HOTEL BOOKING DEMAND

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OVERVIEW & OBJECTIVES

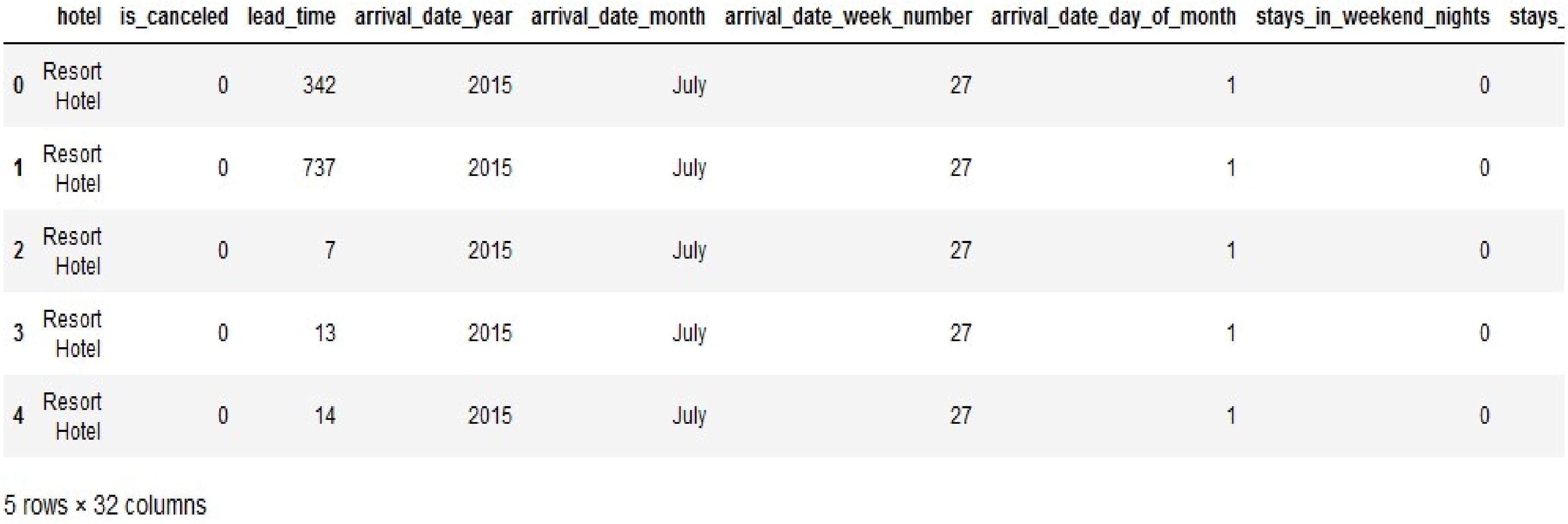
PROBLEM STATEMENT

Building a machine learning model that classify booking statuses accurately can help hotels plan for:

- Refund policies
- Staffing schedules
- Targeting customers with offers and discounts

DATASET

The dataset consists of 119,390 observations with 32 features.



	hotel	is_canceled	lead_time	arrival_date_year	arrival_date_month	arrival_date_week_number	arrival_date_day_of_month	stays_in_weekend_nights	stays_
0	Resort Hotel	0	342	2015	July	27	1	0	
1	Resort Hotel	0	737	2015	July	27	1	0	
2	Resort Hotel	0	7	2015	July	27	1	0	
3	Resort Hotel	0	13	2015	July	27	1	0	
4	Resort Hotel	0	14	2015	July	27	1	0	

5 rows × 32 columns

EXPLANATORY DATA ANALYSIS

DATA CLEANING

Checking features Types

- Features with Incorrect Types:4
- Handling techniques:
  - Change to object
  - Change to integer

- Features with Missing Values:4
- Handling techniques:
  - Column dropping
  - Rows dropping
  - Imputing with mean
  - and mode

