**Machine Learning (CS564)**

**Assignment 3 Linear Regression**

**Output Obtained**

*Intercept: 1044.2574146365573*

*Slope: [25.5962591 38.78534598 0.31038593 61.89682859]*

*Coefficients:*

*Coefficient*

*Avg. Session Length 25.596259*

*Time on App 38.785346*

*Time on Website 0.310386*

*Length of Membership 61.896829*

*Company should invest more in: Length of Membership*

## **Observation Report / Conclusion**

The analysis was conducted to understand the relationship between various factors and the yearly amount spent by customers at Amazon\_cloths.

Linear regression was performed using the scikit learn library to model this relationship.

**Model Coefficients:**

The intercept of approximately 1044.26 indicates that even if all independent variables (features) are zero, there is still a significant baseline spending.

The coefficients provide insights into the impact of each feature on the yearly amount spent:

* **Avg. Session Length:** A one unit increase results in an increase of approximately $25.60.
* **Time on App**: A one unit increase results in an increase of approximately $38.79.
* **Time on Website:** A one unit increase results in an increase of approximately $0.31.
* **Length of Membership:** A one unit increase results in the highest increase of approximately $61.90.

**Feature Importance:**

The analysis suggests that Length of Membership has the most significant impact on the yearly amount spent. Therefore, the company should focus more on strategies that enhance and retain customer memberships.

**Recommendations:**

* **Investment Focus:** The company should prioritize initiatives aimed at increasing and retaining customer memberships. This may include loyalty programs, personalized services, and engagement activities to encourage long term relationships.
* **Mobile App Optimization:** While both the mobile app and website contribute to customer spending, the analysis indicates that the app has a higher impact. Hence, further optimization of the mobile app experience could lead to increased spending.
* **Continuous Monitoring:** Regular monitoring and analysis of customer behavior and spending patterns are essential. This allows for the identification of evolving trends and opportunities for further optimization and investment.

**Conclusion:**

In conclusion, understanding the factors influencing customer spending is crucial for Amazon\_cloths to drive growth and profitability. By leveraging insights from linear regression analysis, the company can make informed decisions and allocate resources effectively to maximize customer value and satisfaction.