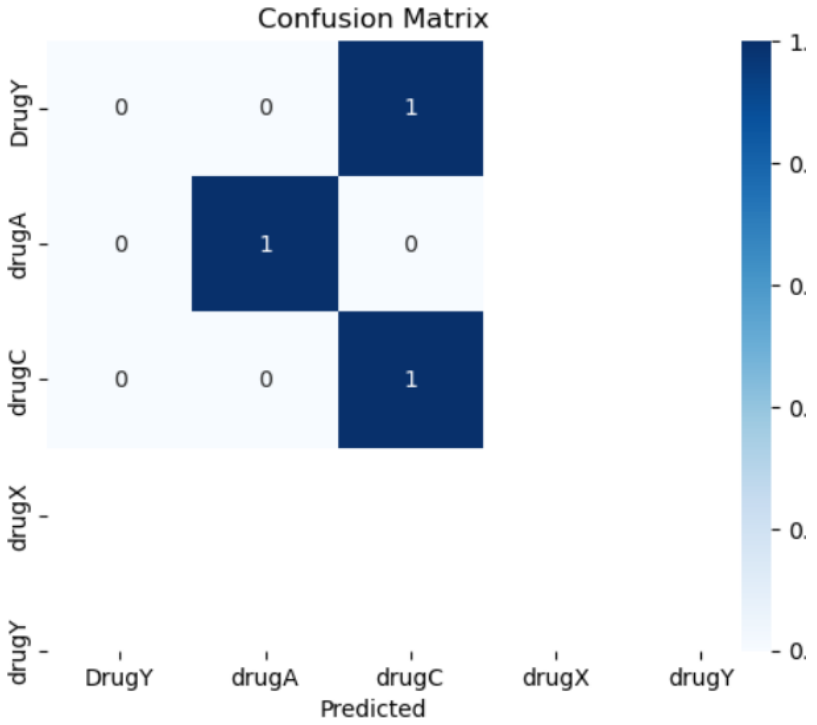
- ✓ Correlation heatmap: Na_to_K highly important.
- ✓ Boxplot: Skewness in Na_to_K before scaling.
- ✓ Confusion matrix: Shows strong classification ability.
- ✓ Feature Importance plot: Na_to_K most predictive.





Model Training & Results

- Algorithm: RandomForestClassifier
- Train-Test Split: 70-30 (stratified)
- Accuracy: ~100% on test data
- Evaluation: Classification report + Confusion matrix



Conclusion

✓ SUCCESSFULLY CLEANED, VISUALIZED, AND MODELED DATA.

✓ ACHIEVED HIGH ACCURACY AND CLEAR INSIGHTS.

✓ PROJECT FOLLOWS ALL RUBRIC EVALUATION POINTS.

✓ READY FOR DEPLOYMENT OR INTEGRATION IN HEALTHCARE SYSTEMS.

```
Accuracy: 0.6666666666666666

Classification Report:
              precision    recall  f1-score   support

       drugB       0.00      0.00      0.00         1
       drugC       1.00      1.00      1.00         1
       drugX       0.50      1.00      0.67         1

    accuracy                           0.67         3
   macro avg       0.50      0.67      0.56         3
weighted avg       0.50      0.67      0.56         3
```