Exploring & Handling the Missing values

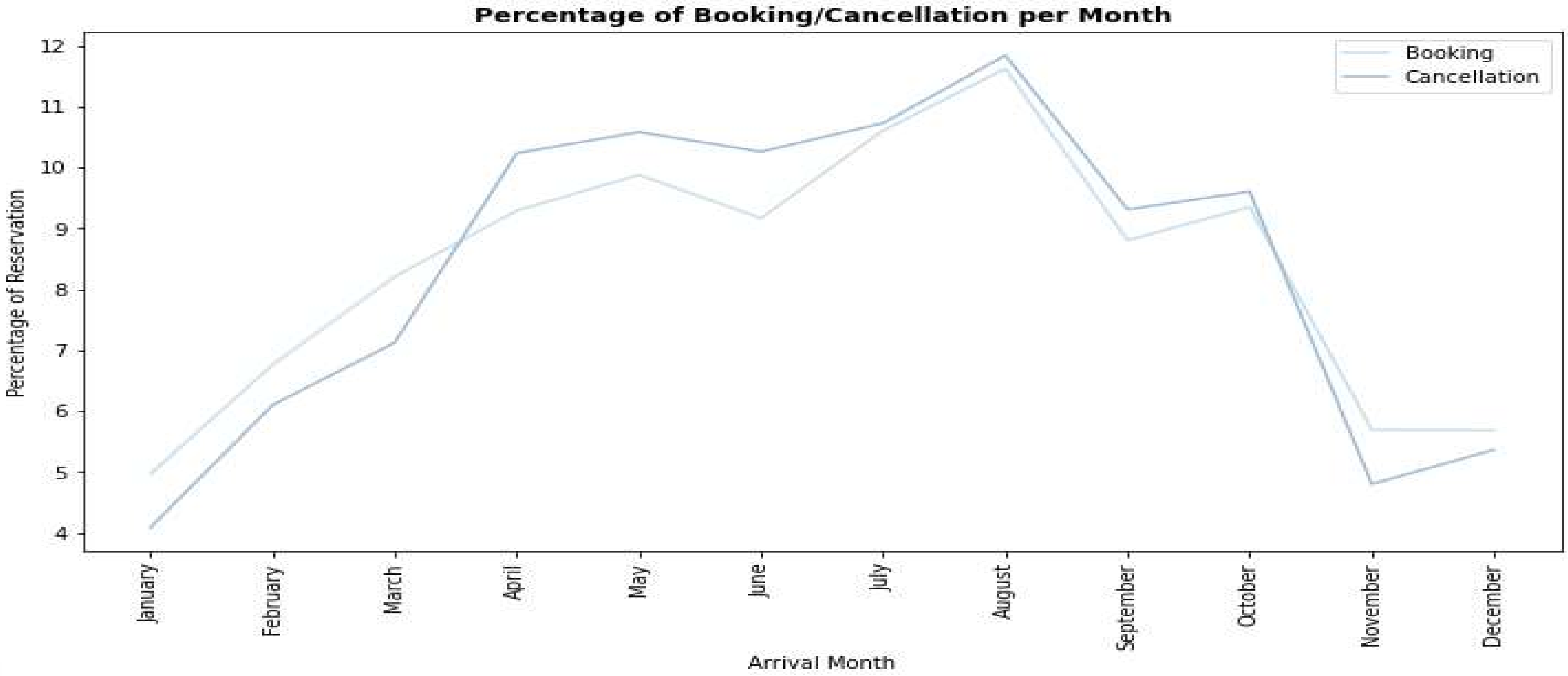
HANDLING OUTLIERS

Features with outlier: 1

Handling techniques:

