Laptop Price Prediction using Machine Learning

Abstract— This paper presents a Laptop price indicator scheme by utilizing the directed machine intelligence method. The research uses diversified undeviating reversion as the machine intelligence prognosis arrangement that presented 81% prophecy accuracy. Using diversified uninterrupted reversion, skilled are diversified free variables but singular individual weak changeable whose real and concluded principles are distinguished to find accuracy of results. This paper suggests a structure place price is reliant changing that is foresaw, and this price is arisen determinants like Laptop's model, RAM, ROM (HDD/SSD), GPU, CPU, IPS Display, and Touch Screen. Keywords— Multiple Linear reversion, Laptop Price, Regression model, Machine Learning.

I. INTRODUCTION

Laptop price forecast exceptionally when the desktop computer often imposingly direct from the laboratory to Electronic Market/ Stores, is two together a detracting and main task. The highly agitated state that we proverb in 2020 for laptops to support detached work and knowledge is not any more skilled. In India, demand of Laptops flied later the Nationwide confinement in isolation, superior to 4.1-Million-part shipments in the June quarter of 2021, the chief in the five age. Accurate Laptop price prognosis includes expert information, cause price commonly depends on many unique appearance and determinants. Typically, most important one are brand and model, RAM, ROM, GPU, CPU, etc. In this paper, we used various plans and methods in consideration of realize larger accuracy of the secondhand desktop computer price prognosis.

II. RELATED WORK

Predicting price of laptops has existed intentional widely in differing researches. Listian explained, in her paper composed for Master belief, that reversion model that was buxom utilizing Decision Tree & Random Forest Regressor can forecast the price of a desktop computer that has happened leased accompanying better accuracy than multivariate reversion or few natural diversified reversion. This act the estates that Decision Tree Algorithm is better in handling datasets accompanying more ranges and it is less compulsive overfitting and underfitting. The proneness concerning this research is that a change of natural reversion accompanying more state-of-the-art Decision Tree Algorithm reversion was not proved in fundamental signs like mean, difference or predictable difference.

METHODOLOGY

To support the use of machine intelligence utilizing the Decision Tree treasure, by all means the sample dossier is wanted. Table beneath holds dossier about miscellaneous laptops and their prices contingent upon their arrangement. Sample dossier were acquired from Kaggle.com

Company	TypeName	Inches	ScreenResolution	Cpu	Ram	Memory	Gpu	OpSys	Weight	Price
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
Apple	Ultrabook	13.3	1440x900	Intel Core i5 1.8GHz	8GB	128GB Flash Storage	Intel HD Graphics 6000	macOS	1.34kg	47895.5232
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
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
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
...	...	...	...	...	...	...	...	...	...	...
Lenovo	2 in 1 Convertible	14.0	IPS Panel Full HD / Touchscreen 1920x1080	Intel Core i7 6500U 2.5GHz	4GB	128GB SSD	Intel HD Graphics 520	Windows 10	1.8kg	33992.6400
Lenovo	2 in 1 Convertible	13.3	IPS Panel Quad HD+ / Touchscreen 3200x1800	Intel Core i7 6500U 2.5GHz	16GB	512GB SSD	Intel HD Graphics 520	Windows 10	1.3kg	79866.7200
Lenovo	Notebook	14.0	1366x768	Intel Celeron Dual Core N3050 1.6GHz	2GB	64GB Flash Storage	Intel HD Graphics	Windows 10	1.5kg	12201.1200
HP	Notebook	15.6	1366x768	Intel Core i7 6500U 2.5GHz	6GB	1TB HDD	AMD Radeon R5 M330	Windows 10	2.19kg	40705.9200
Asus	Notebook	15.6	1366x768	Intel Celeron Dual Core N3050 1.6GHz	4GB	500GB HDD	Intel HD Graphics	Windows 10	2.2kg	19660.3200

The C4.5 invention (secondhand as a Decision Tree Classifier that maybe working to create a resolution, established sample dataset) starts accompanying the process of selecting the best gain attribute as the root of the timber, therefore forges a arm each worth, before divides the case in arms, before repeats the process each arm just before all cases in the arm have the unchanging class.

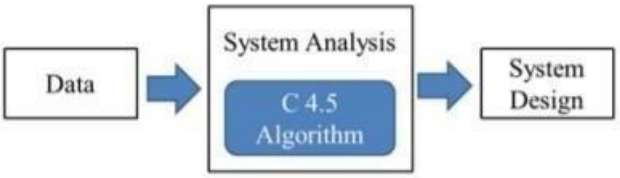

Figure: Flow of design and analysis

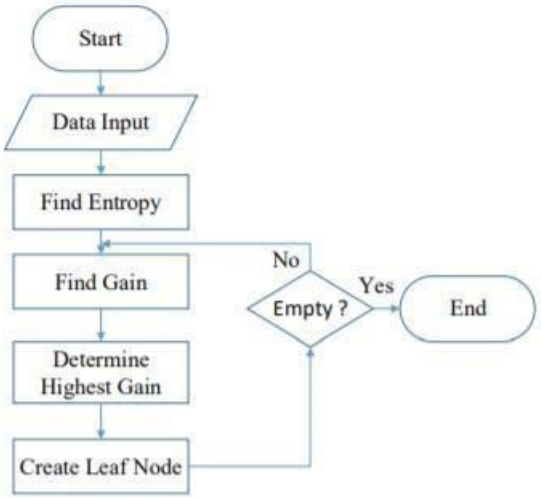

Figure: C 4.5 algorithms flowchart

To catch correct estimation results, estimates secondhand Entropy and Gain each changing. Entropy measures changeableness middle from two points chance variables in a dossier. The extreme Entropy worth will influence the categorization process.

