



LAPTOP PRICE PREDICTION USING MACHINE LEARNING

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PURPOSE

- Predict laptop prices based on key specifications like RAM, CPU, SSD, and display.
- Provide an interactive tool for users to estimate laptop prices based on their desired configurations.

OBJECTIVE

- Assist in making informed decisions when purchasing laptops, balancing performance and budget.
- Leverage machine learning to generate reliable price predictions.
- Helping consumers understand how specific features affect price.

LITERATURE REVIEW

Key Research

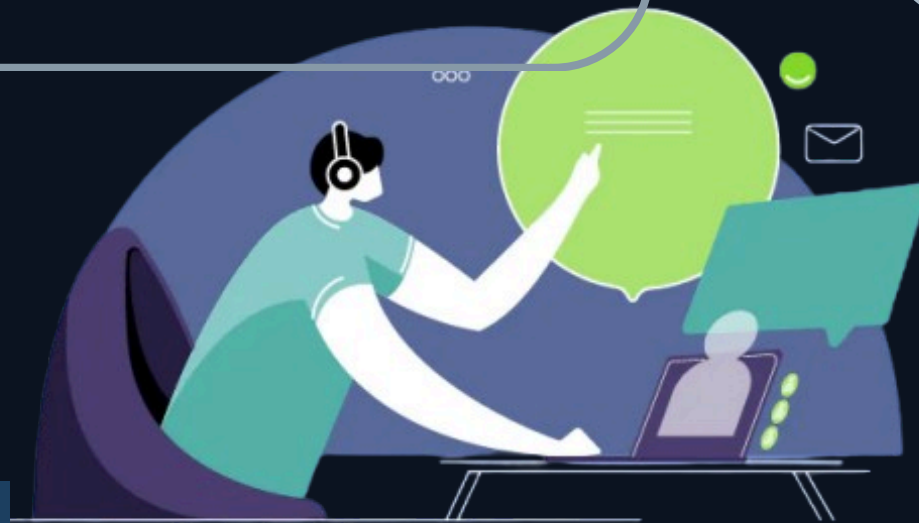
- Machine learning models like **Linear Regression** and **Random Forest** are widely used for price prediction.
- Feature Engineering: Techniques such as creating **derived attributes** (e.g., ppi) .
- Importance of **combining** numerical and categorical features (e.g., RAM, brand, CPU type).

Identified Gaps

- Existing tools lack specificity for laptops
- Limited interactivity prevents users from experimenting with configurations
- Few solutions cater to students and non-technical consumers.

Addressing these Gaps

- Interactive tool specifically for laptop price prediction.
- User-friendly design via a Streamlit app.
- Bridges academic research with real-world applications, empowering informed decision-making.



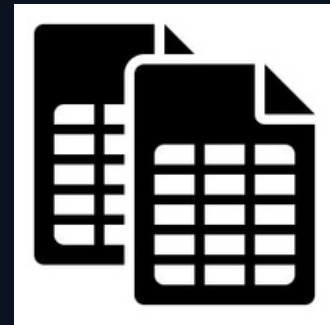
METHODOLOGY

DATASET

Contains detailed information about various laptop models, including their technical specifications and price.

Unnamed: 0	Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price	
0	0	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 2.3GHz	8GB	128GB SSD	Intel Iris Plus Graphics 640	macOS	1.37kg	71378.6832
1	1	Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34kg	47895.5232
2	2	HP	Notebook	15.6	Full HD 1920x1080	Intel Core i5 7200U 2.5GHz	8GB	256GB SSD	Intel HD Graphics 620	No OS	1.86kg	30636.0000
3	3	Apple	Ultrabook	15.4	IPS Panel Retina Display 2880x1800	Intel Core i7 2.7GHz	16GB	512GB SSD	AMD Radeon Pro 455	macOS	1.83kg	135195.3360
4	4	Apple	Ultrabook	13.3	IPS Panel Retina Display 2560x1600	Intel Core i5 3.1GHz	8GB	256GB SSD	Intel Iris Plus Graphics 650	macOS	1.37kg	96095.8080