- Dropping of rows with outlier

DATA EXPLORATION



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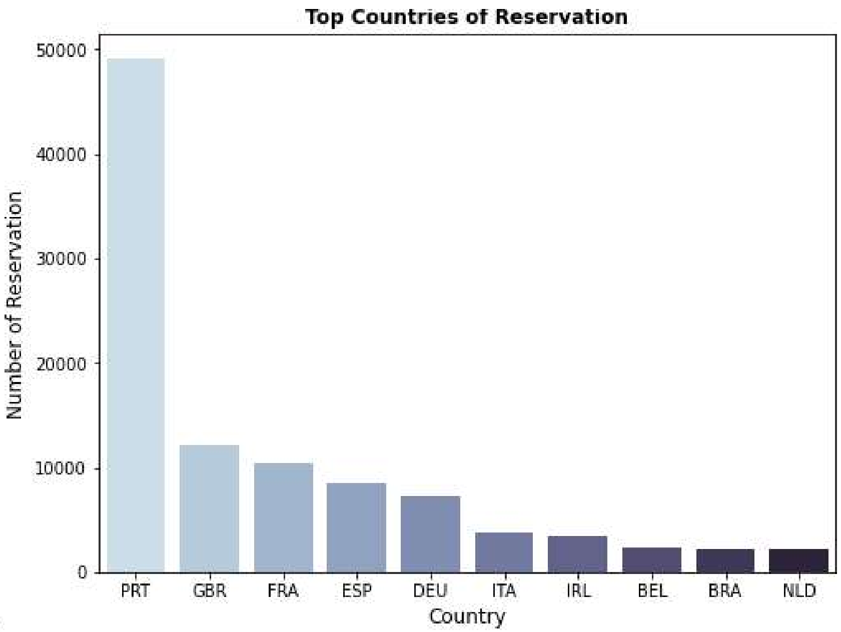

