MOBILE PHONE PRICE PREDICTION AND ANALYSIS

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Organization: Next Hikes IT Solutions

MOBILE PHONE PRICE PREDICTION AND ANALYSIS

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INTRODUCTION TO MOBILE PHONE PRICE PREDICTION

- **Objective of Prediction:** Leverage data analysis and machine learning to estimate mobile phone prices based on nuanced feature interactions.
- **Value for Consumers:** Empowers buyers to evaluate fair pricing, enhancing purchasing decisions and budget optimization in a competitive market.
- **Benefits to Sellers and Manufacturers:** Assists sellers in competitive pricing strategies and helps manufacturers understand price-influencing features for product design.

OVERVIEW OF MOBILE PHONE FEATURES

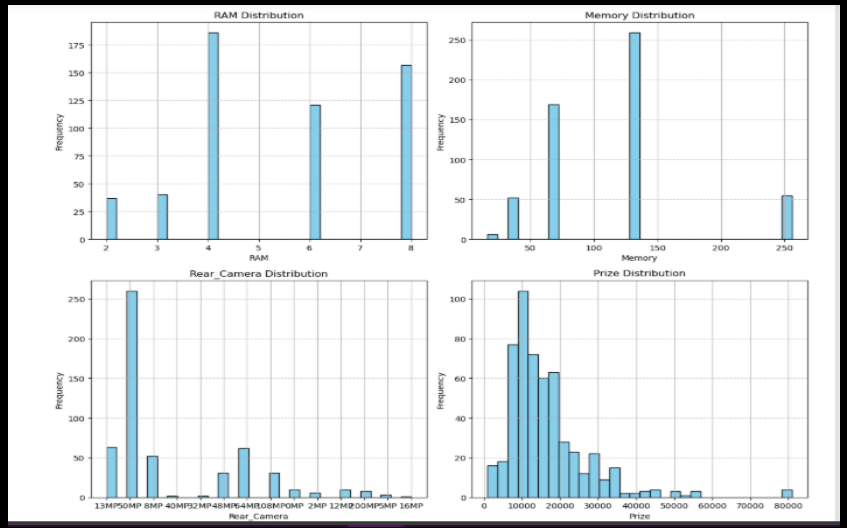
- **Key Hardware Attributes:** Brand reputation, RAM capacity, internal storage size, and processor type significantly impact mobile phone prices.
- **Multimedia Capabilities:** Camera quality—measured in megapixels and sensor features—determines device valuation relevant to user preference trends.
- **Physical and Temporal Specs:** Screen size, battery capacity, and release year reflect technological advancements influencing the pricing landscape over time.

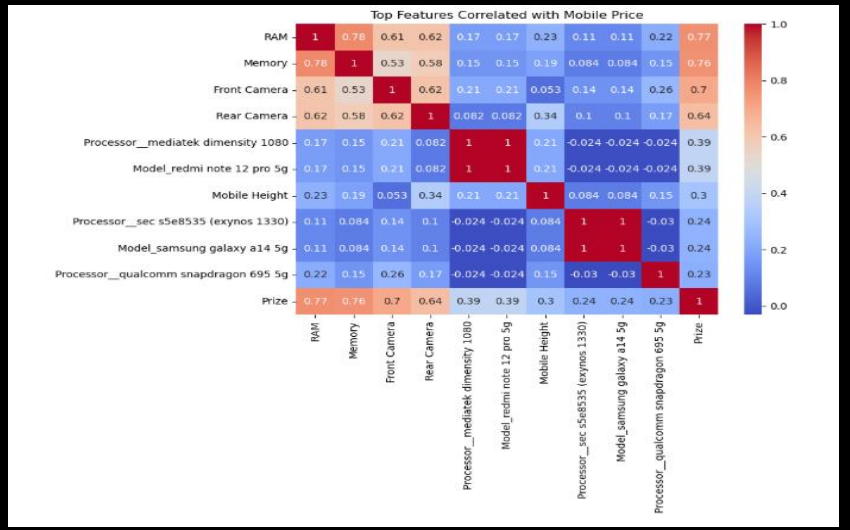
DATASET DESCRIPTION

- **Dataset Size and Source:** Dataset comprises 541 mobile phone samples gathered from publicly available e-commerce platform archives.
- **Feature Set Included:** Features include brand, RAM, storage, camera megapixels, battery, processor, screen size, and release year.
- **Preprocessing Techniques:** Applied data cleaning, imputed missing values using median, and normalized numeric features for uniform scale alignment.

