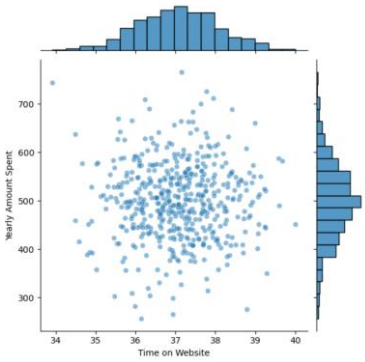
Report: Critical Analysis on the Model Results

Linear Regression Model for the Prediction of 'Yearly Amount Spent' by Customer for Clothing Brand

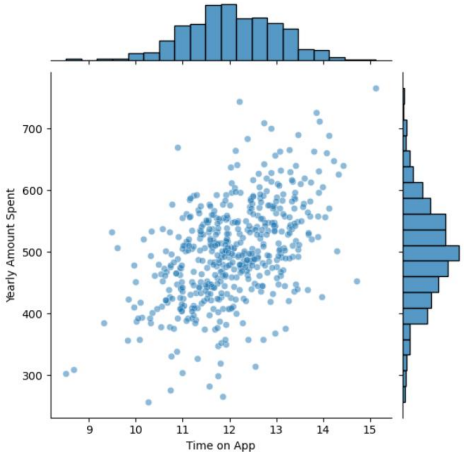
1: Joint Plot on Time on Website vs Yearly Amount Spent

It visualizes the relationship between Time on Website and Yearly Amount Spent to understand the correlation between these two variables.



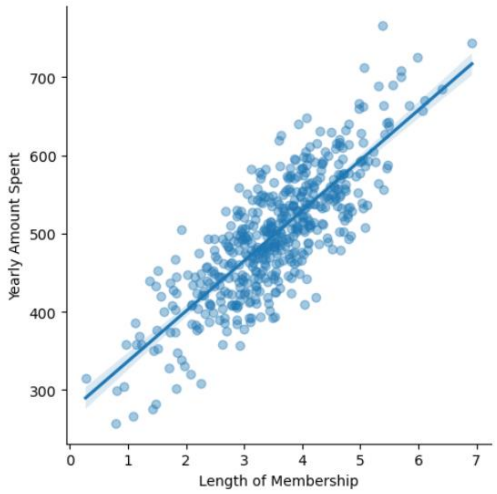
This visual is showing the higher scatternets between the datapoint. In a conclusion, it shows there is no linear relationship between the variables under study.

2: Joint Plot on Time on App vs Yearly Amount Spent



The scatter plot shows a faint linearity in the relationship, indicating that there is a somewhat clear linear relationship between these variables. This suggests that the time people spend on the app is nearly turning them into customers. However, this is not a final verdict, and a more comprehensive analysis is needed.

3: lmplot (Linear Model Plot) on Length of Membership vs Yearly Amount Spent



The plot above shows a nearly strong relationship between 'Length of Membership' and 'Yearly Amount Spent,' indicating a clear linear relationship between the variables under study.

Coefficient of the Model

In linear regression model, the coefficients represent the change in the dependent variable with the one unit-change in the independent variables while keeping other variable constant.

Here, model predicts **'Yearly Amount Spent'** based on the following independent variables:

- **Time on App**
- **Time on Website**
- **Length of Membership**
- **Avg. Session Length**

1: Time on App → 38.79

If customer spent one more unit of time on the app, their Yearly Amount Spent increases by $38.79 on average. It suggests that it has significantly high impact on the target variable.

2: Time on Website → 0.31

If a customer spends one more unit of time on the website, their Yearly Amount Spent increases by only $0.31 on average. It suggests that it has very small impact on the target variable.

3: Length of Membership → 61.90

If a customer's membership increases by one year, their Yearly Amount Spent increases by $61.90 on average. This suggests that long-term members tend to spend more.

4: Avg. Session Length → 25.60

If the average session length increases by one unit, the Yearly Amount Spent increases by $25.60. This means that longer browsing sessions lead to higher spending.

Evaluation Matrix

Mean Squared Error: 109.86

Mean Absolute Error: 8.55

RMSE: 10.48

The model predicts yearly spending quite well, but on average, its predictions are off by around **$8.56 to $10.48**. The small error suggests a good fit, though there's still room for improvement. A better model could further reduce the difference between actual and predicted spending.

Policy Recommendations Based on the Model Results

- **Enhance Mobile App Engagement:** Since time on the app significantly impacts spending, invest in improving user experience, personalized recommendations, and targeted promotions to increase app usage.

- **Optimize Website Experience:** The website has minimal impact on spending, indicating a need for redesign, better UI/UX, or integrating interactive features to enhance customer retention.

- **Loyalty Programs for Long-Term Customers:** As length of membership strongly influences spending, introduce membership rewards, exclusive discounts, and referral incentives to retain customers and boost spending.

- **Encourage Longer Session Durations:** Since average session length correlates with higher spending, implement strategies like engaging content, gamification, and AI-driven recommendations to keep users active.