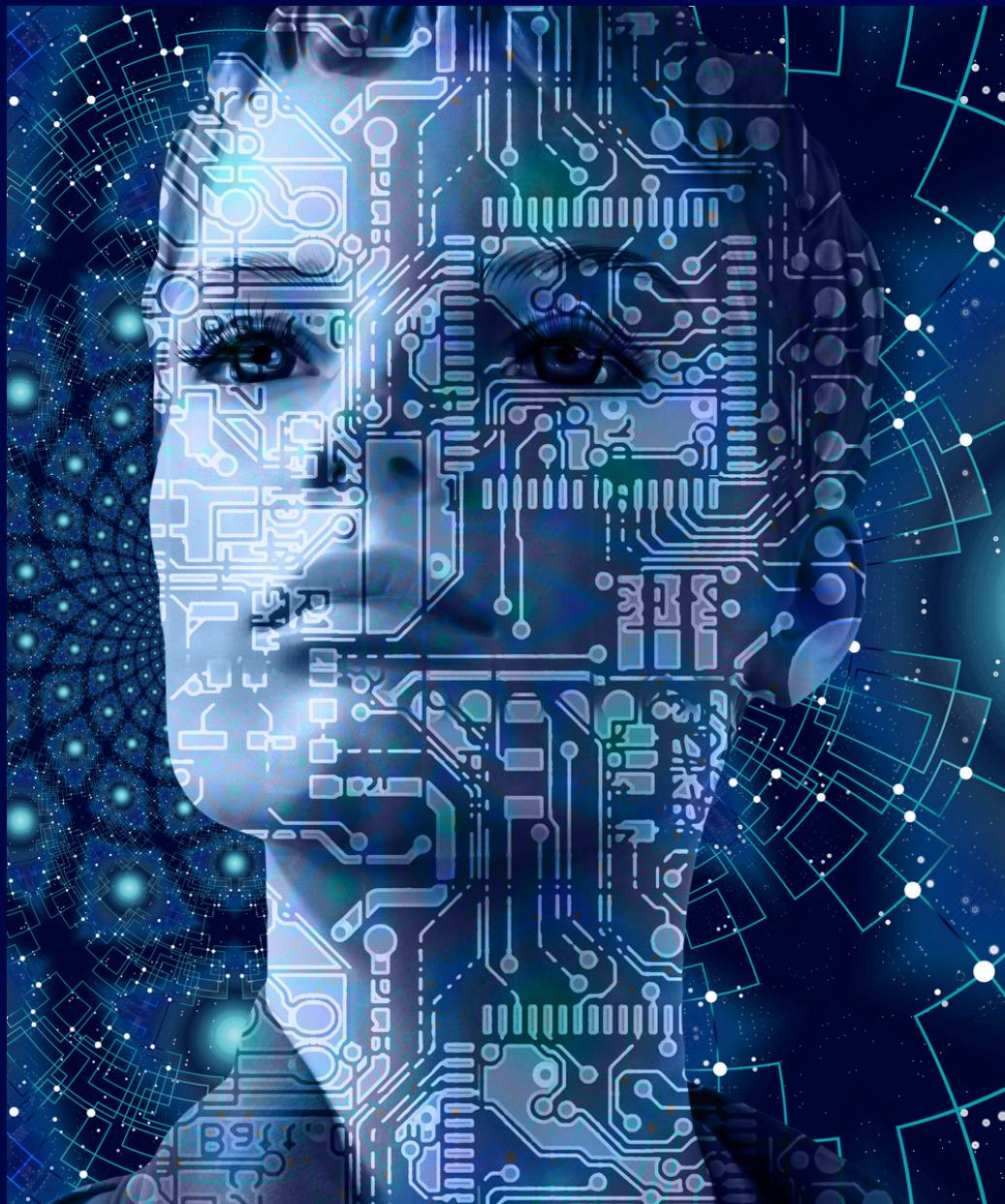


IBM Data science capstone project  
Hruthikamamidala

# SPACEX FALCON 9 LAUNCH ANALYSIS



## ANALYZED SPACEX FALCON 9 LAUNCH DATA TO STUDY LANDING SUCCESS

- Used data collection, EDA, SQL, visualization, and ML models.
- Built predictive models to estimate landing success outcomes.
- Best model achieved ~83% accuracy.

### INTRODUCTION

Falcon 9 reusability reduces launch cost significantly.  
–Predicting first-stage landing success is crucial.  
–Objective: analyze patterns and build prediction models.

## DATA COLLECTION

Data collected from SpaceX REST API.

- Additional data scraped from Wikipedia.
- Launch, payload, orbit, landing outcomes collected.

