Bank Telecaller Decision Support System

Group 6
Amol Sakhale
Ismail Ocak
Chenhao Zhou
Xintong Zhou
Harshita Krishna

Outline

- Introduction
- Dataset
- User Stories
- Analysis
- Dashboard Demo
- Challenges
- Conclusion

Introduction

- Market research sector valued over $47 billion in 2018
- Growth rate exceeded the Global GDP, at 10%
- JPMorgan Chase spent over $1 billion on marketing in 2018

The Dataset

- Bank Marketing Data Set [1] - UC Irvine's machine learning repository
- Collected between May 2008 to November 2010
- 41188 samples and 20 features

Direct marketing campaigns of a Portuguese banking institution

marital	age	month	day_of_week	job	education	housing	loan	duration	campaign	contact	y
married	56	may	mon	housemaid	basic.4y	no	no	261	1	telephone	no
married	57	may	mon	services	high.school	no	no	149	1	telephone	no
married	37	may	mon	services	high.school	yes	no	226	1	telephone	no
married	40	may	mon	admin.	basic.6y	no	no	151	1	telephone	no
married	56	may	mon	services	high.school	no	yes	307	1	telephone	no
married	45	may	mon	services	basic.9y	no	no	198	1	telephone	no
married	59	may	mon	admin.	professional.course	no	no	139	1	telephone	no
married	41	may	mon	blue-collar	unknown	no	no	217	1	telephone	no
single	24	may	mon	technician	professional.course	yes	no	380	1	telephone	no
single	25	may	mon	services	high.school	yes	no	50	1	telephone	no

Our interest

- Maximize the output of the marketing campaigns
- How?

  => By knowing who to target for the campaign

How can we take calls from this

to this?

User Stories

Upper management:

- Understand potential success rate of campaign to optimize campaign investment

Telecaller:

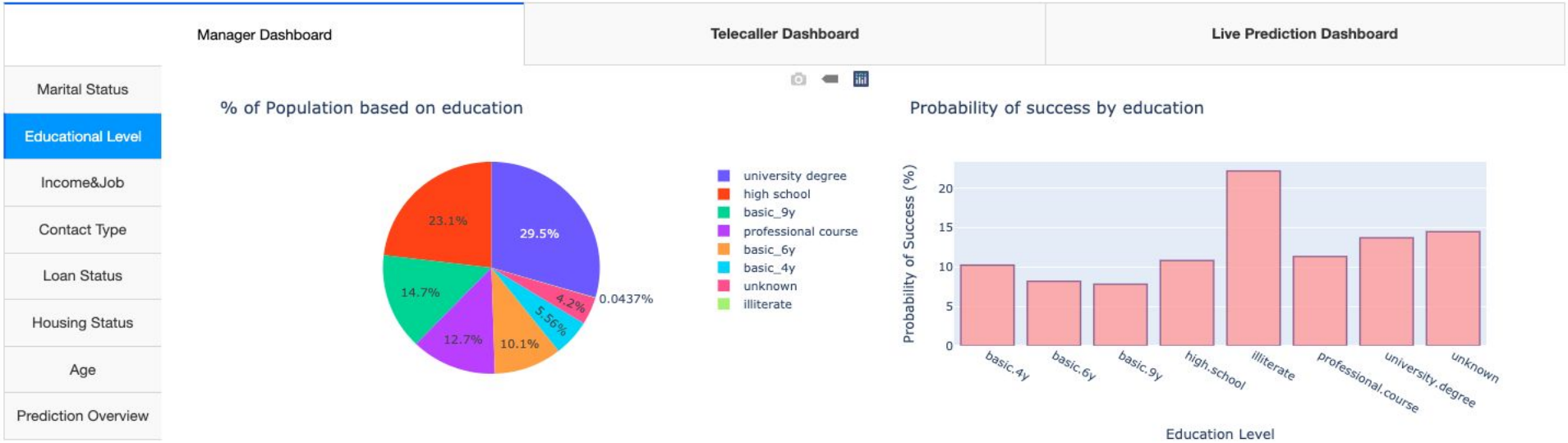
- Able to call the customers who are more likely to purchase the product

Analysis

- Important features
- Probability prediction for current bank customers
- User input prediction for future customers

Analysis - Important features

- Individual analysis and visualization
- For managers to get actionable insights