EXPLORATORY DATA ANALYSIS (EDA)

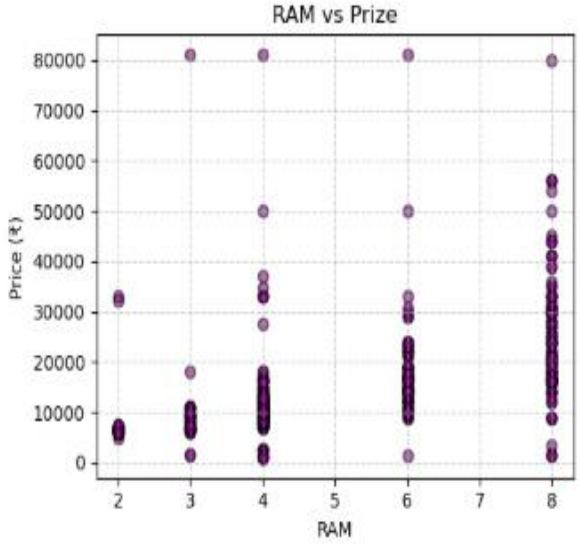
- **Feature Distribution Insights:** Visualizing feature histograms reveals skewness and outliers influencing mobile phone price variability significantly.
- **Correlation Matrix Analysis:** Heatmap presents strong positive correlations between RAM, storage, and price highlighting key pricing drivers.

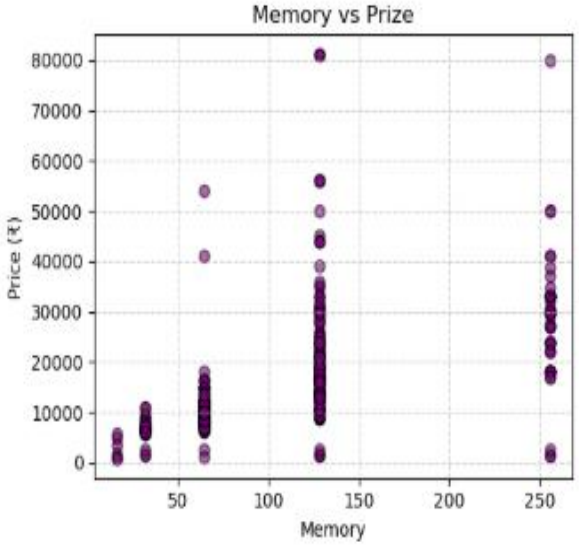


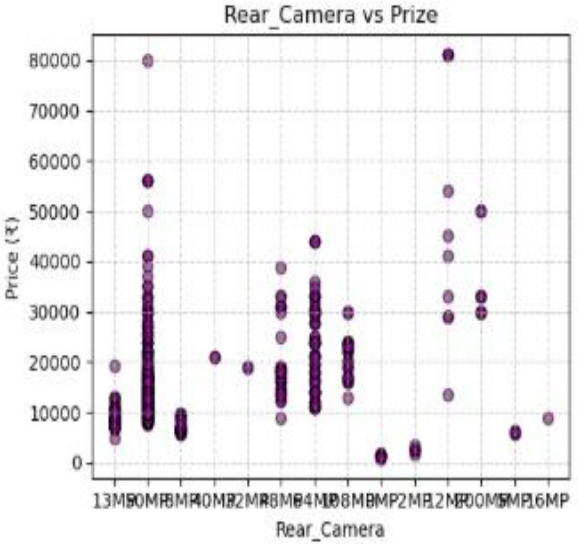


EXPLORATORY DATA ANALYSIS (EDA)

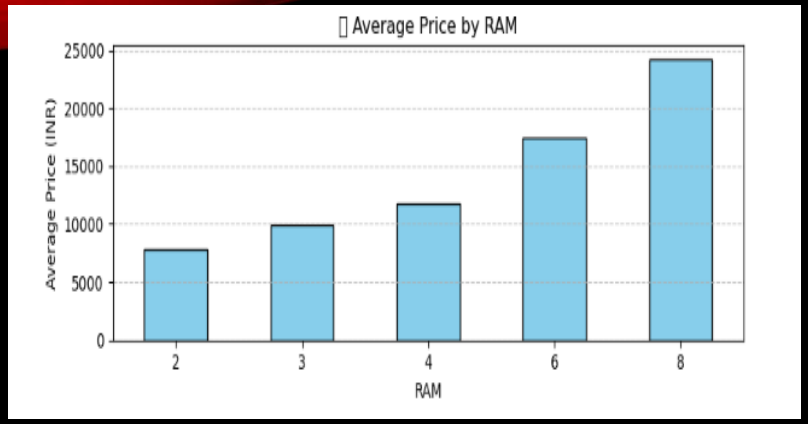
SCATTER PLOT INSIGHTS: RAM and camera megapixels showed **positive correlation with price**, highlighting their role in premium pricing. Denser clusters in lower price bands indicated **market saturation** for budget segments.

