Click on Ads Prediction Analysis for Making Business Decisions

DECISION 520Q Section B Team 18
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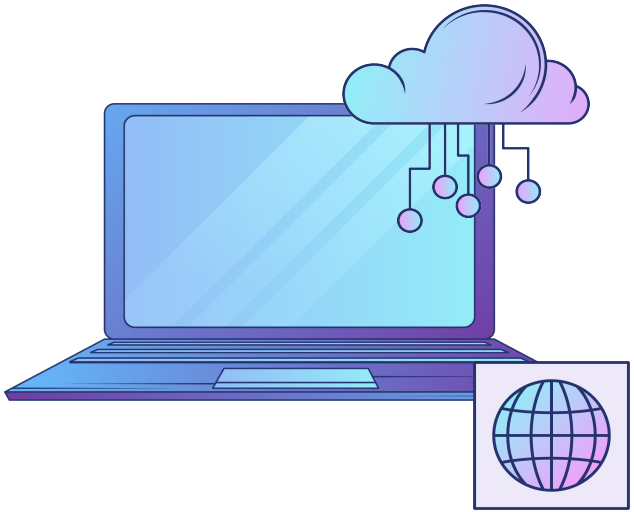
Flow of Presentation

1. Business Understanding
2. Data Understanding
3. Data Preparation
4. Modeling
5. Deployment
6. Key Takeaway



Business Understanding

1. **Industry & Challenge:**

   Focus: Telecommunication industry.

   Main Challenge: Not a well defined target segment of customers

2. **Impact:**

   Direct impact on revenue.

   Increases customer acquisition costs.

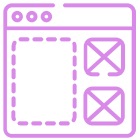
   Negative feedback from lost customers.

3. **Strategy:**

   Prioritize early identification of potential customers

   Recommendations as to refining our advertisement for better retention.

Objectives



Our aim

- Analyze potential customers in the telecom industry.
- Minimize cost of each impression and it's impact on revenue.
- Prioritize identification of patterns in viewers
- Recommend refinement in advertising strategies.

The tasks

- Predict customer retention or departures.
- Recommend fine tuning of retention strategies.
- Discover key product/service combinations.
- Offer tailored retention insights to optimize allocation of marketing resources