## DATA WRANGLING

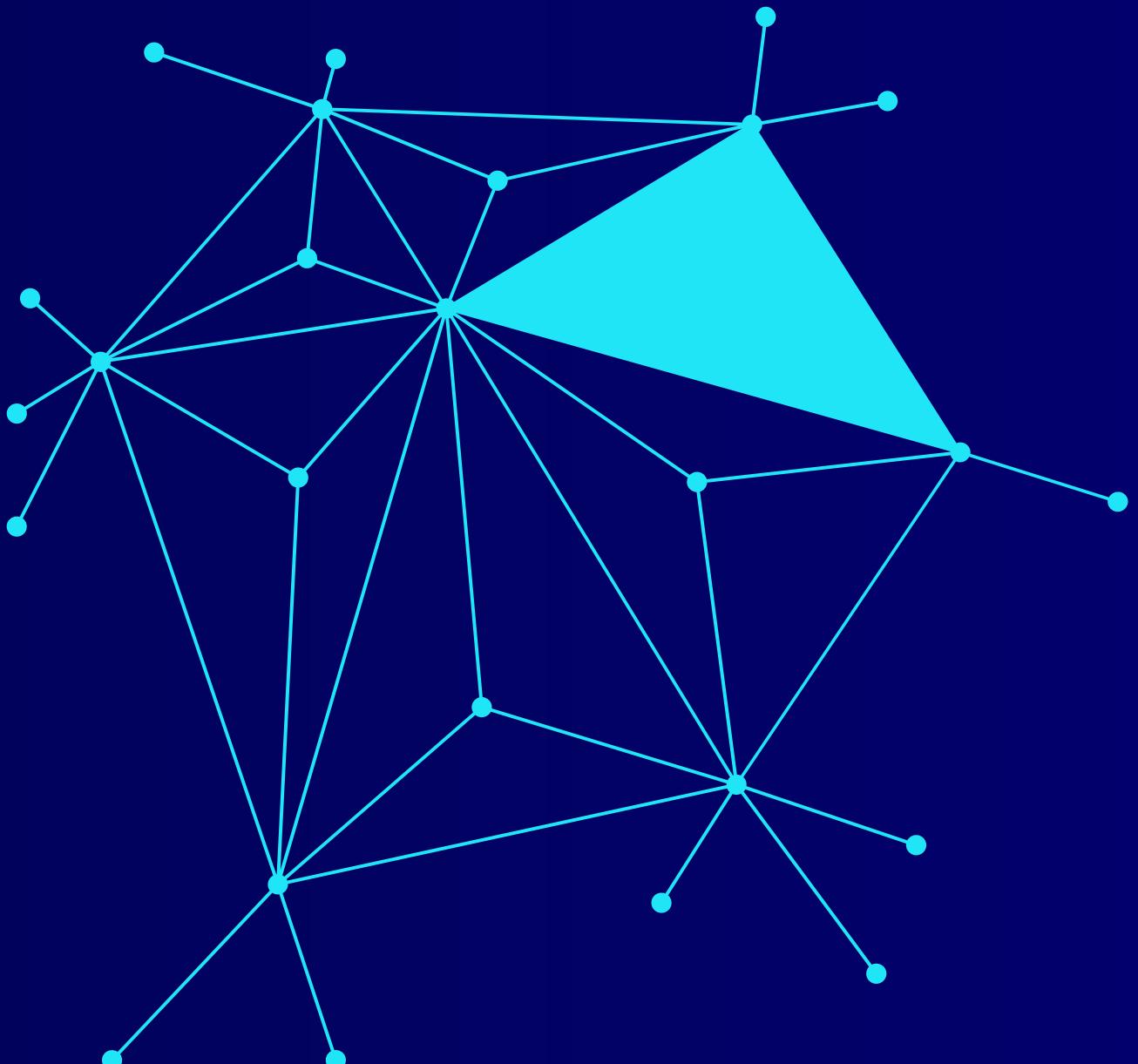
Handled missing values and inconsistent entries.

- Selected relevant features for analysis.
- Created target variable for landing success.



# EXPLORATORY DATA ANALYSIS (SQL)

Analyzed launch sites and payload distributions.  
-Queried mission outcomes and booster performance.  
-Identified trends using SQL queries.



# EDA USING VISUALIZATION

Scatter plots to study payload vs success.  
–Bar charts for launch site performance.  
–Yearly trends in launch success.

# INTERACTIVE VISUAL ANALYTICS

Folium maps used to visualize launch locations.

- Dash dashboard built with dropdowns and sliders.
- Interactive exploration of success vs payload.