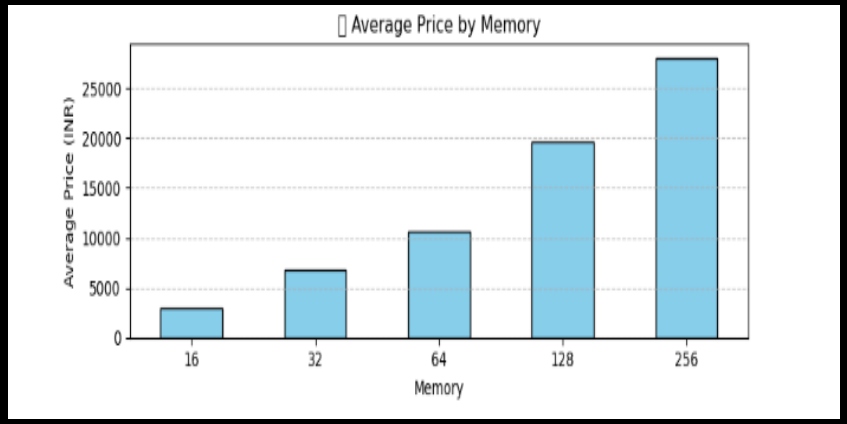


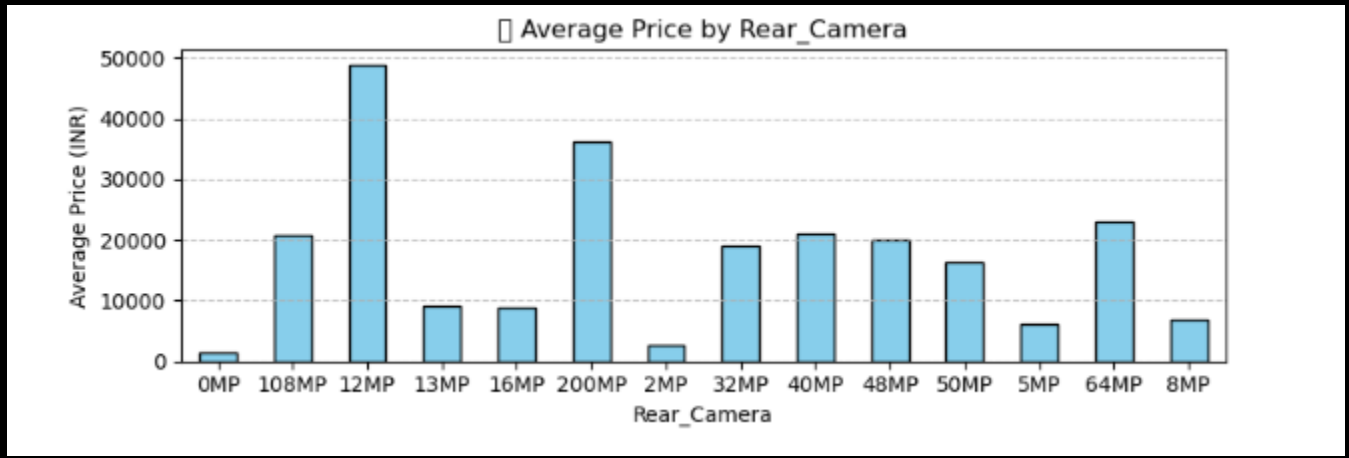




EXPLORATORY DATA ANALYSIS (EDA)