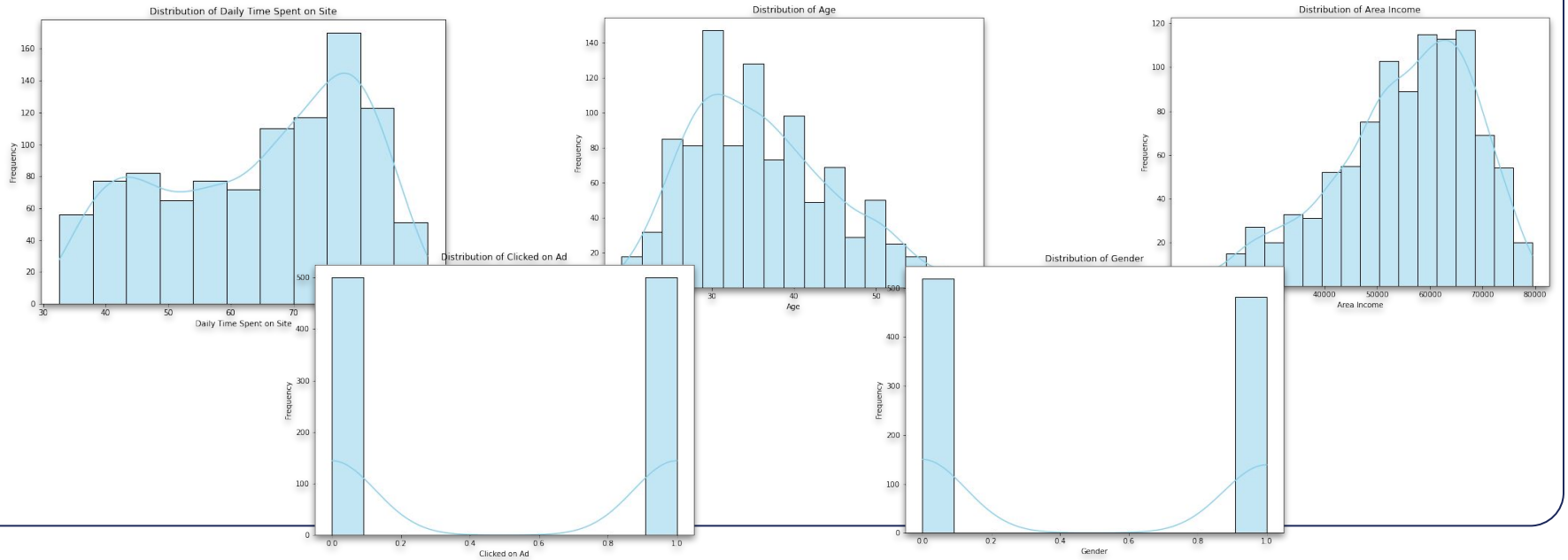
Data Understanding

- Data Source

  The ***Advertisement - Click on Ad dataset*** is retrieved from ***Kaggle***

- Exploratory Data Analysis

  5 Variables — Clicked On Ad, Daily Time Spent on Site, Age, Area Income, Gender



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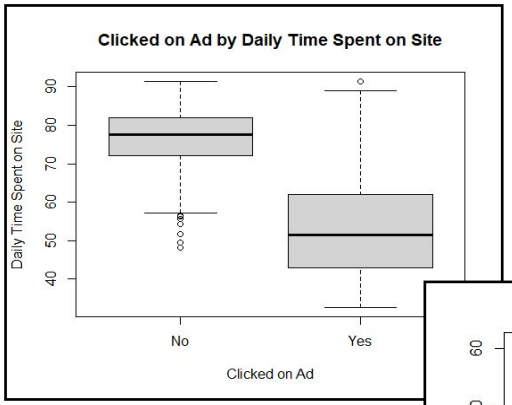
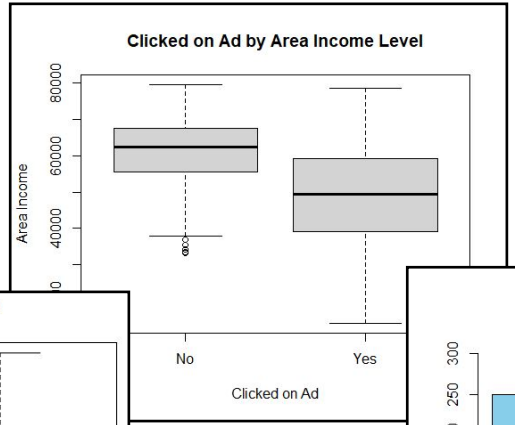
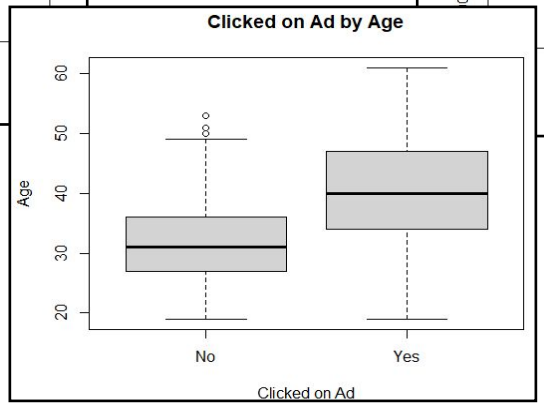
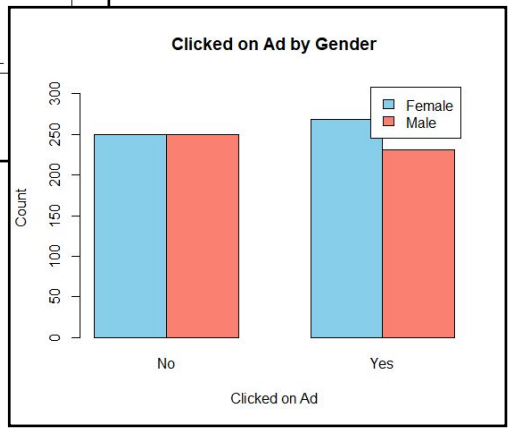






