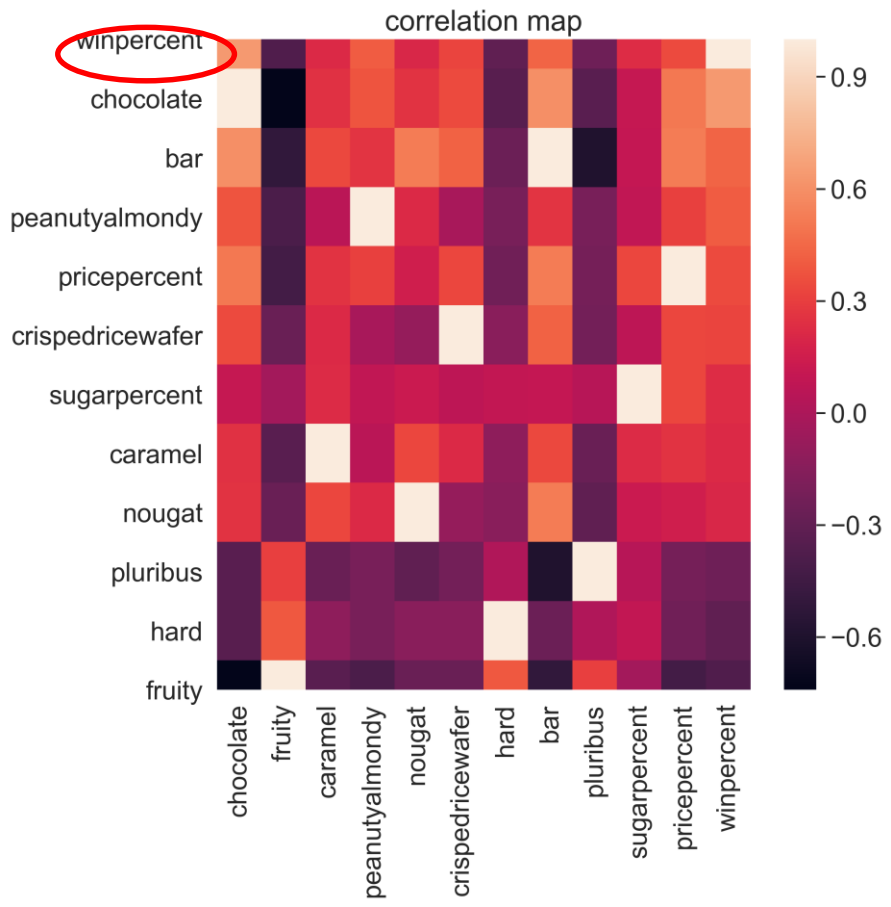
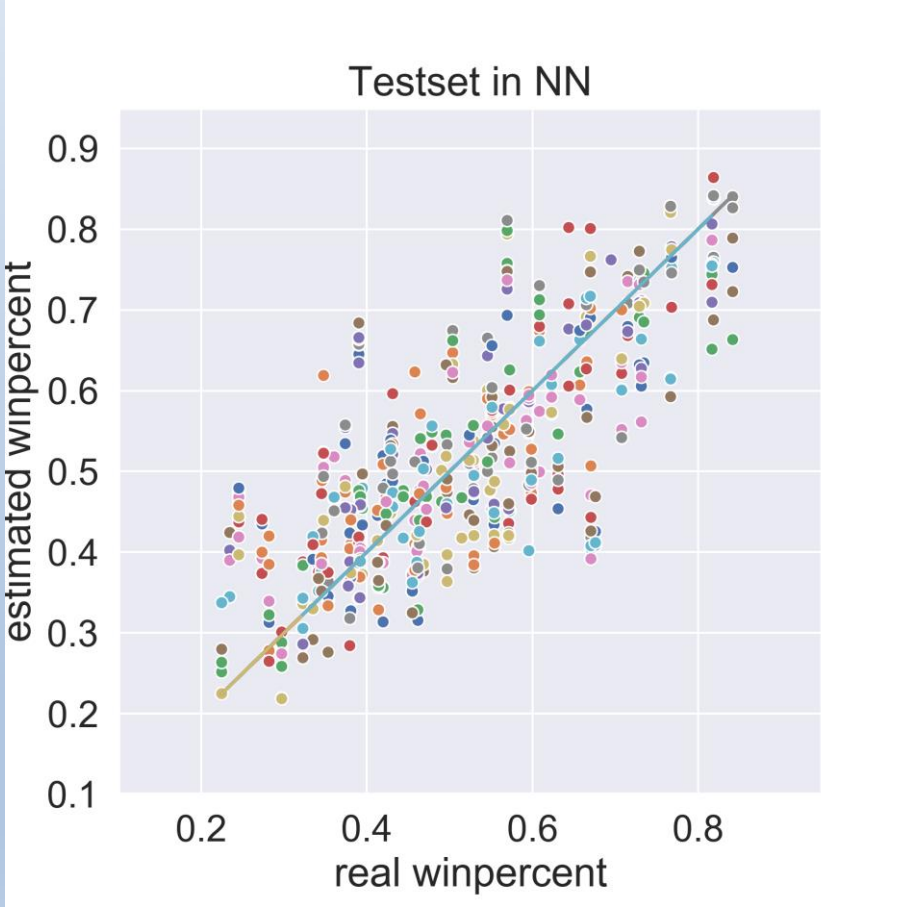
Analysis of candy-power-ranking