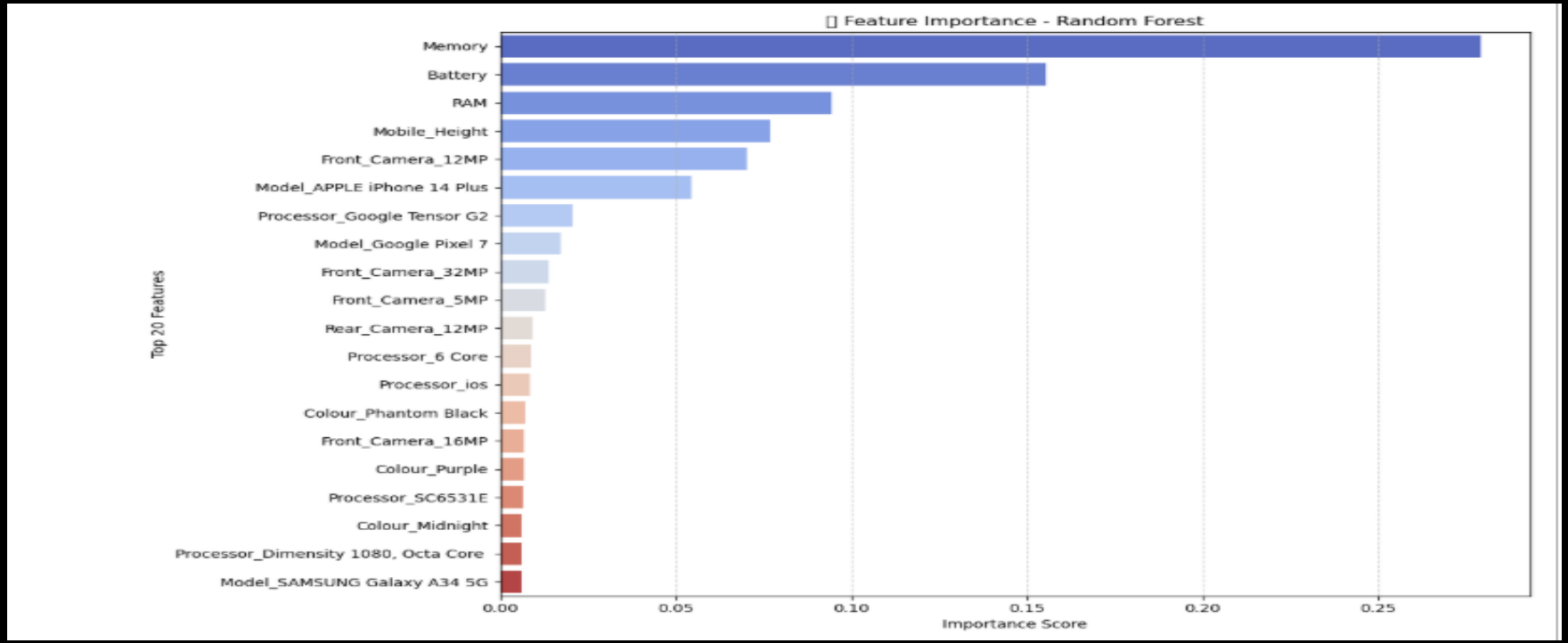




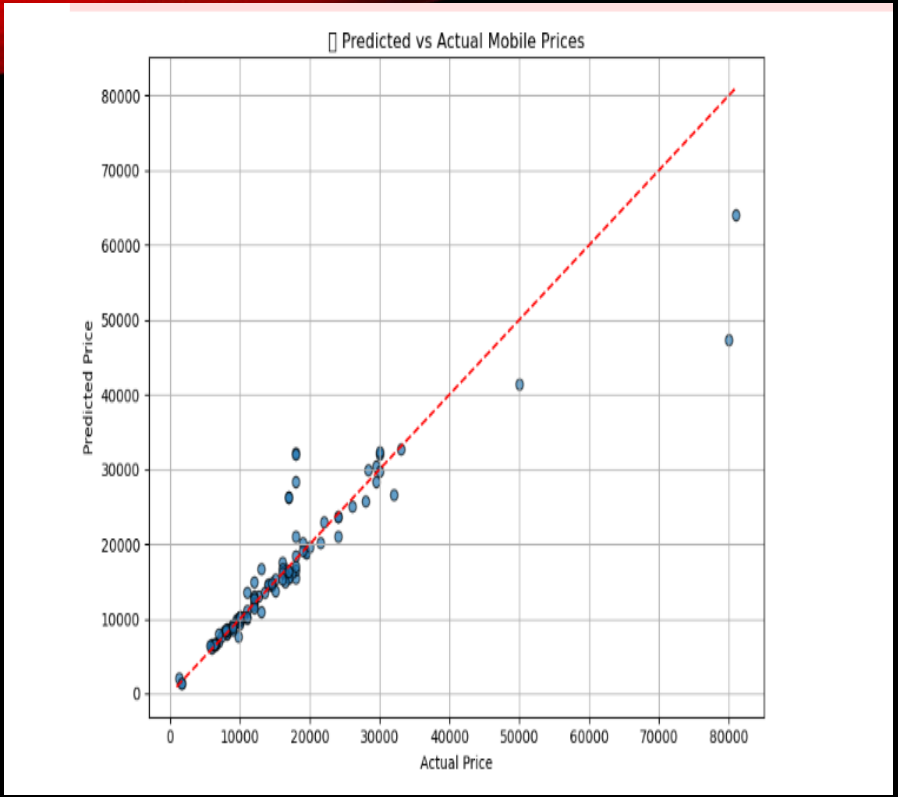
FEATURE IMPORTANCE ANALYSIS
(RANDOM FOREST REGRESSION)