Analysis - Current Customers

- Predicting probability of success
- Optimizing telemarketers' calls

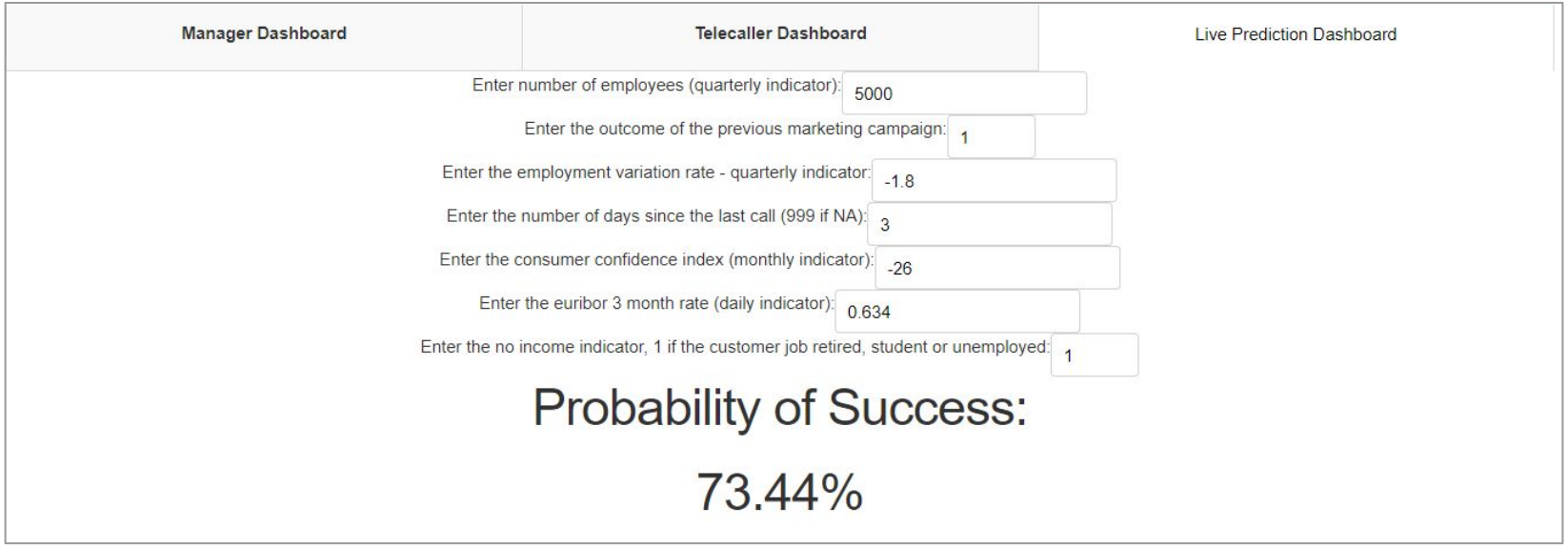
Manager Dashboard | Telecaller Dashboard | Live Prediction Dashboard

Customer ID	Age	Income	Previously Contacted	Probability of Success	Call Result
filter data...					
39334	30	No Income	Success	93.0%	Success
39222	34	Higher Income	Success	90.0%	Not Called
40276	68	No Income	Success	89.0%	Not Called
41053	23	No Income	Success	89.0%	Not Called
40574	45	Higher Income	Success	89.0%	Failure
39224	55	No Income	Success	89.0%	Not Called
39738	28	Higher Income	Success	89.0%	Not Called
40735	60	No Income	Success	89.0%	Not Called
40419	41	Higher Income	Success	88.0%	Not Called
39803	48	Higher Income	Success	88.0%	Not Called

« ‹ 1 / 33 › »

Analysis - Future Customers

- Predicting the probability of success for future customers based on logistic regression



DEMO

Challenges

- Model selection
- Live prediction

Conclusion

- Predicted call results with 90% accuracy
- Generated actionable insights for upper management by analysing important features
- Optimized telecaller decisions by providing accurate predictions
- Live prediction support

Test Coverage Report

```
Name                                                                                    Stmts   Miss  Cover
Missing
-----------------------------------------------------------------------------------------------------------
---------
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/dashboard.py        204     41    80%
587-604, 741-759, 767-772, 775-776
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/src/__init__.py       0      0   100%
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/src/feature_extraction.py  56  0   100%
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/src/pre_processing.py   55      4    93%
148-151
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/src/prediction.py     70     21    70%
52-54, 75, 77-102, 105-128, 158-161, 168
test_analysis.py                                                                          85      0   100%
test_dashboard.py                                                                         32      3    91%
12, 39-40
test_feature_extraction.py                                                                33      0   100%
test_pre_processing.py                                                                    39      7    82%
20, 44-45, 53-54, 64-65
test_prediction.py                                                                        18      0   100%
test_util.py                                                                              16      0   100%
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/util.py              42      0   100%
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/visualization/__init__.py  0  0   100%
/Users/harshita/Desktop/Spring2020/ECE229/Project/new/ECE229-Project/visualization/analysis.py  89  6   93%
62-63, 121, 198-201
-----------------------------------------------------------------------------------------------------------
---------
TOTAL                                                                                    739     82    89%
```

Thank You

References:

[1] [Moro et al., 2014] S. Moro, P. Cortez and P. Rita. A Data-Driven Approach to Predict the Success of Bank Telemarketing. Decision Support Systems, Elsevier, 62:22-31, June 2014

[2] ECE143 WI'20 project of group 17, https://github.com/sepehrfrgh/ece143_direct_marketing