Machine Learning Assignment 1

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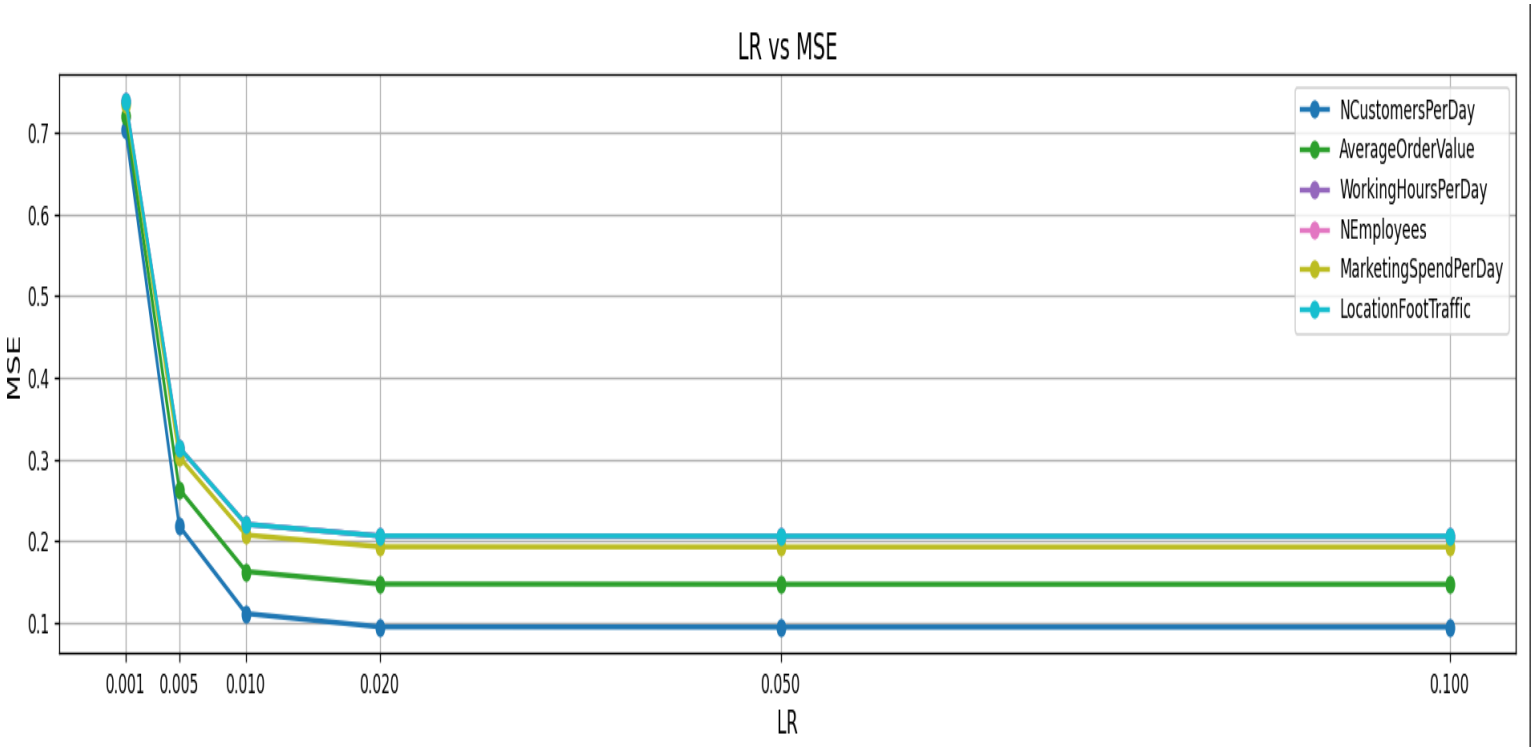
UMS Level: 3

