H1N1 Vaccine Model Analysis

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Summary

Predicting whether someone received the H1N1 vaccine or not

Cost Trade-off:

- Missed Opportunity

- Sending survey/medical record request to the wrong person

Outline

- Business Problem

- Data Understanding

- Limitations

- Features

- Model/Evaluation

- Conclusion

- Next Steps

Business Problem

- Private Insurance Company; send follow-survey/request medical records

- Goal: predicting who received the H1N1 vaccine

- Increased knowledge → better insurance policies → company growth
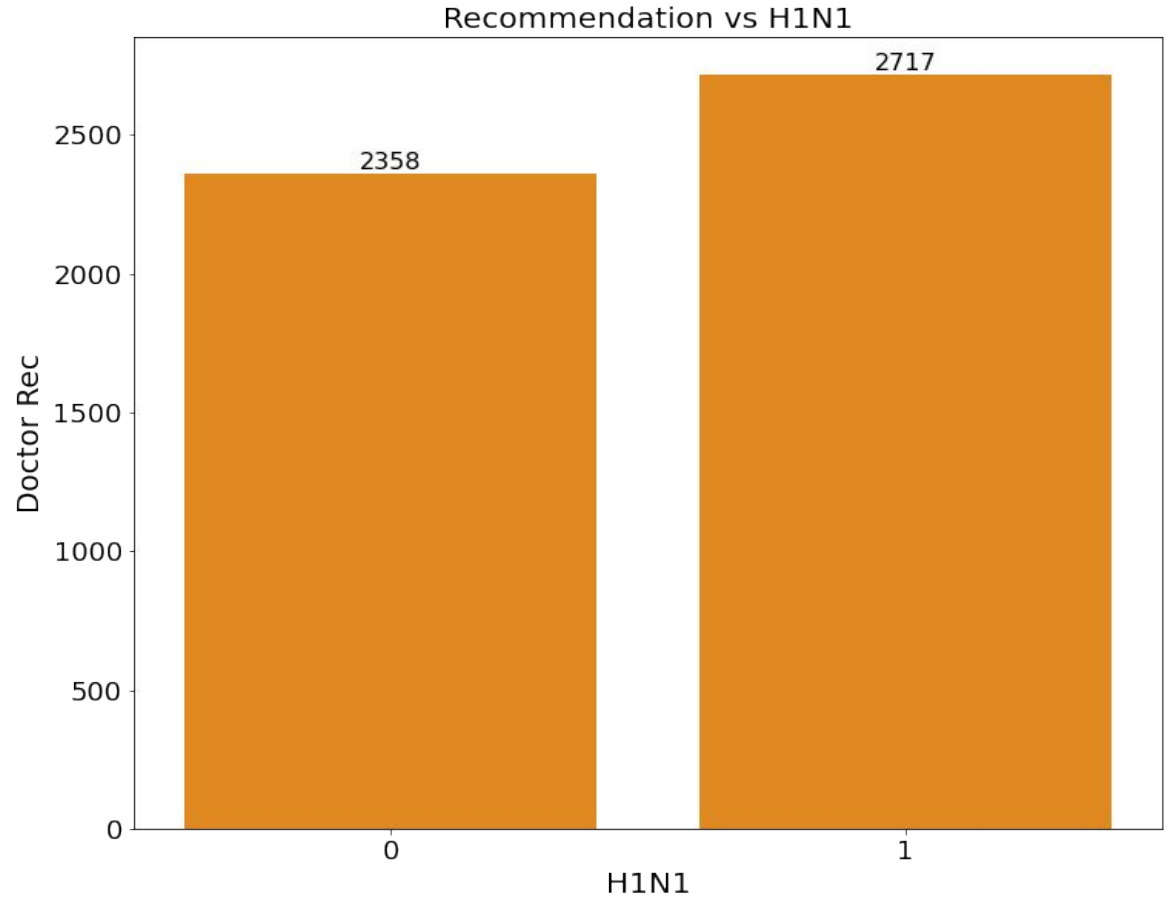
Data understanding

- National 2009 H1N1 Flu Survey Dataset
- "Social, economic, and demographic background, opinions on risks of illness and vaccine effectiveness, and behaviors towards mitigating transmission"
- 26,000 rows and 38 columns