WORKFLOW



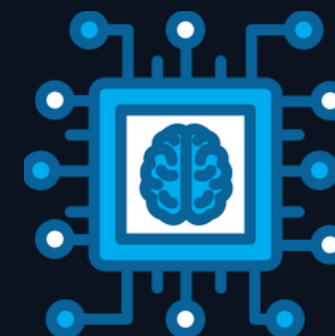
Dataset



Preprocessing



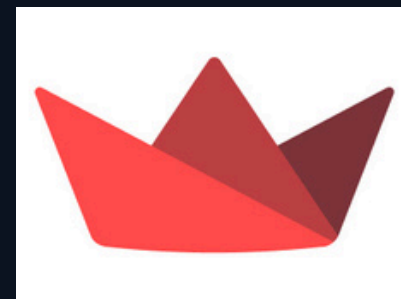
Feature Selection
& Engineering



Model Training



Model Evaluation



Deployment

RESULTS

MODEL PERFORMANCE

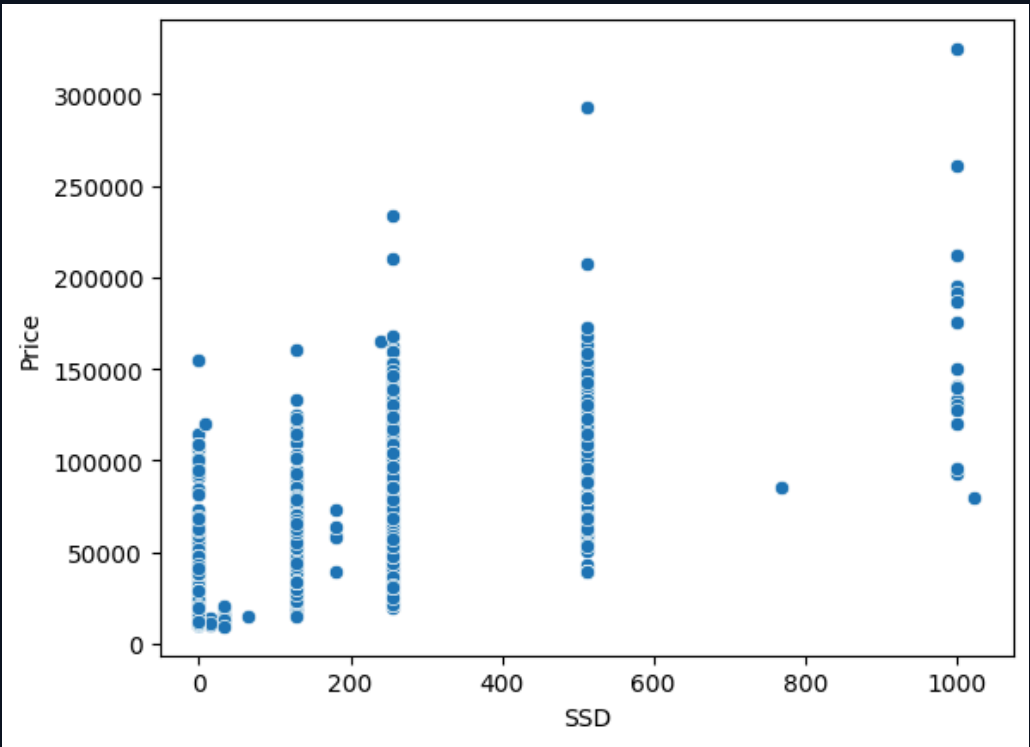
Best Model:

Random Forest Regressor performed the best with an R^2 of 0.88 and MAE of 0.15.

