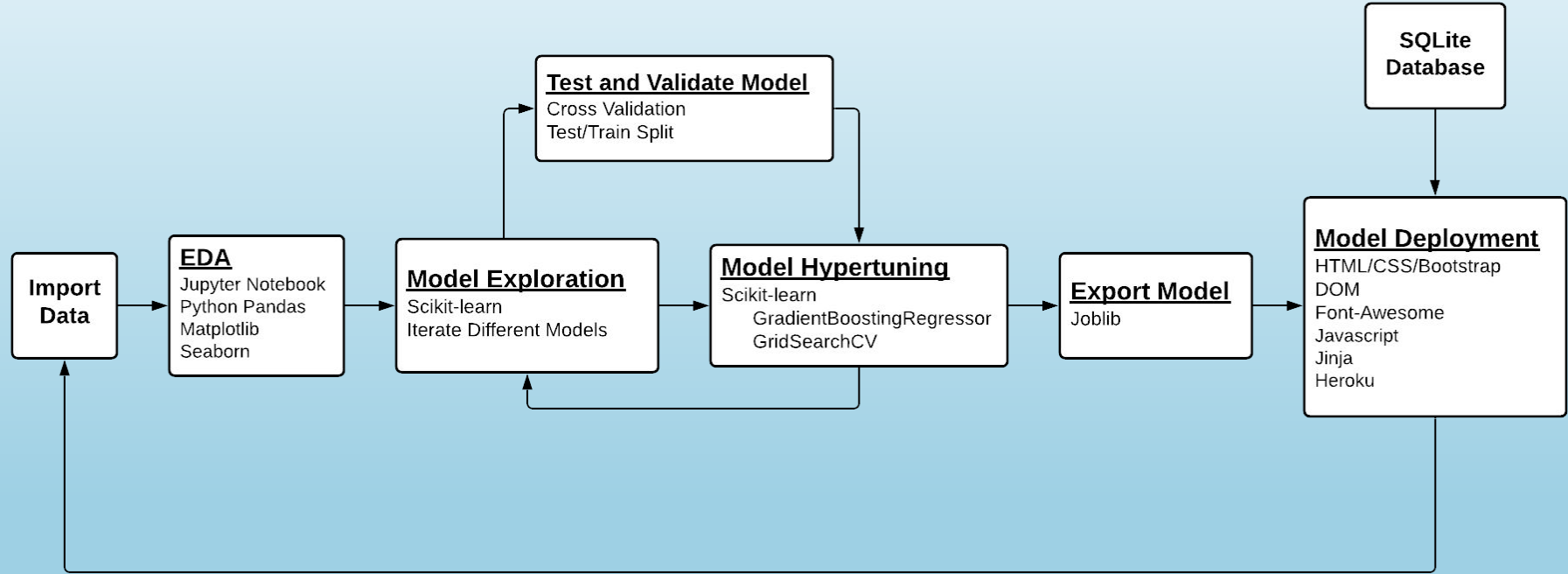# S-MART SALES PREDICTOR

John Clos, Jack Cohen, Sharon Colson and Uchenna Nwagbara

BUSINESS OPPORTUNITY

- The right price is critical to maximize profit

- This model predicts units sold and calculates revenue

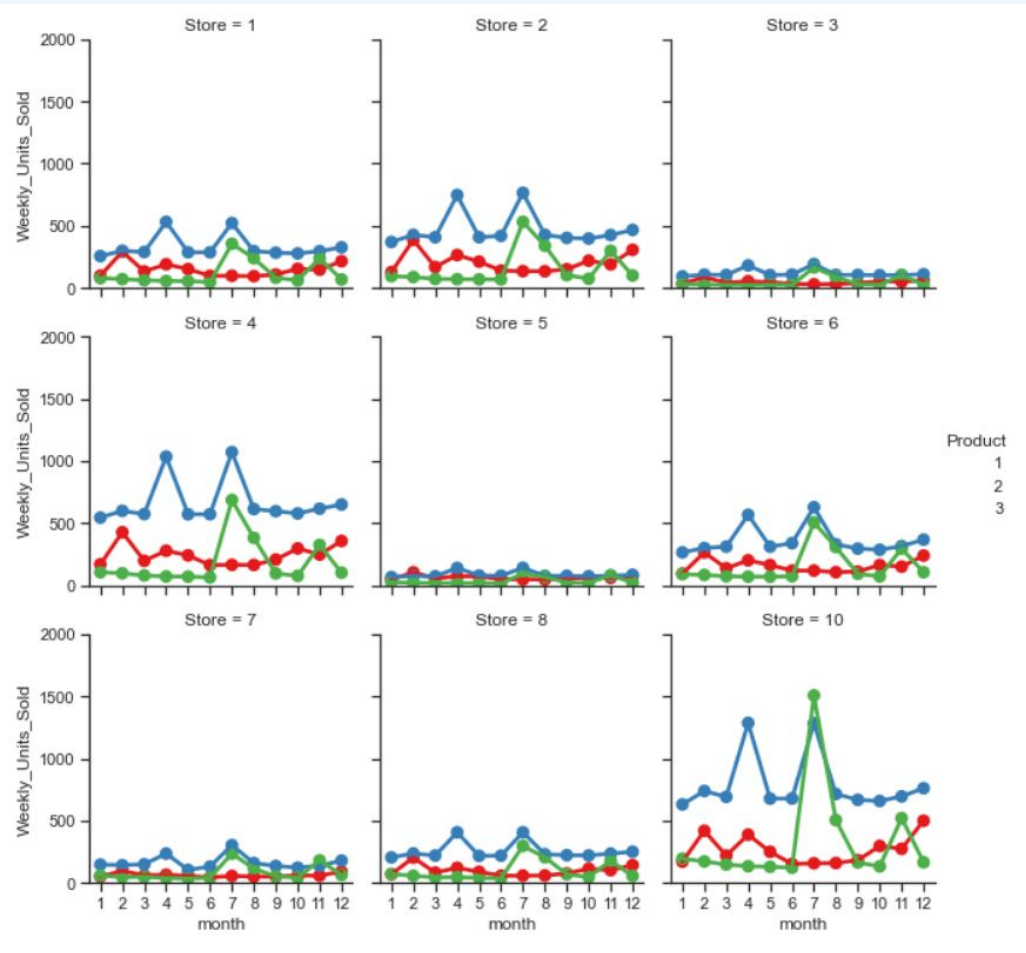- Businesses can use this model to price products and forecast sales

SYSTEM ARCHITECTURE

EDA

- Continual
- Dependent on:
  - Promotion
  - Price
  - Holiday
  - Location
  - Season
  - Product

ORIGINAL DATA

	Store	Product	week_of_year	Base Price	Price	promotion	Is_Holiday	Weekly_Units_Sold
0	1	1	5	9.99	7.99	1	False	245
1	1	1	6	9.99	7.99	1	True	453
2	1	1	7	9.99	7.99	1	False	409
3	1	1	8	9.99	7.99	1	False	191
4	1	1	9	9.99	9.99	0	False	145

ONE-HOT ENCODING

	Base Price	Price	promotion	Is_Holiday	Store__1	Store__10	Store__2	Store__3	Store__4	Store__5	...	week_of_year__48
0	9.99	7.99	1	0	1	0	0	0	0	0	...	0
