Mental Health Classifier

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Background

Over the past 10 years mental health has finally gained more attention and importance in society.The occurrence of a mental health issues can not only cause major issues in one's personal life but can also disrupt the success of any company. As we are focused in data science this project chooses to look at those issues specifically in the tech industry. There are many factors that can cause the occurrence of a mental health issue which need exploration.This project uses the 2014 data set collected from 1260 persons currently working in the tech industry.

Objectives

- *The first objective for this capstone was to explore the data. Each feature was explored and for some it was digitized.*
- *To understand what is predictive of mental illness*

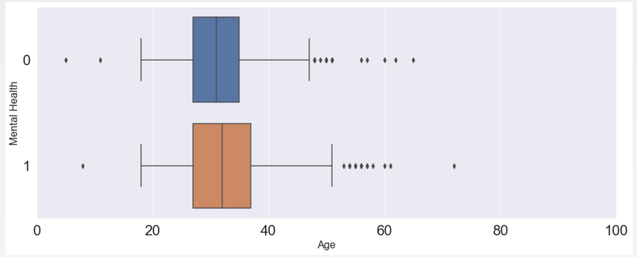
Methods

A box plot on each of the features was examined to see if they had any importance. As you can see below age is plotted.

Then a Random Forest Classifier. The results from the selected metrics will be show later.

The third used was Gradient Boosted Classifier.

	Age	Are you self-employed?	history	If you have a mental health condition, do you feel that it interferes with your work?	Do you work remotely (outside of an office) at least 50% of the time?	Is your employer primarily a tech company/organization?	Does your employer provide mental health benefits?	Do you know the options for mental health care your employer provides?	Has your employer ever discussed mental health as part of an employee wellness program?	Does your employer provide resources to learn more about mental health issues and how to seek help?	Is your anonymity protected if you choose to take advantage of mental health or substance abuse treatment resources?	Do you think that discussing a mental health issue with your employer would have negative consequences?	Do you th that discuss a physi health iss with y emplo would ha negat consequenc
0	37	0	0	1	0	1	1	0	0	1	1	0	
1	44	0	0	0	0	0	0	0	0	0	0	0	
2	32	0	0	0	0	1	0	0	0	0	0	0	
3	31	0	1	1	0	1	0	1	0	0	0	1	
4	31	0	0	0	1	1	1	0	0	0	0	0	



Measures

As it is important to eliminate false negatives the metric selected for this data set and model was recall. Recall focuses on eliminating our false negative rate. Additionally precision is used as it keeps down the false positive rates.

$$recall = \frac{true\ positives}{true\ positives\ + false\ negatives} \qquad precision = \frac{true\ positives}{true\ positives + false\ positives}$$

Results

Here are the scores from both the random forest model and Gradient Boosted

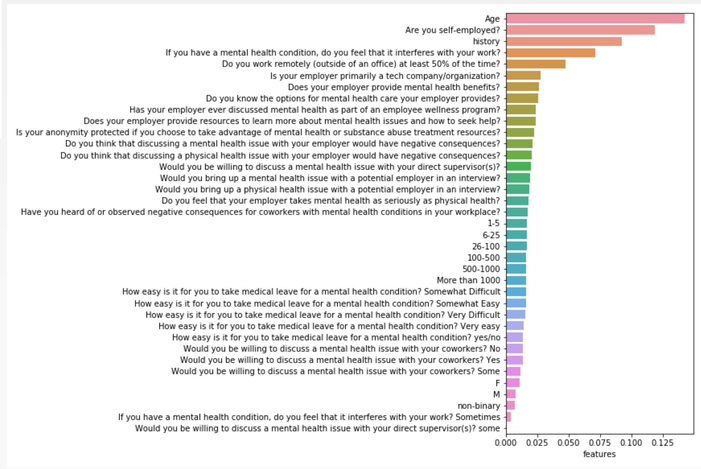
```
accuracy: 0.740
precision: 0.725
recall: 0.787
============================================================
classification_report:
              precision    recall  f1-score   support

           0       0.76      0.69      0.72       205
           1       0.72      0.79      0.75       211

    accuracy                           0.74       416
   macro avg       0.74      0.74      0.74       416
weighted avg       0.74      0.74      0.74       416
```

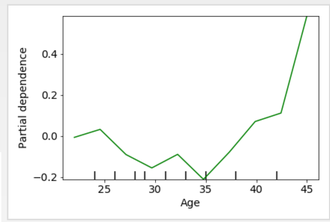
Random Forest Model

```
accuracy: 0.752
precision: 0.739
recall: 0.791
============================================================
classification_report:
              precision    recall  f1-score   support

           0       0.77      0.71      0.74       205
           1       0.74      0.79      0.76       211

    accuracy                           0.75       416
   macro avg       0.75      0.75      0.75       416
weighted avg       0.75      0.75      0.75       416
```

Gradient Boosted Model

Discussion





Conclusion

As is shown by the feature importance the most influencing factor in determining potential for a mental health issue is age.

Following that we see that the most important feature is self-employment. Which surprisingly shows up before a history of mental illness

Obviously a history of mental illness is going to be an important feature.

As we look at the feature importance a lot of influence is on communication. From the data it seems willingness to communicate sums up to a higher chance of mental illness from looking at the features.

References

1. https://www.understandingsociety.ac.uk/documentation/health-assessment