

Mobile Price Prediction Using Random Forest

1. Problem Statement:

The goal of this project is to predict the price range of a mobile device based on its hardware and software features. Target variable: price_range (0=Low, 1=Medium, 2=High, 3=Very High).

2. Objective:

- Build a model to predict mobile price range.
- Feature selection to improve accuracy.
- Hyperparameter tuning with Random Forest.
- Save the model for deployment.

3. Dataset Description:

2000 records with features like RAM, battery power, screen, camera, cores, connectivity, etc.

Derived features: pixel_area, screen_area, total_camera_mp, supports_3_4G.

4. Solution Approach:

- Data preprocessing and feature engineering.
- Feature selection using SelectKBest, RFE, PCA.
- Train-test split (80-20).
- Random Forest with GridSearchCV hyperparameter tuning.

5. Top Features Selected:

['ram', 'battery_power', 'pixel_area', 'int_memory', 'n_cores']

6. Model Performance (Top Features):

- Accuracy: 92.75%

Classification Report:

	precision	recall	f1-score	support
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0	0.97	0.96	0.96	100
1	0.91	0.90	0.90	100
2	0.88	0.90	0.89	100
3	0.95	0.95	0.95	100

accuracy		0.93	400	
macro avg	0.93	0.93	0.93	400
weighted avg	0.93	0.93	0.93	400

Confusion Matrix:

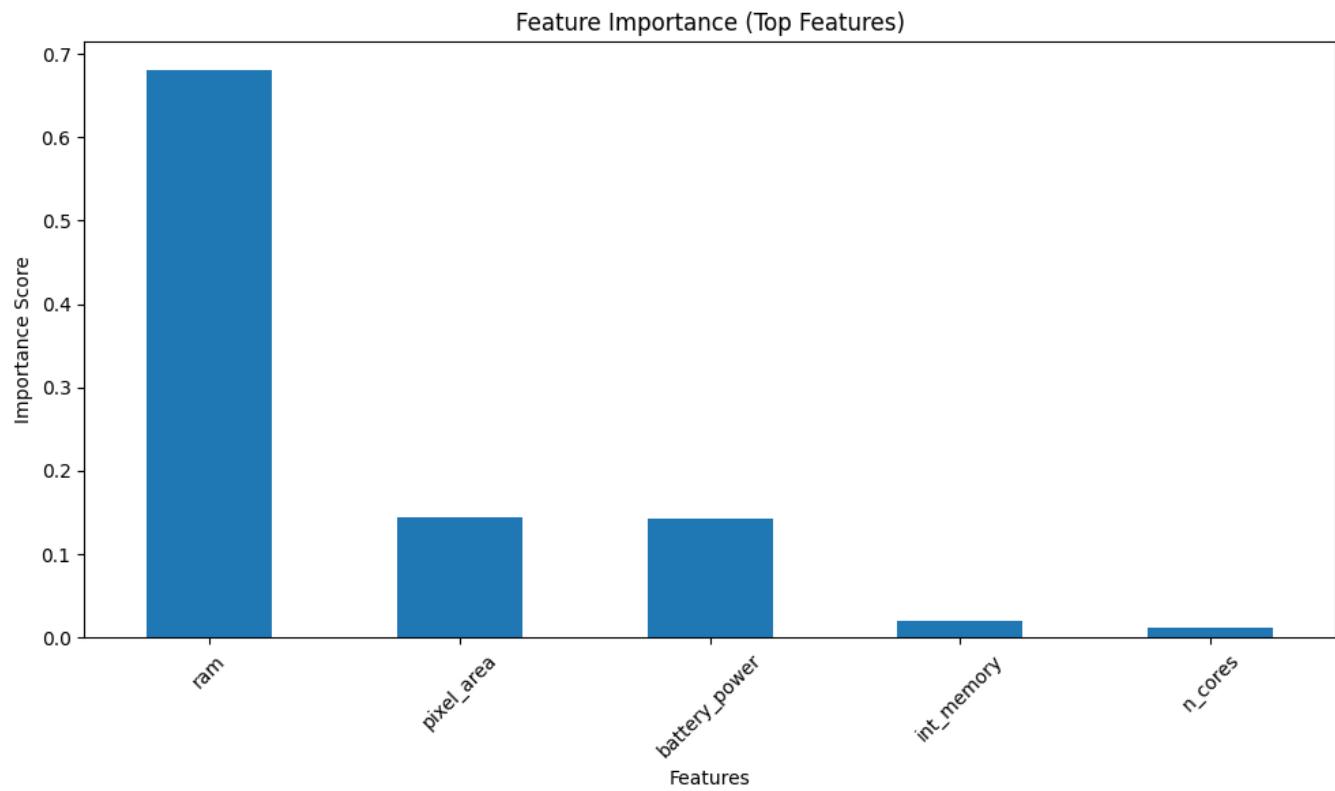
[[96 4 0 0]

[3 90 7 0]

[0 5 90 5]

[0 0 5 95]]

Feature Importance Visualization



7. Deployment:

The model is saved as 'Mobile_Price_RF_Model.sav'. It can be loaded using pickle and used to predict new mobile devices based on top features.

8. Conclusion:

Successfully built a Random Forest model with 92.75% accuracy using top 5 features. Ready for deployment.