The equating used to reckon Entropy and Gain, in this manner:

$$Entropi\ (S) = \sum_{j=1}^{k} - p_j\ \log_2\ p_j$$

S: Case set
k: Number of S partition
Pj: Probability got from the total (Yes / No) detached for one total case

$$\text{Gain (S,A)} = \text{Entrophy (s)} - \sum_{i=1}^{n} \frac{|si|}{|s|} * \text{Entrophy (si)}$$

S: Case set
A: Attributen:
Number of A attribute partition
|Si|: Number of cases on the i partition
|S|: Number of S partition

Explanatory Data Analysis (EDA)

Using our feature-devised dataset, we can immediately plot graphs and estimate tables to dream up by what method each feature has connection with the instability of desktop computer prices. By utilizing the barplot means foreign from Matplotlib, we can test and validate our theory or beginning belief on by means of what few facial characteristics will influence the valuing of laptops. Here's an exemplification of scheming a barplot for the feature TypeName (type of desktop computer)

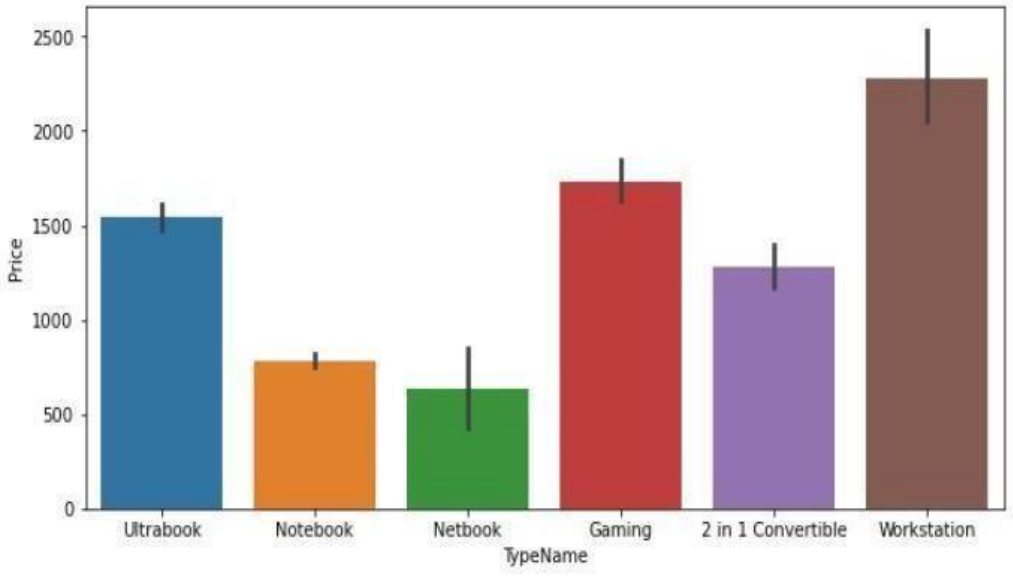

Figure: Data Visualisation using barplot

Result

Stream lit library is used to build this WebApp UI. Stream lit is an (open-source Python library) that makes it easy to create and share, custom web apps for machine learning and data science. Result with backend code is shown in following figures.

```python
import streamlit as st
import pickle
import numpy as np

# import the model
pipe = pickle.load(open('pipe.pkl', 'rb'))
df = pickle.load(open('df.pkl', 'rb'))

st.title("Laptop Predictor")

# Asking the user which brand laptop to choose
company = st.selectbox('Brand', df['Company'].unique())

# type of laptop
type = st.selectbox('Type', df['TypeName'].unique())


# Ram
ram = st.selectbox('RAM(in GB)', [2, 4, 6, 8, 12, 16, 24, 32, 64])

# Weight
weight = st.number_input('Weight of Laptop')

# Touchscreen
touchscreen = st.selectbox('Touchscreen', ['No', 'Yes'])

# IPS Display
ips = st.selectbox('IPS', ['No', 'Yes'])

```

Figure: Integrating ML model with Web Application

Conclusions

Predicting entity through the request of machine intelligence utilizing the Decision Tree invention form it smooth for graduates, particularly in deciding the choice of desktop computer qualifications that are most attractive for pupils to meet pupil needs and similarly the ability to purchase of juniors. Students not any more need to expect miscellaneous beginnings to find desktop computer requirements that are wanted by pupils in gathering the needs of pupils, cause the desktop computer requirements from the results of the machine intelligence use have given the most seductive requirements accompanying their prices of laptops.

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