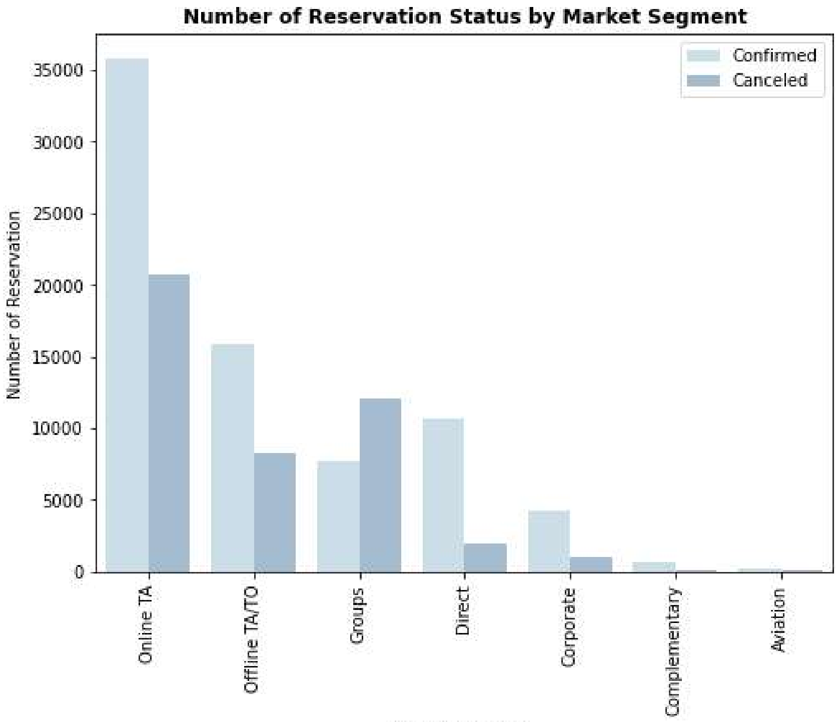

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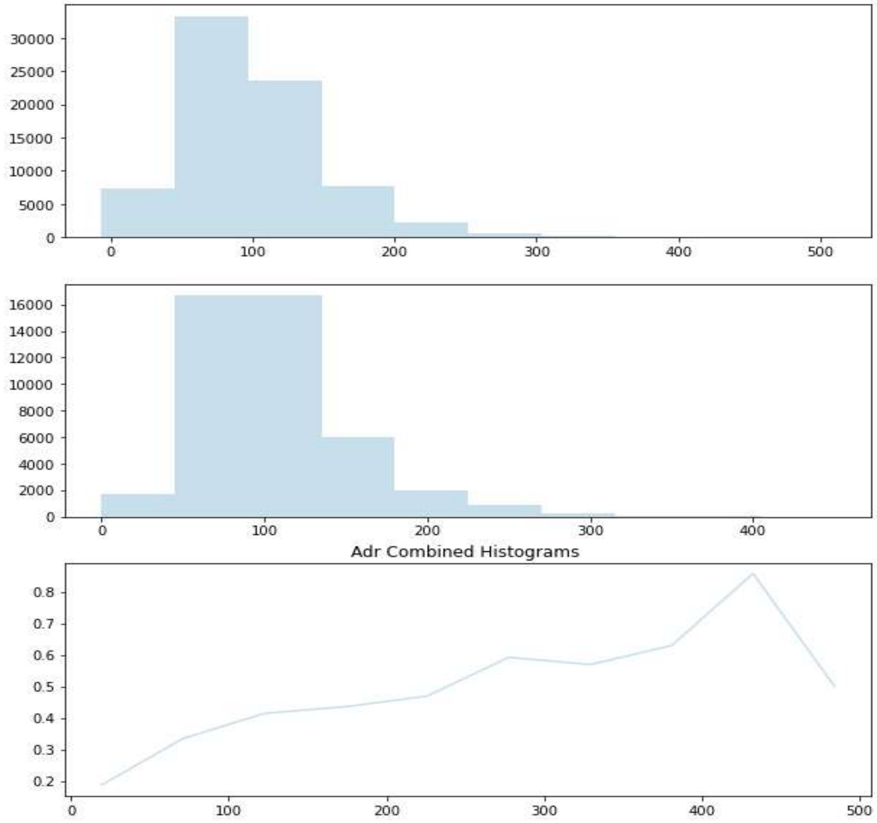
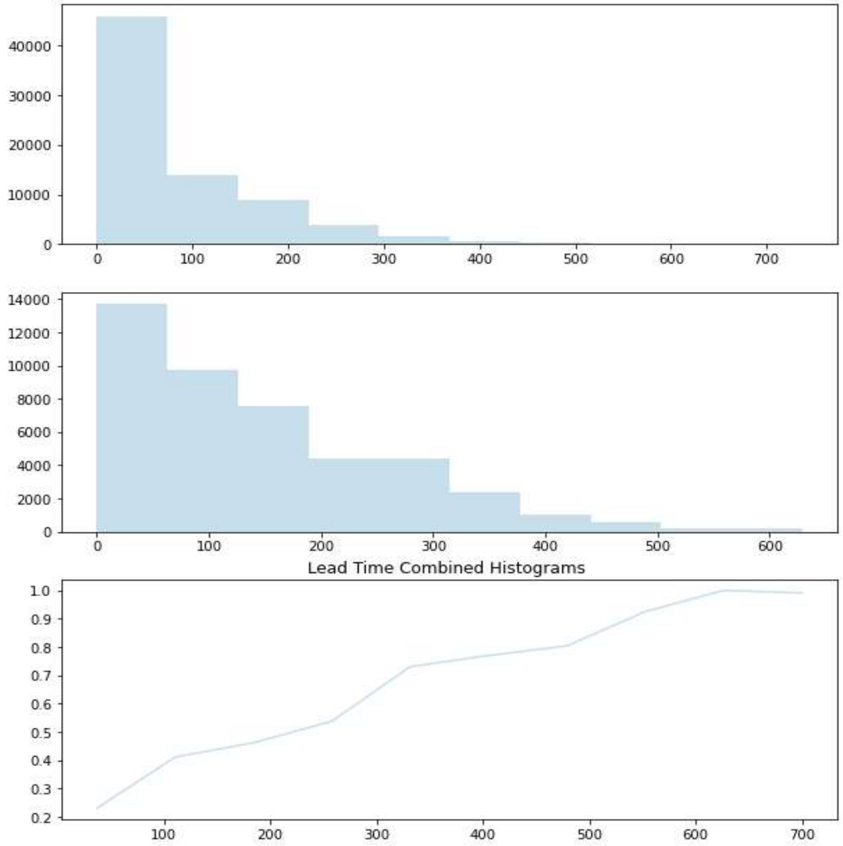