1	9.99	7.99	1	1	1	0	0	0	0	0	...	0
2	9.99	7.99	1	0	1	0	0	0	0	0	...	0
3	9.99	7.99	1	0	1	0	0	0	0	0	...	0
4	9.99	9.99	0	0	1	0	0	0	0	0	...	0

CHOOSING AND HYPER TUNING THE MODEL

- Supervised Learning
- 68 Features
- 14 Model Iterations
- GridSearchCV:
  - Learning Rate: 0.07
  - Subsample: 0.09
  - N_Estimators: 900
  - Max_Depth: 14
- Numeric Prediction

Gradient Boosting Regressor

```
Cross Validation Score: 0.880 accuracy with a standard deviation of 0.068
Training Accuracy: 0.904
Testing Accuracy: 0.814
Mean Absolute Error: 43.331
R2 Score: 0.814
```

Hypertuned with GridSearchCV

```
Cross Validation Score: 0.934 accuracy with a standard deviation of 0.057
Training Accuracy: 0.991
Testing Accuracy: 0.928
Mean Absolute Error: 26.210
R2 Score: 0.928
```

MODEL DEPLOYMENT

Model Features:

- Product
- Store
- Week of year
- Base price
- Actual price
- Holiday

Model Output:

- Quantity Sold

Calculation:

- Revenue
- Cost
- Profit

https://s-martpredictor.herokuapp.com/

S-MART

Home   Predictor   Data   About   EDA   Model

Contributors

Jack Cohen
Data Analyst

John Clos
Data Analyst

Uchenna Nwagbara
Data Analyst

Sharon Colson
Data Analyst

s-martpredictor.herokuapp.com/predictor

Update

S-MART

Home   Predictor   Data   About   EDA   Model

Choose Your Scenario

Predicted Results

Store

Store 8

Product

Product 2

Week of Year

✓ Select Week

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

Week 9

Week 10

Week 11

Week 12

Week 13

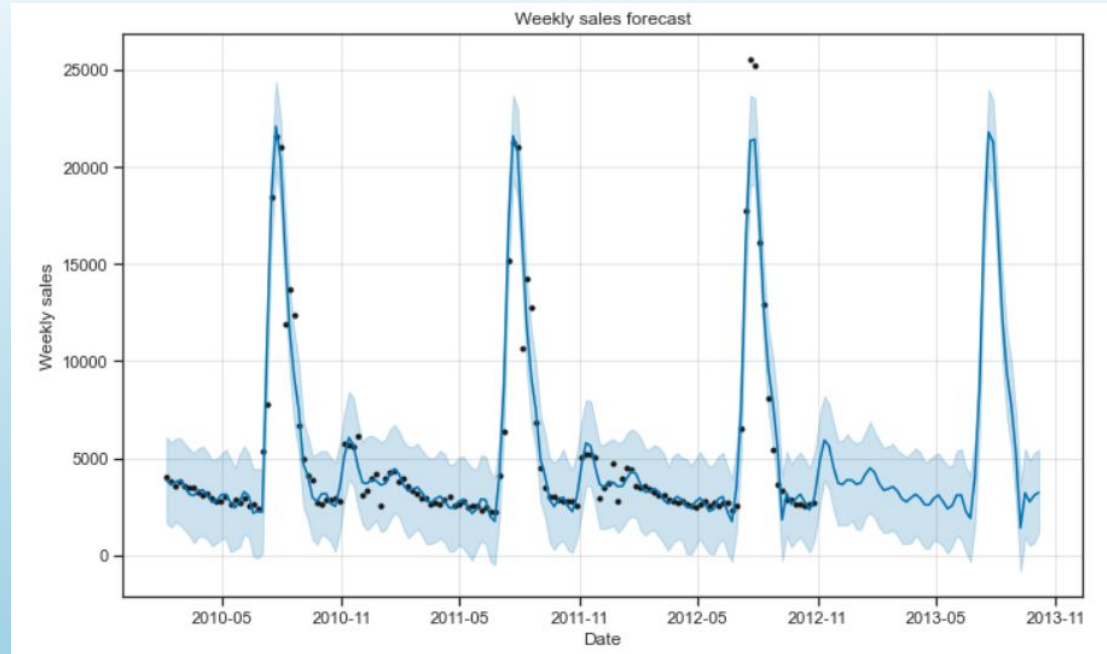Week 14

Week 15

Week 16
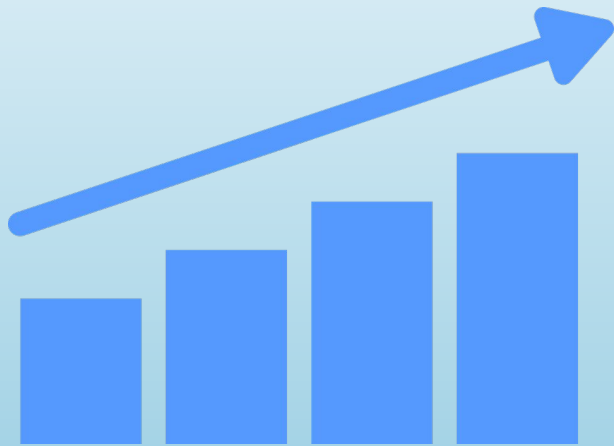
Week 17

Week 18

Week 19

Week 20

Week 21

Base Price

Price

Cost

Predict!

CONCLUSION

- Forecast sales

- Optimize product stock

- Plan for appropriate staffing needs
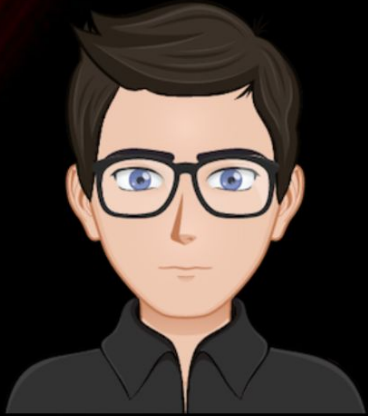

Weekly sales forecast

Minimize waste, maximize profit!

NEXT STEPS

- Input more data in the model

- Alter training method with new tools

- Add visualization tools for comparisons across products and stores

- Add larger variety of products and stores

THE TEAM

Jack Cohen
Data Analyst

John Clos
Data Analyst

Uchenna Nwagbara
Data Analyst

Sharon Colson
Data Analyst

QUESTIONS?

https://s-martpredictor.herokuapp.com/