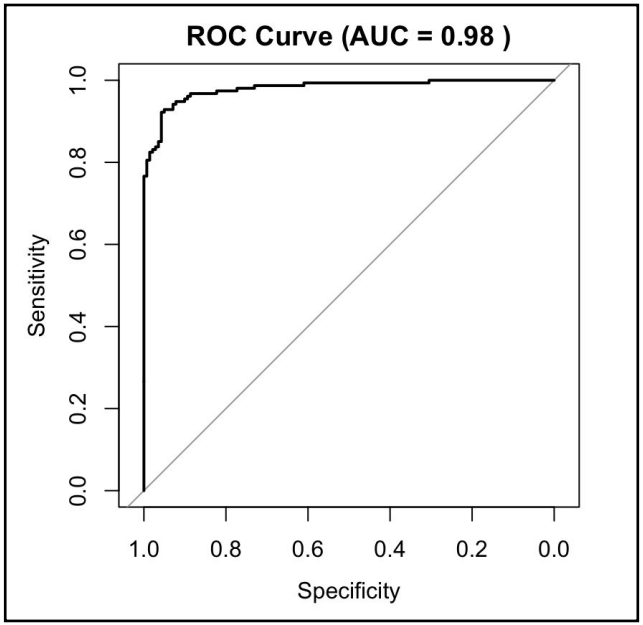


Modeling

5-Fold Cross Validation
Evaluation Metric: Accuracy

	In-Sample Accuracy	Out-of-Sample Accuracy
Logistic Regression	0.9206	0.9255
Decision Tree	0.7998	0.8315
CART	0.8374	0.8122
LASSO	0.9168	0.9205

ROC curve & AUC :
high discrimination ability.



Deployment

Deployment of Data Mining Result

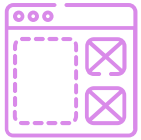
- Feed the data featuring characters of visitors of a certain website
- Predict a Clicked on Ad Rate for the exact ad
- Choose the websites where the ad can bring in the highest Clicks

Issues to be Aware of

- Biases and Inaccurate Results
- Model Robustness and Generalization
- Dramatic Change in the Market

Ethical Consideration

- Dataset itself may face some ethical issues
- Whether and where to place our ads would cause unexpected ethical problems



Other Risk & Proposed Solution

- Risk:
  specific features of a certain ad
- Solution:
  A/B testing on ad placement platforms

Proposed Solution and Insights

1

Focus on viewing behaviors of telecom ads on third-party sites.

2

Emphasis on total click count over click-through rate.

3

Tested models: logistic regression, decision tree, CART, LASSO.

4

Outstanding AUC of 0.98 on the ROC curve.

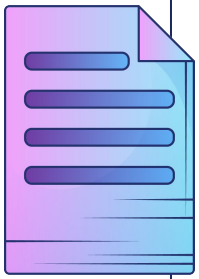
5

Lack of impression data led to focus on the raw click counts.