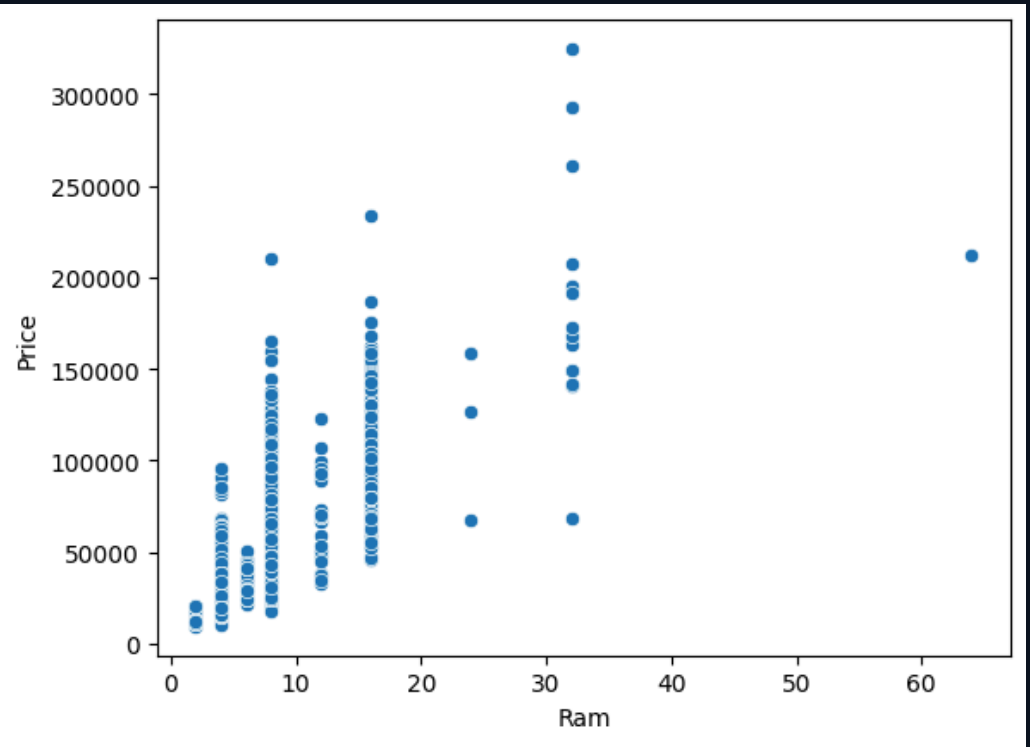
	R2 Score	MAE
Linear Regression	0.80732	0.21017
Ridge Regression	0.81273	0.20926
Lasso Regression	0.80718	0.21114
KNN	0.80314	0.19264
Decision Tree	0.84117	0.18254
SVM	0.80831	0.20239
Random Forest	0.88734	0.15860