Limitations

- Account for all people that received H1N1 vaccines
- Account for all the factors that lead to receiving H1N1 vaccines
- Missing health insurance and employment data
- Survey Data:
    - Biased, Inaccurate, Unreliable
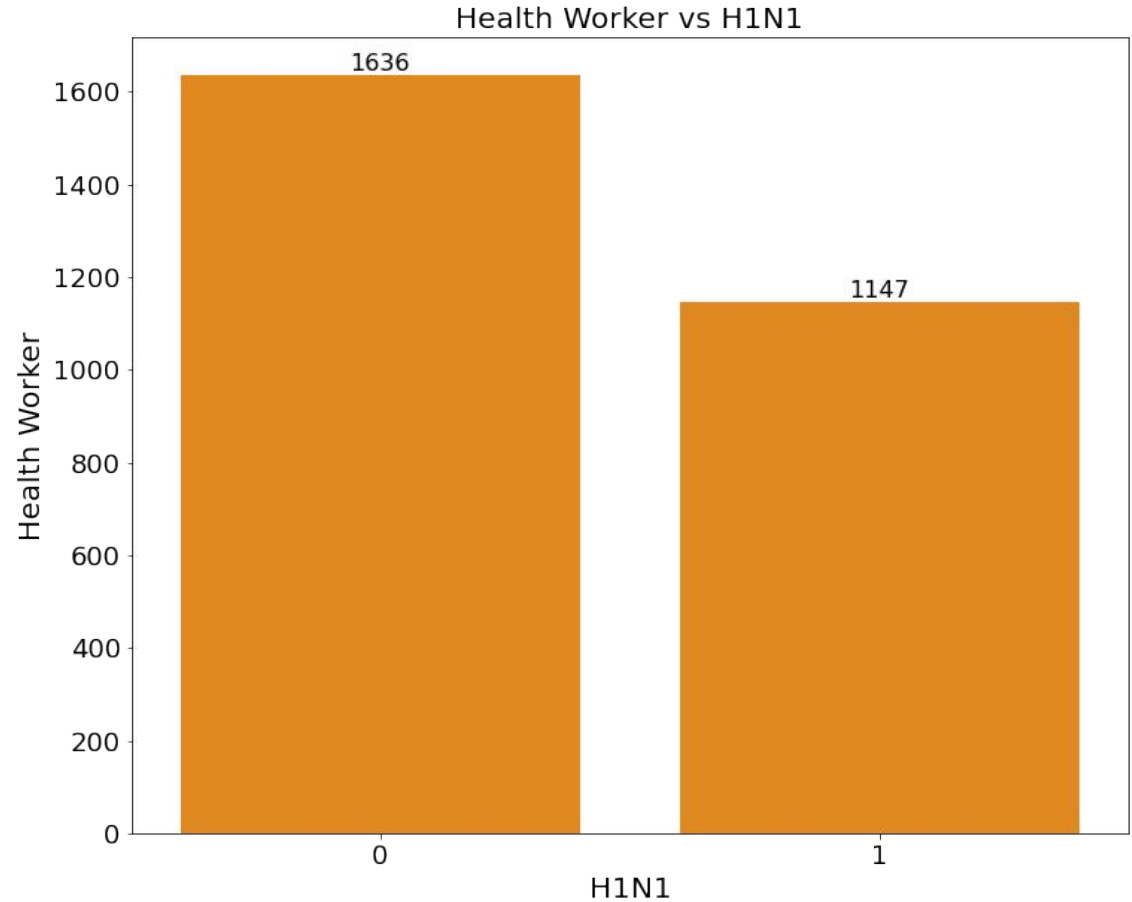
- Patterns/trends
- Follow-up Survey, Medical Records

Feature 1:

- Doctor recommended vaccine
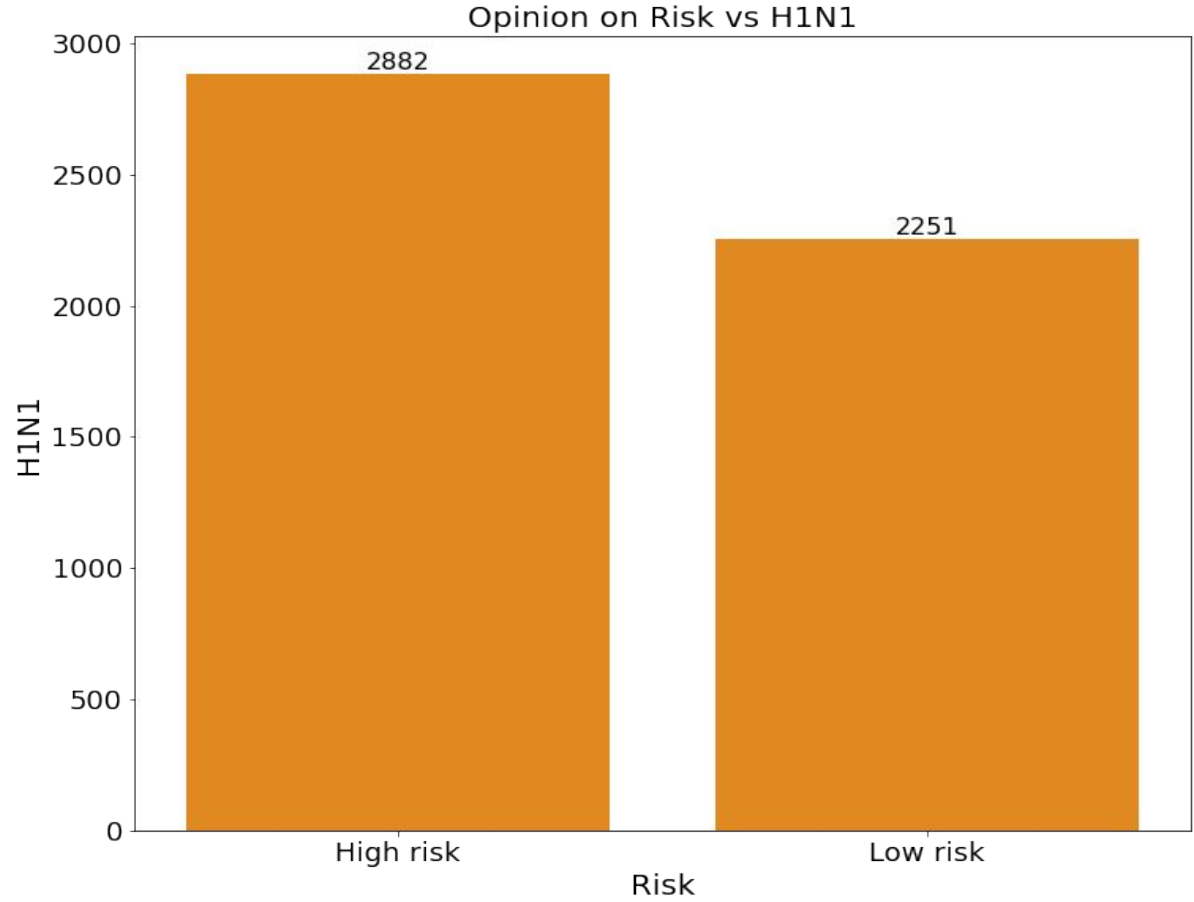
- Doctor rec vs. H1N1 vaccine

Feature 2:

- Is a healthcare worker

- Health worker vs H1N1 vaccine

Health Worker vs H1N1

Feature 3

- H1N1 vaccine received

- Opinion on risk vs H1N1
  vaccine

Opinion on Risk vs H1N1

Model/Evaluation

- Model = ~72%

- Cost Trade-off

  - Missed opportunity vs sending to wrong person

- Three Scenarios based on hypothetical: Surveying 10,000 people with a cost of $1 to create/ship

  - Model = ~72%, cost = $1,800

  - Model = ~81%, cost = $3,000

  - Model = ~91%, cost = $4,800

Conclusion

- Predict who received the H1N1 vaccine

  - Send follow-up survey, request medical records

- Increased knowledge → better insurance policies → company growth

- Three features:

  - Doctor recommendation, health worker, opinion on H1N1 risk

- Logistic Regression

Next Steps

- Cost trade-off

- Send follow-up survey/request medical records → reduce limitations

- Survey focus:

  - Three features, insurance/employment information

- More reliable/accurate model

Questions

Thank you

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