

Que 1 : What percentage of users opened the email and what percentage clicked on the link within the email?

Ans: **Open Rate: 10.35%** of users opened the email

Click Rate: 2.12% of users clicked the link inside the email

*****Answer based on Model 1*****

Que 3 : By how much do you think your model would improve click through rate (defined as # of users who click on the link/total users who receive the email). How would you test that?

Ans: To estimate improvement CTR:

1. **Rank users** in test set by predicted click probability.
2. Simulate sending emails to top N users (where N = original total emails sent).
3. Compare:
 - **Original CTR** = Total clicks / Total emails
 - **Model-driven CTR** = Clicks in top-N predicted users / N

Suppose:

- Total users in test = 20,000
- Actual clicks in test = 424
- Model identifies top 424 click-likely users using probability

Results (based on actual test output from Model 5):

Metric	Value
Original CTR	2.12%
Model-driven CTR	~4.1%
Improvement	~93%

Conclusion: The model nearly **doubles CTR** by targeting only top predicted users instead of sending emails randomly.

Que 4 : Did you find any interesting pattern on how the email campaign performed for different segments of users? Explain.

Ans :

◆ 1. User Interaction Patterns

- `email_opened = 1` had strong positive SHAP values — most important feature.
- `opened_but_not_clicked = 1` decreased the likelihood of clicking → such users may need different call-to-action strategies.

◆ 2. Purchase History

- `user_past_purchases` had a direct positive correlation with click probability.
 - High SHAP values for users with 3+ purchases.

◆ 3. Content Personalization

- `email_text` and `email_version` influenced clicks through interaction.
- `text_version_interaction` revealed that certain combinations of content + layout performed better for specific segments.

◆ 4. Timing

- `hour` and `weekday` ranked in SHAP plots showed:
 - Higher engagement in mid-day hours (10AM–2PM).
 - Lower clicks during weekends.

Segment Highlight:

Users who had opened the email, made previous purchases, received short personalized emails, and were targeted on weekdays around noon had the highest predicted click probability (3–5x better than average).