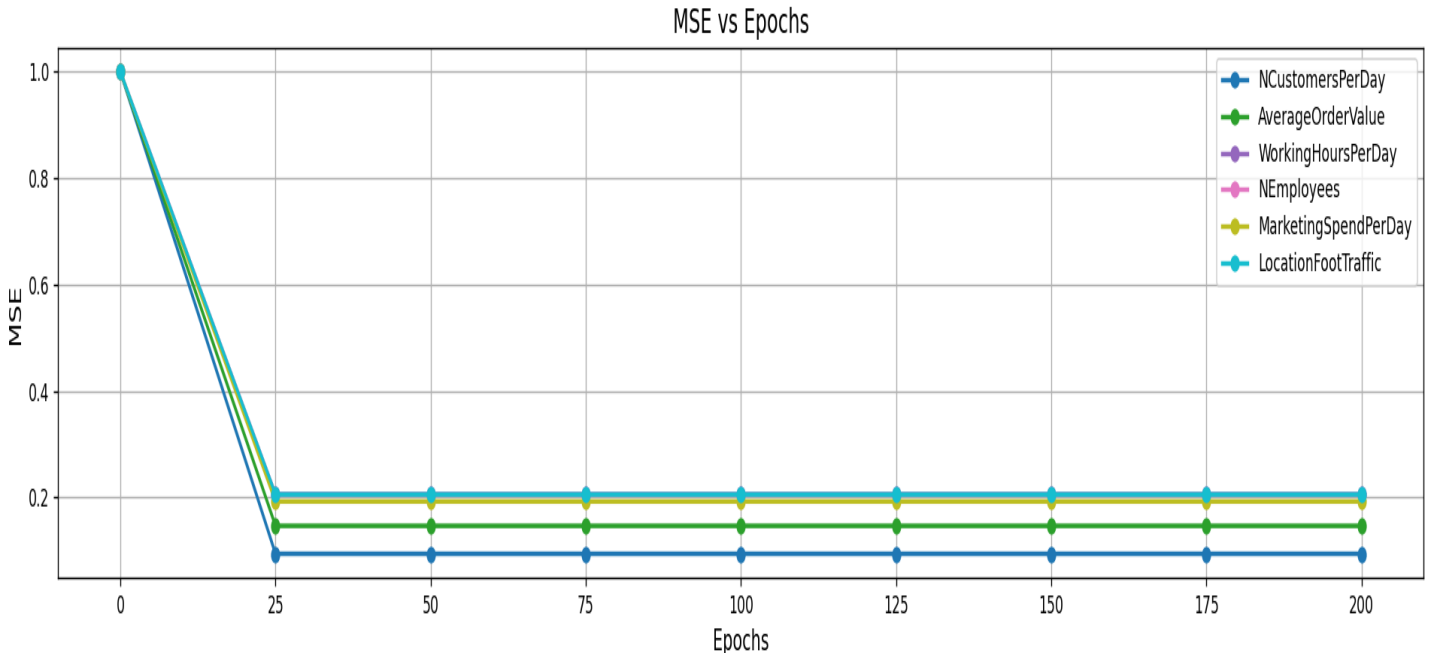
- **LR vs MSE**

Learning Rate	NCustomers PerDay	AverageOrder Value	WorkingHoursPer Day	NEmployees	MarketingSpend PerDay	LocationFoot Traffic
0.001	0.7036	0.7208	0.7401	0.7401	0.7357	0.7401
0.005	0.2180	0.2634	0.3143	0.3144	0.3028	0.3143
0.01	0.1108	0.1624	0.2203	0.2203	0.2072	0.2203
0.02	0.0945	0.1470	0.2060	0.2060	0.1927	0.2060
0.05	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
0.1	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057



- **Epochs vs MSE**

Epochs	NCustomers PerDay	AverageOrder Value	WorkingHoursPer Day	NEmployees	MarketingSpend PerDay	LocationFoot Traffic
0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25	0.0942	0.1467	0.2058	0.2058	0.1924	0.2058
50	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
75	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
100	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
125	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
150	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
175	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057
200	0.0942	0.1467	0.2058	0.2058	0.1924	0.2057



- **Conclusion**

  Across all different hyperparameters that I tried, NCustomersPerDay proved to be the strongest predictor as it was the fastest to converge

  It achieved the lowest MSE of 0.0942 using an optimal learning rate of 0.05 and only 25 epochs.

  This confirms that careful tuning of hyperparameters can significantly improve performance.