KEY FEATURES IMPACTING PRICE

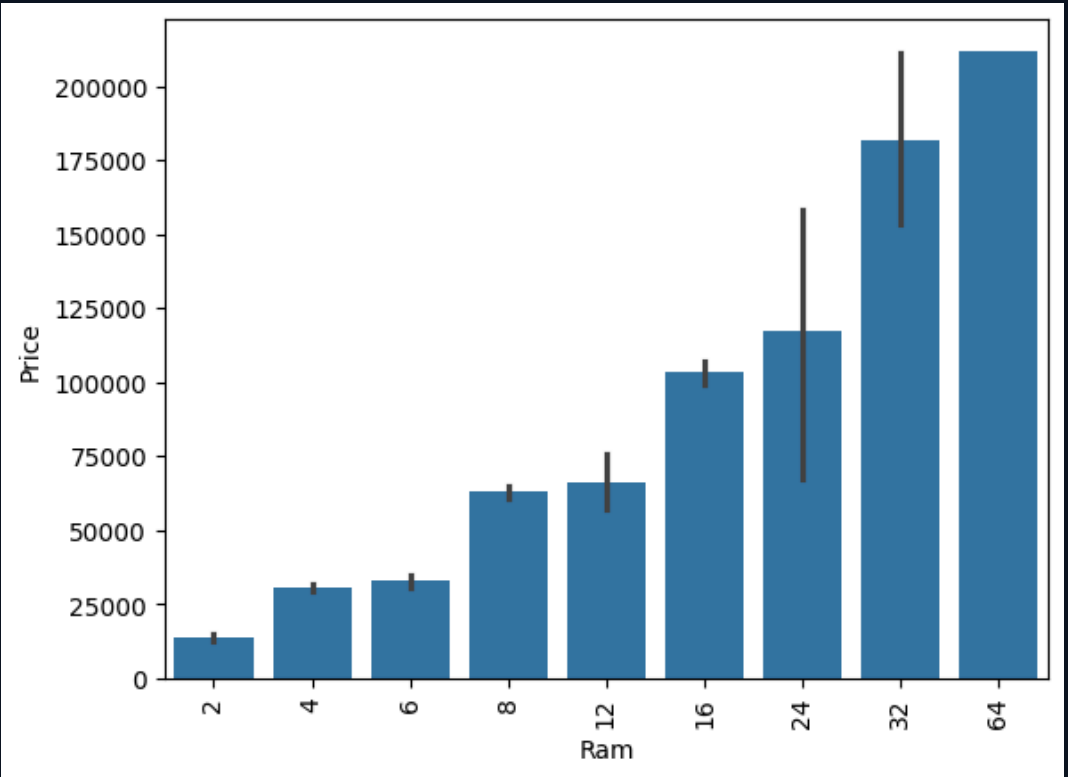
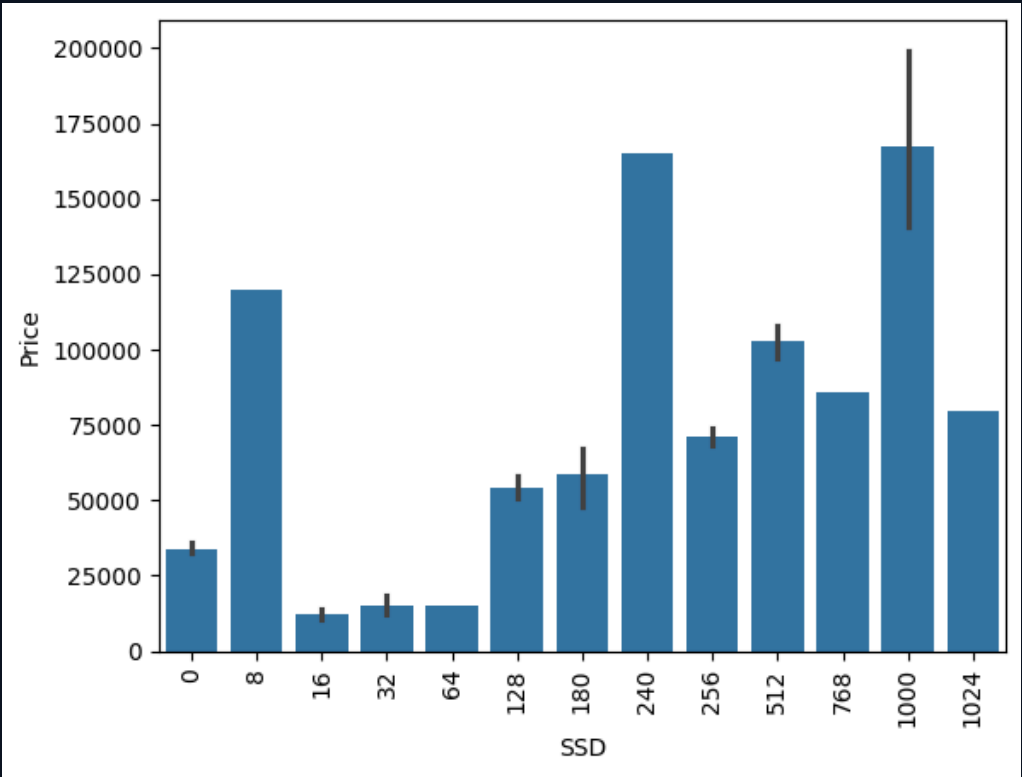
RAM and SSD are the strongest predictors of laptop price.