- **Memory (Internal Storage)** — *Most important*
- Strongest influence on price.
- Phones with higher storage (e.g., 128GB, 256GB) are priced significantly higher.
- **Battery Capacity**
- Second most important feature.
- Longer battery life is a major selling point for consumers.
- **RAM**
- High RAM (6GB, 8GB, etc.) strongly correlates with higher pricing due to performance expectations

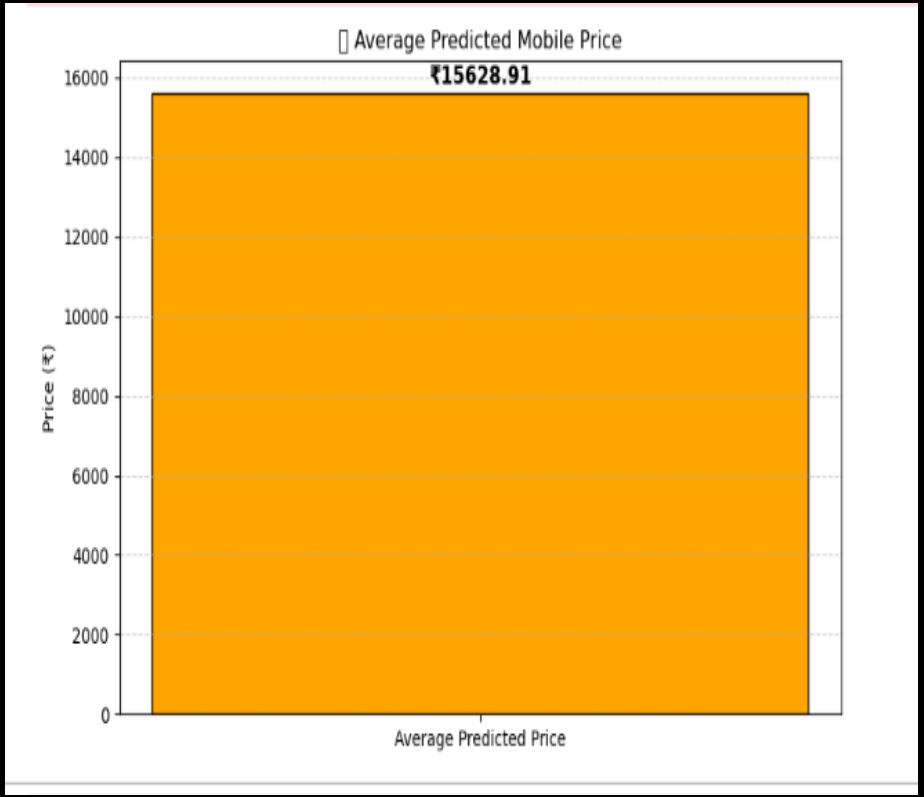
FEATURE IMPORTANCE ANALYSIS
(RANDOM FOREST REGRESSION)



Predicted vs Actual Prices



Average Predicted Price



INSIGHTS AND INTERPRETATION

- **What affects mobile phone prices the most?**
- The **storage space** (like 128GB or 256GB) matters the most — more space usually means a higher price.
- **Battery size** and **RAM** (which affects speed) also have a big impact. Phones with more RAM and bigger batteries usually cost more.
- The **front camera quality** and **phone size** affect the price too, but not as much as storage and RAM.
- **Does our prediction match real prices?**
- Yes, in most cases! The predicted prices are very close to the actual prices of the phones.
- Only a few phones had big differences — mostly very expensive ones, which might be priced higher due to brand value.

CONCLUSION AND FUTURE WORK

- We built a smart system that can **guess the price of a phone** just by looking at its features like RAM, battery, and storage.
- It works really well and could help:
  - **Online sellers** price phones fairly.
  - **Buyers** understand what they're paying for.
  - **Companies** set prices using data, not just guesswork.
- In short: **Better features = Higher price**

“THANK YOU”