Yangbin Ma

Original dataset: https://github.com/fivethirtyeight/data/blob/master/candy-power-ranking/candy-data.csv





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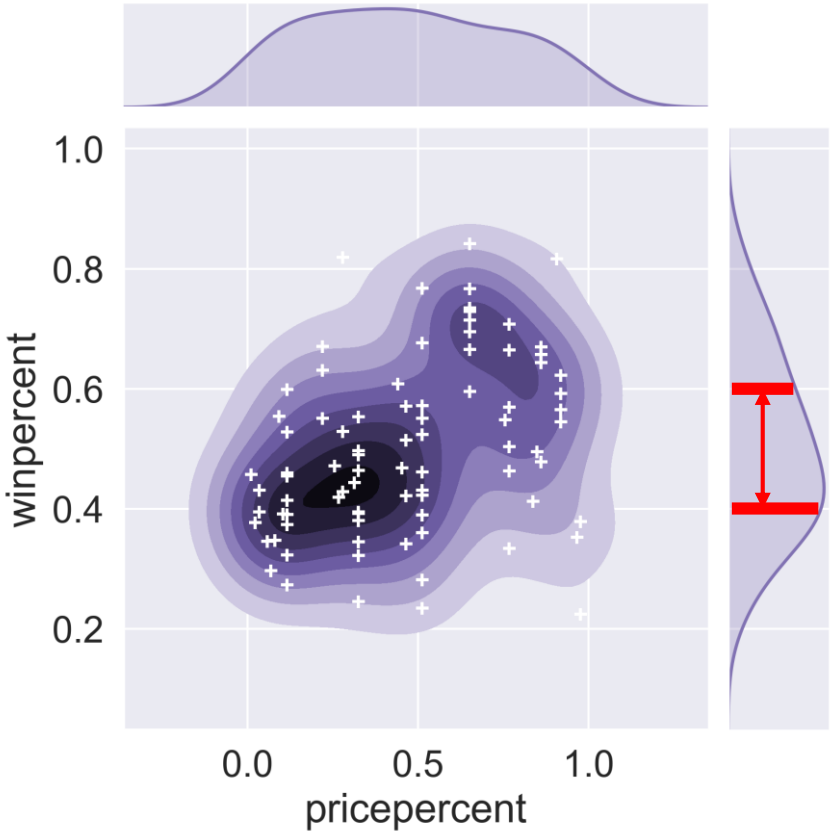
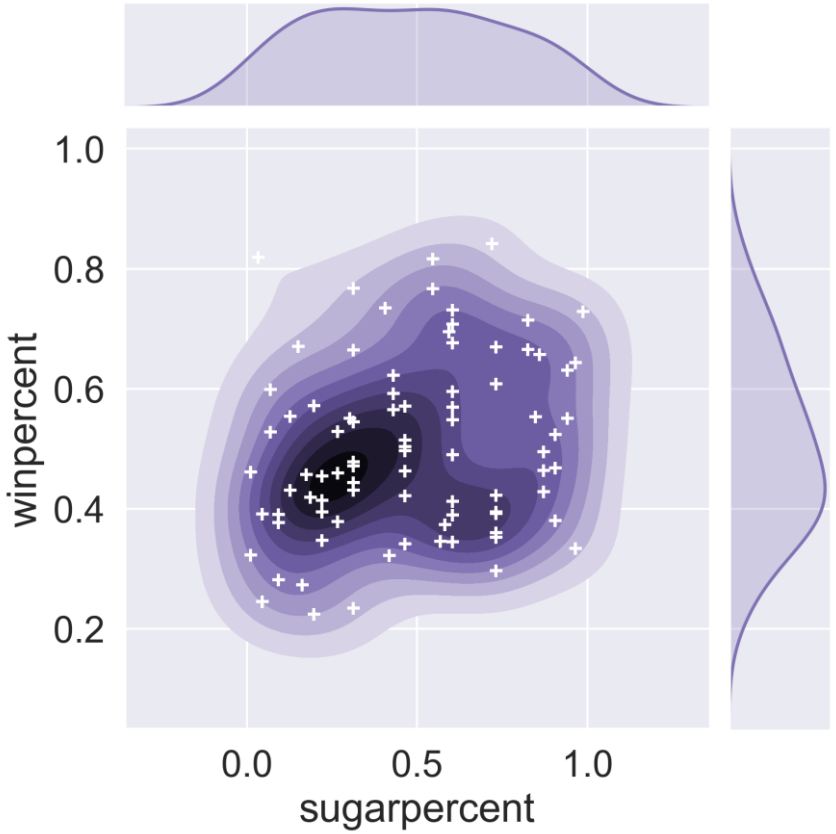
First glance of data





Overview of winpercent

(20%~40%) occupied 25% dataset

(40%~60%) occupied 50% dataset

(60%~80%) occupied 25% dataset

→ **Data oversampling!**

Small dataset

↓

Data augmentation!