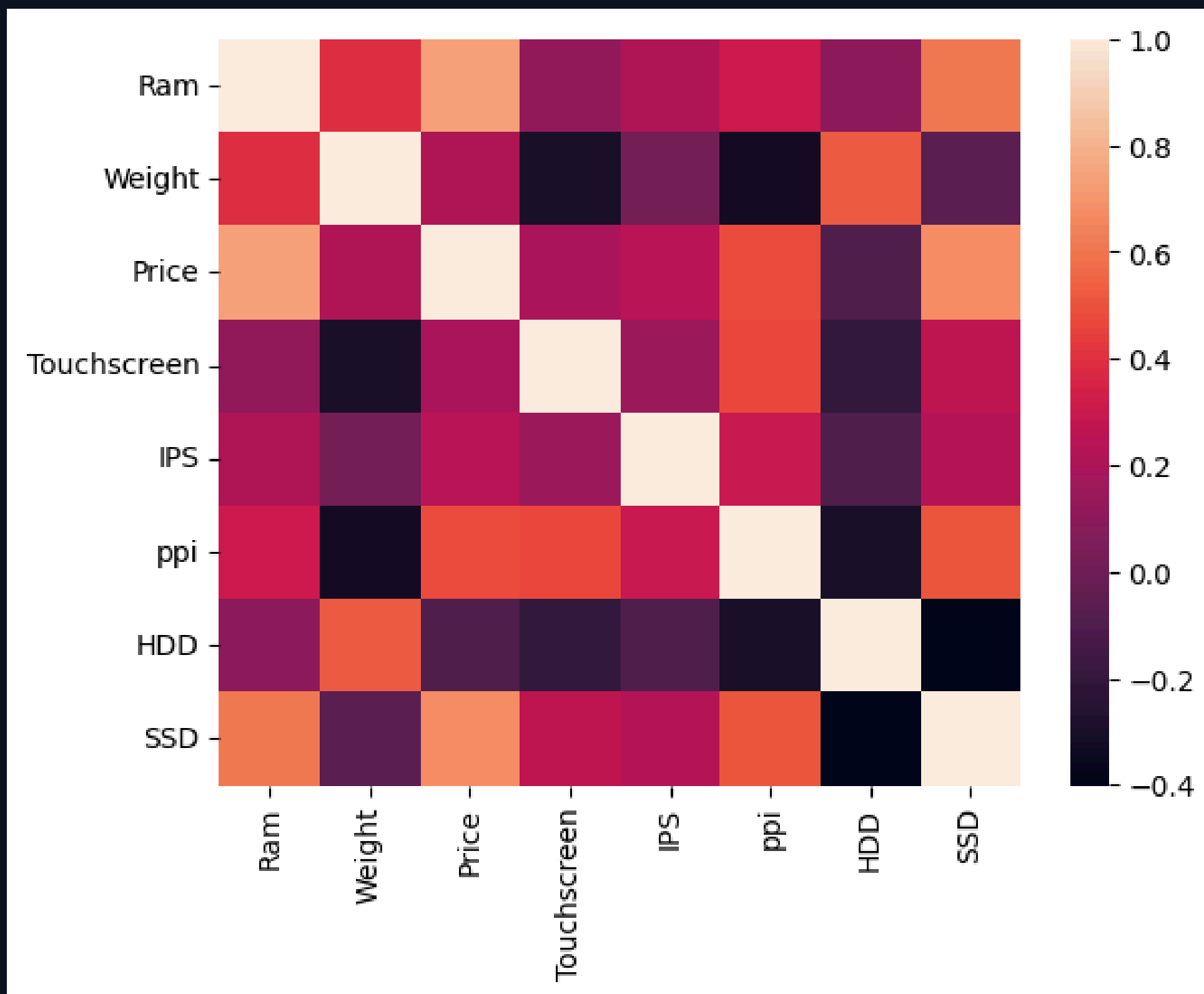


Price vs SSD



Price vs RAM





Visible correlations between Price and RAM, Price and SSD, RAM and SSD, Weight and HDD etc.

Laptop Predictor

Brand

Asus

Type

Gaming

RAM(in GB)

16

Weight of the Laptop

3.00

Touchscreen

No

IPS

Yes

Screensize in inches

10.0015.6018.00

Screen Resolution

1920x1080

CPU

Intel Core i7

HDD(in GB)

512

SSD(in GB)

256

GPU

Nvidia

OS

Windows

Predict Price

The predicted price of this configuration is 100527

STREAMLIT INTERFACE

CONCLUSION

Key Findings

- RAM and SSD are the top predictors of laptop price.
- ppi (Pixels Per Inch) also affects price, with higher values leading to more expensive laptops.
- Random Forest performed the best with an R^2 of 0.85 and MAE of 0.11.

Practical Implications

- The tool helps students and buyers make informed decisions on laptop pricing based on configurations.
- It could be used by retailers for better pricing strategies.

Future Recommendations

- Expand the dataset with more laptop models and features (e.g., battery life).
- Explore neural networks for improved accuracy.
- Adapt the tool for other electronics (smartphones, tablets).