# PREDICTIVE ANALYSIS

Models used: Logistic Regression, SVM, Decision Tree.

–Hyperparameter tuning performed using GridSearch.

–Decision Tree performed best.

# RESULTS INSIGHTS

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Payload mass and orbit affect success probability.  
–Certain launch sites have higher success rates.  
–Reusability improves with experience.



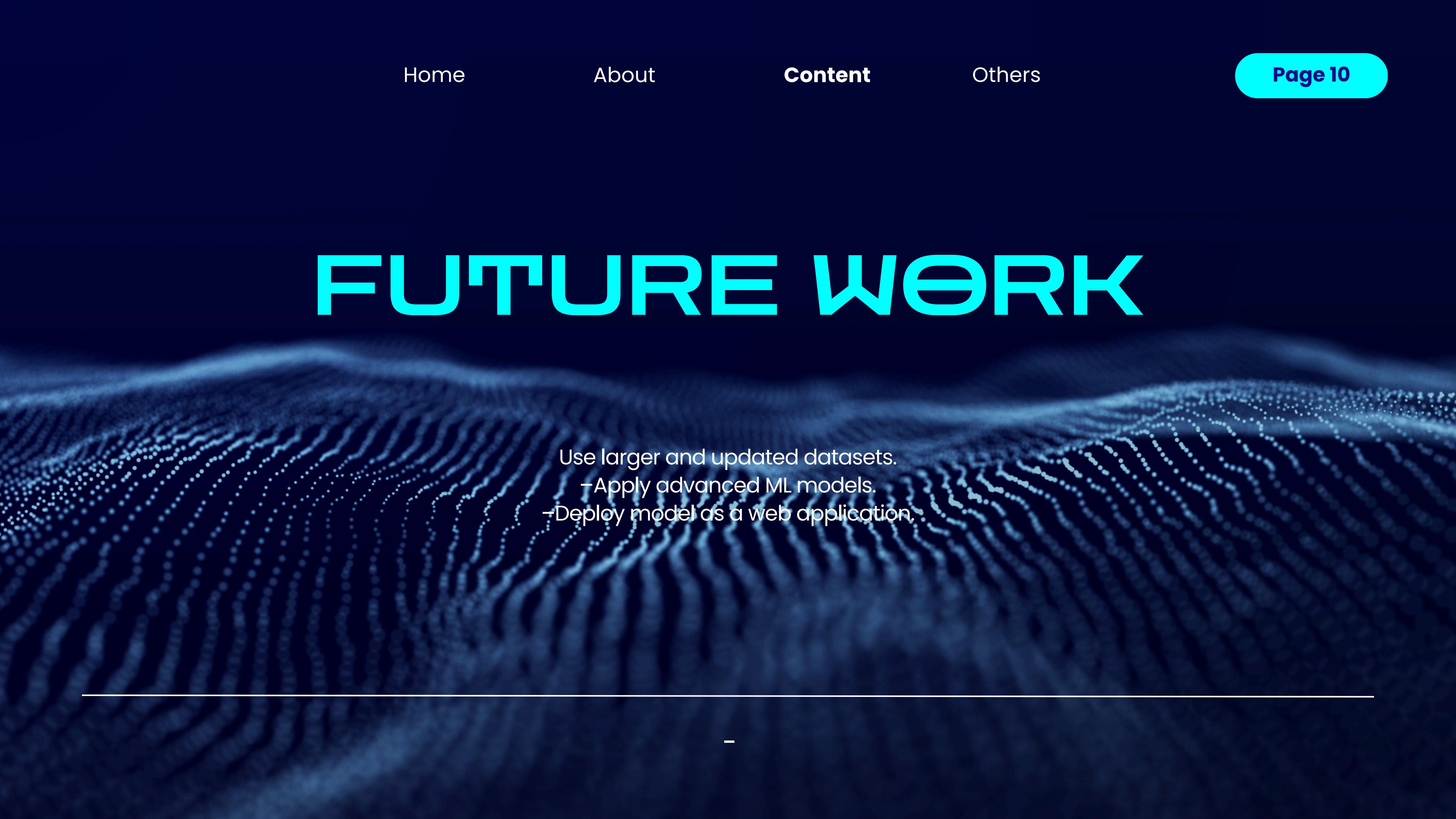


# CONCLUSION

Successfully analyzed and modeled Falcon 9 data.  
–Prediction objective achieved.  
–Project demonstrates end-to-end data science workflow.



# FUTURE WORK

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- Use larger and updated datasets.
- Apply advanced ML models.
  - Deploy model as a web application.
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