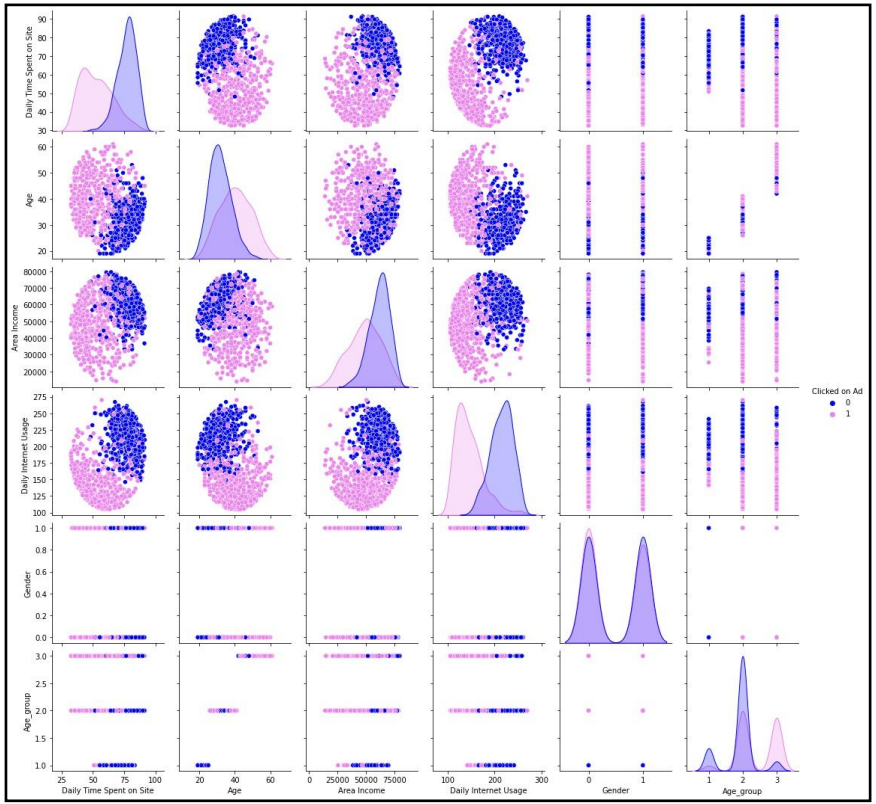
6

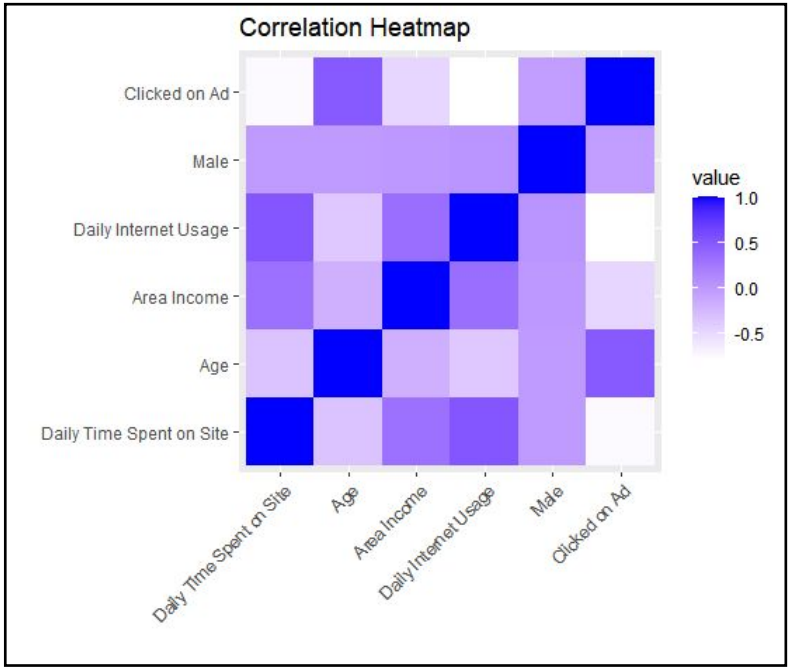
Analysis shows predictive modeling role in enhancing digital advertising.

Thank You!



Appendix


Daily Time Spent on Site
Age
Area Income
Daily Internet Usage
Gender
Age_group
Clicked on Ad
0
1


Correlation Heatmap
Clicked on Ad
Male
Daily Internet Usage
Area Income
Age
Daily Time Spent on Site
value
1.0
0.5
0.0
-0.5