Prediction of Graduate Admissions with Artificial Neural Network

IBM Data Science Professional Cetificate

Coursera

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Introduction

Prospective graduate students always face a dilemma deciding universities of their choice while applying to master's programs. While there are a good number of predictors and consultancies that guide a student, they aren't always reliable since decision is made on the basis of select past admissions

Dataset

GRE Scores	out of 340
TOEFL Scores	out of 120
University Rating	out of 5
Statement of Purpose and Letter of Recommendation Strength	out of 5
Undergraduate GPA	out of 10
Research Experience	either 0 or 1
Chance of Admit	ranging from 0 to 1

	Serial No.	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
0	1	337	118	4	4.5	4.5	9.65	1	0.92
1	2	324	107	4	4.0	4.5	8.87	1	0.76
2	3	316	104	3	3.0	3.5	8.00	1	0.72
3	4	322	110	3	3.5	2.5	8.67	1	0.80
4	5	314	103	2	2.0	3.0	8.21	0	0.65

Exploratory data analysis

null data report

```
GRE Score            0
TOEFL Score          0
University Rating    0
SOP                  0
LOR                  0
CGPA                 0
Research             0
Chance of Admit      0
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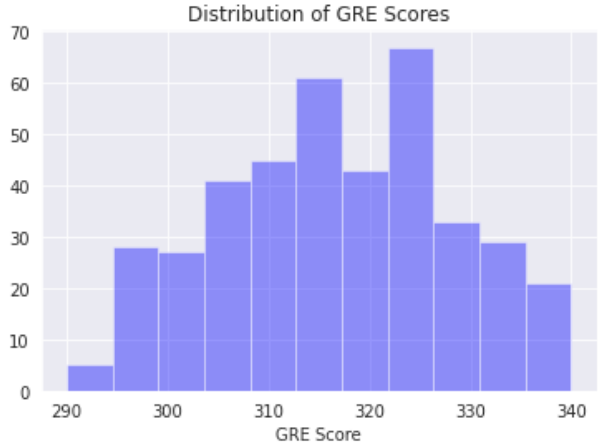
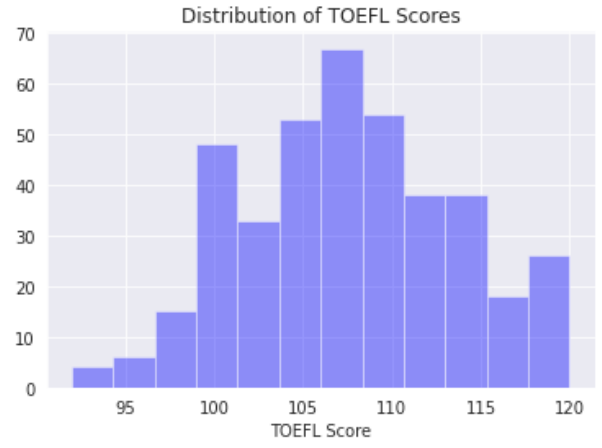
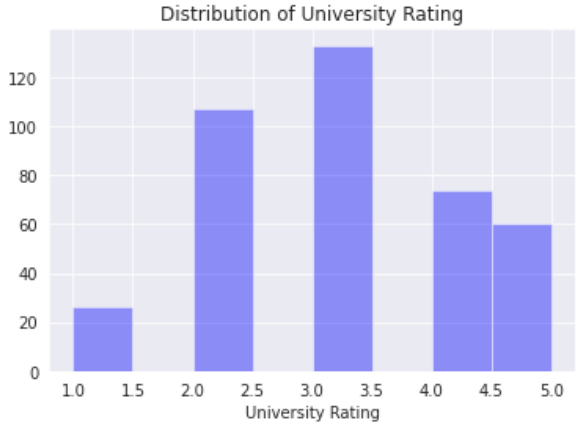
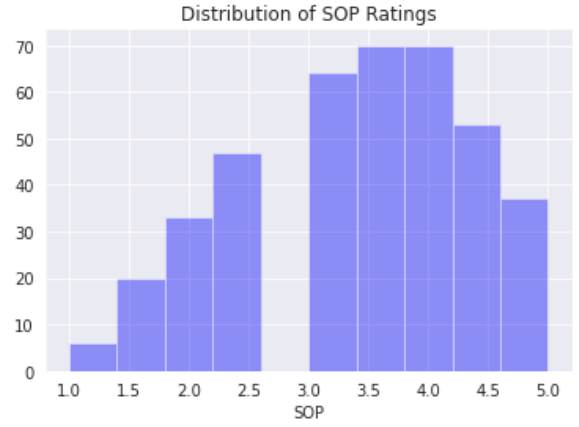
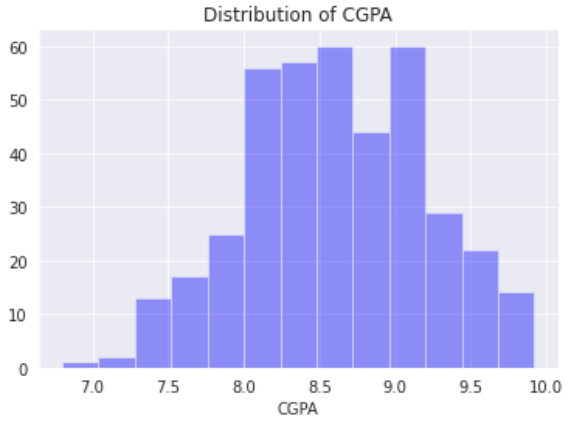
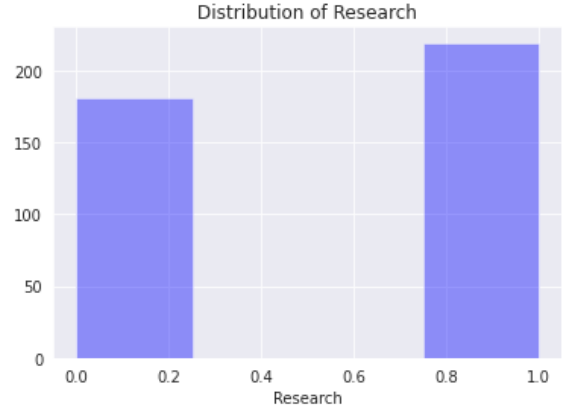




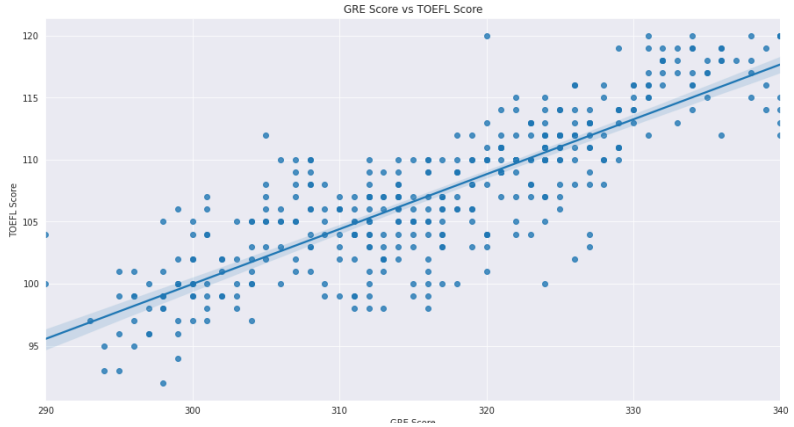


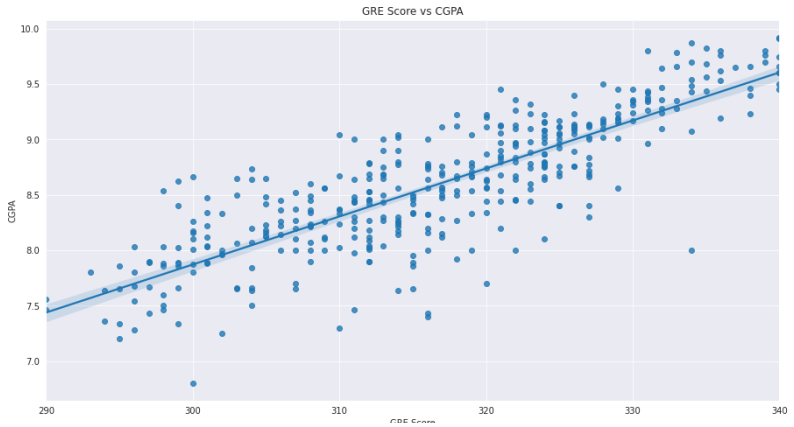


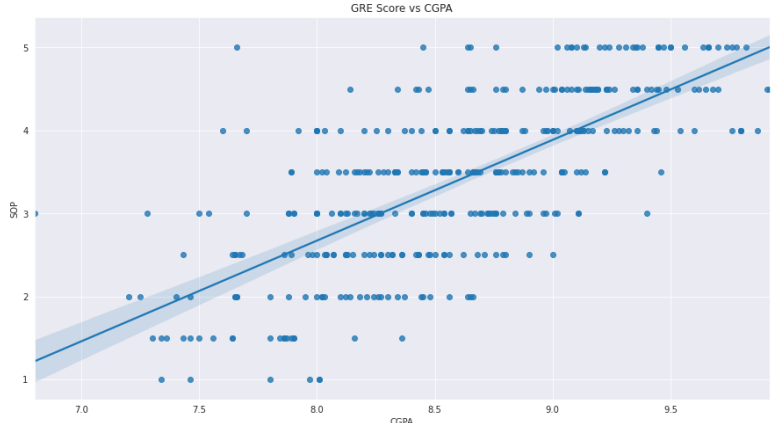


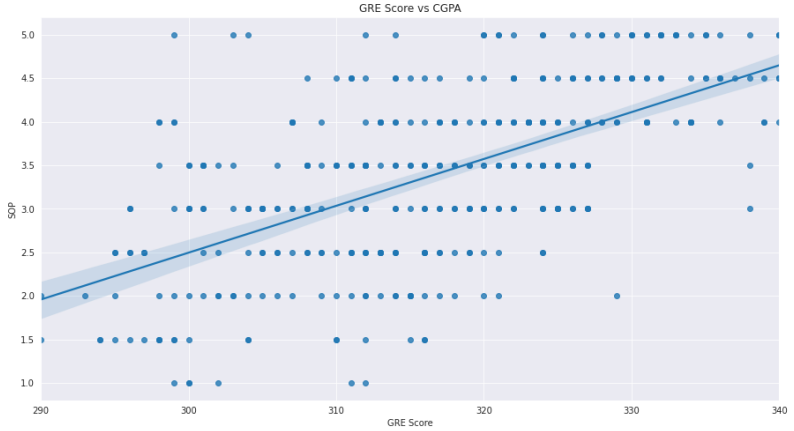


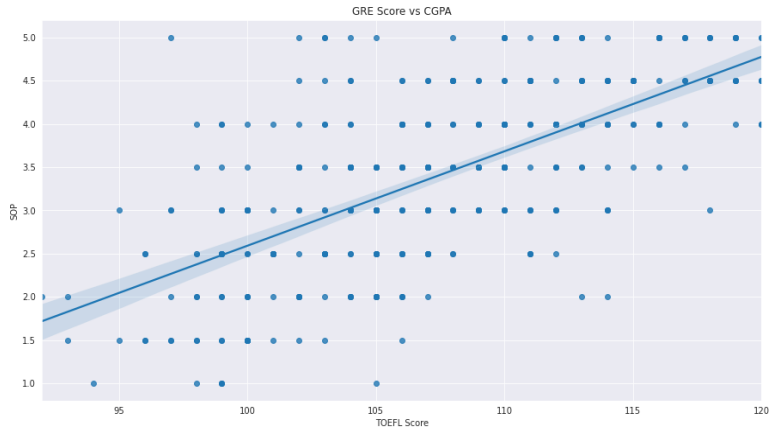
Exploratory data analysis











Exploratory data analysis

Correlation table among features.

	GRE Score	TOEFL Score	University Rating	SOP	LOR	CGPA	Research	Chance of Admit
GRE Score	1.000000	0.835977	0.668976	0.612831	0.557555	0.833060	0.580391	0.802610
TOEFL Score	0.835977	1.000000	0.695590	0.657981	0.567721	0.828417	0.489858	0.791594
University Rating	0.668976	0.695590	1.000000	0.734523	0.660123	0.746479	0.447783	0.711250
SOP	0.612831	0.657981	0.734523	1.000000	0.729593	0.718144	0.444029	0.675732
LOR	0.557555	0.567721	0.660123	0.729593	1.000000	0.670211	0.396859	0.669889
CGPA	0.833060	0.828417	0.746479	0.718144	0.670211	1.000000	0.521654	0.873289
Research	0.580391	0.489858	0.447783	0.444029	0.396859	0.521654	1.000000	0.553202
Chance of Admit	0.802610	0.791594	0.711250	0.675732	0.669889	0.873289	0.553202	1.000000

We can see that there are some high couple of features with high correlative relationship of over 0.8 such as:

- TOEFL vs GRE
- CGPA vs GRE
- TOEFL vs CGPA

Results and Conclusion

	Linear Regression	Deep Neural Network
Mean Squared Error	0.2443111527031876	0.236883118748664 86

As we can see the MSE of the Neural Net Model is 0.236, which is just slightly better than the classic Linear Regression model with MSE of 0.2443 As we can see, sometimes just a simple algorithm can solve the problem just as good as a very advance ones, and also save you time and computing resources.

Dataset Source

The dataset is owned by Mohan S Acharya.

Dataset Source: https://www.kaggle.com/mohansacharya/graduate-admissions

Dataset Citation: Mohan S Acharya, Asfia Armaan, Aneeta S Antony : A Comparison of Regression Models for Prediction of Graduate Admissions, IEEE International Conference on Computational Intelligence in Data Science 2019