MODEL BUILDING AND EVALUATION

FEATURE ENGINEERING AND SELECTION

FEATURES ENGINEERING

Adding feature

Changing feature

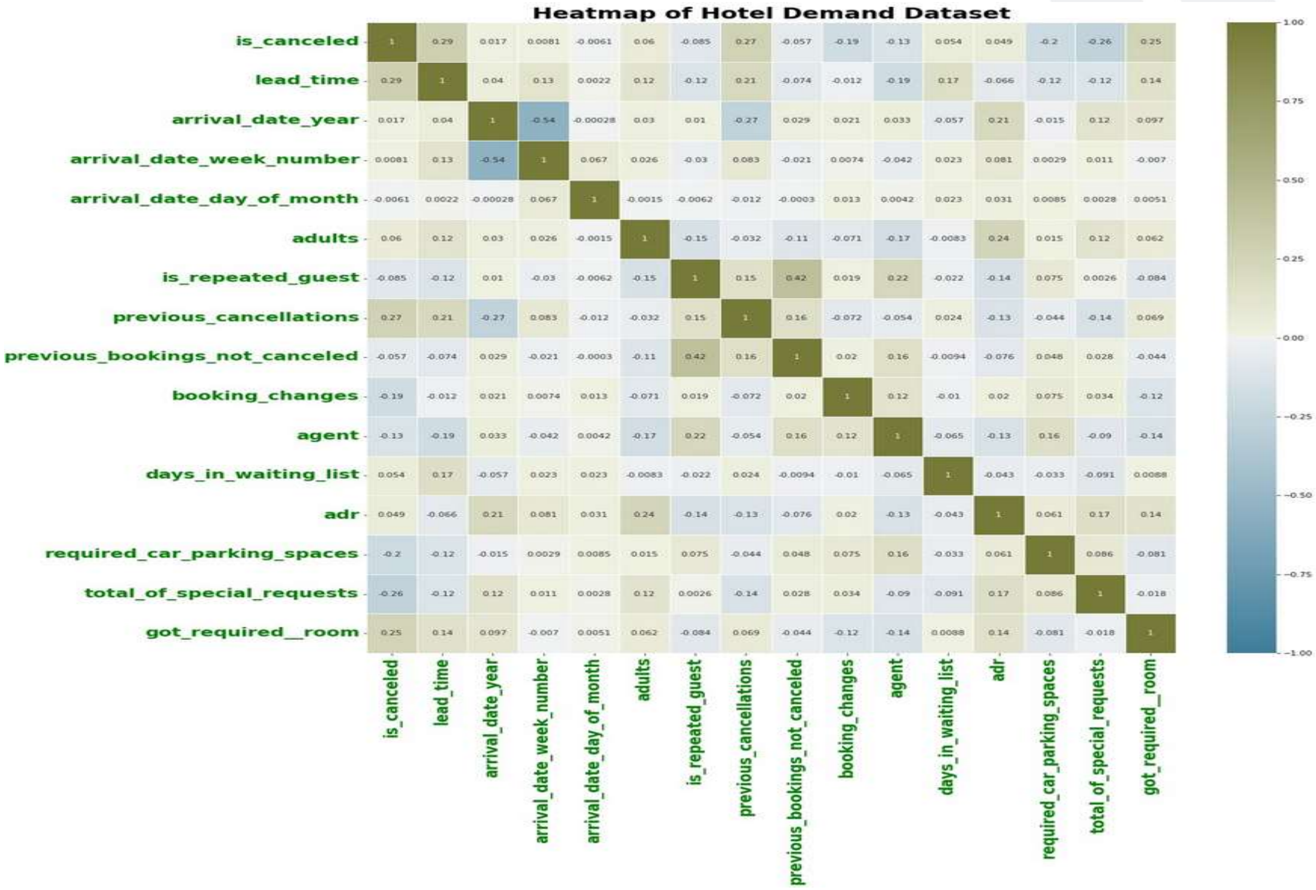
Numerical Features Scaling

Encoding Categorical Features

Select feature based on Importance

FEATURES SELECTION

FEATURE CORRELATION MATRIX

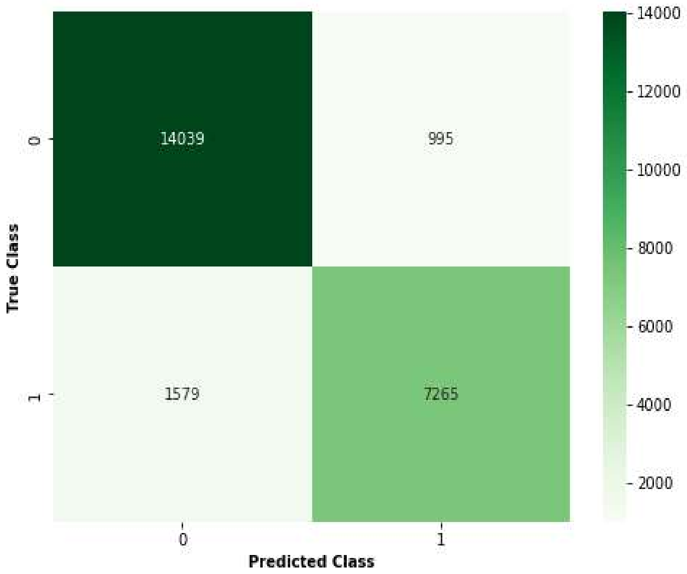


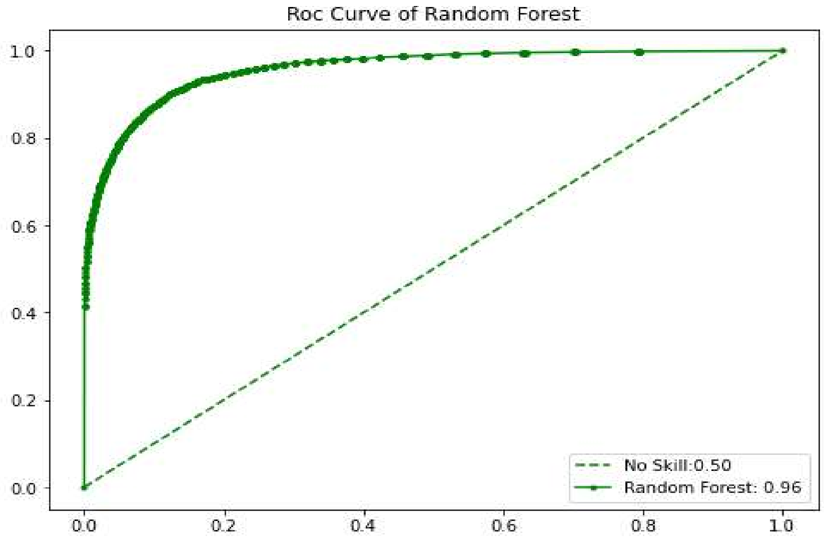
MODEL SELECTION

Model	Precision	Recall	F-Macro (Cross Validation)	F-Macro (Holdout)	AUC
Logistic Regression (LR)	0.81	0.68	0.80	0.80	0.90
Naïve Base (NB)	0.80	0.54	0.74	0.75	
K Nearest Neighbor (KNN)	0.87	0.68	0.82	0.83	
Support Vector Machine (SVM)	0.82	0.67	0.80	0.80	
Random Forest (RF)	0.88	0.81	0.88	0.89	0.95

Model Performance Using 5 Fold Cross Validation & Holdout

RANDOM FOREST ANALYSIS





CONCLUSION

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- Dataset requires cleaning and preparation
- The most important features are:
  - lead_time
  - total_of_special_requests
  - required_car_parking_spaces
  - booking_changes
- Best Model: Random Forest with F-Macro:0.89

THANK YOU

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