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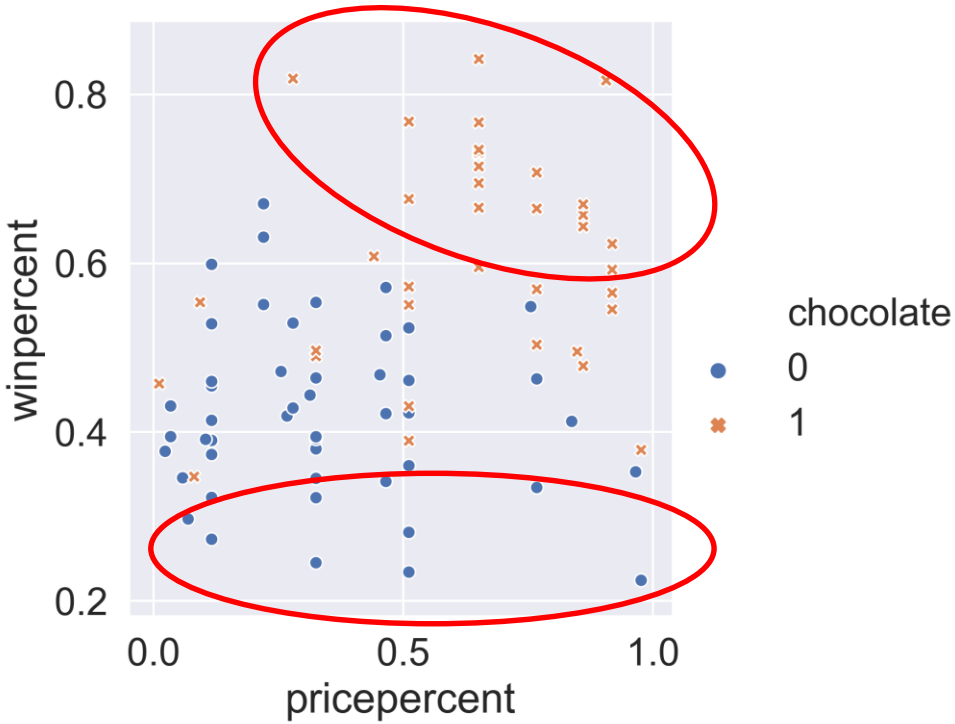
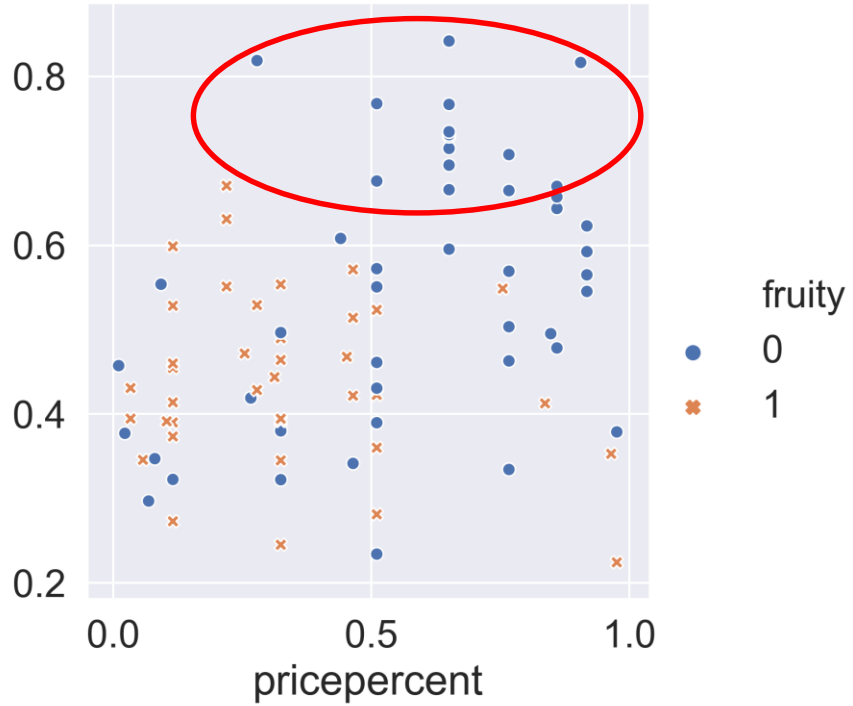
First glance of data



Chocolate is VIP!



High top, no fruity

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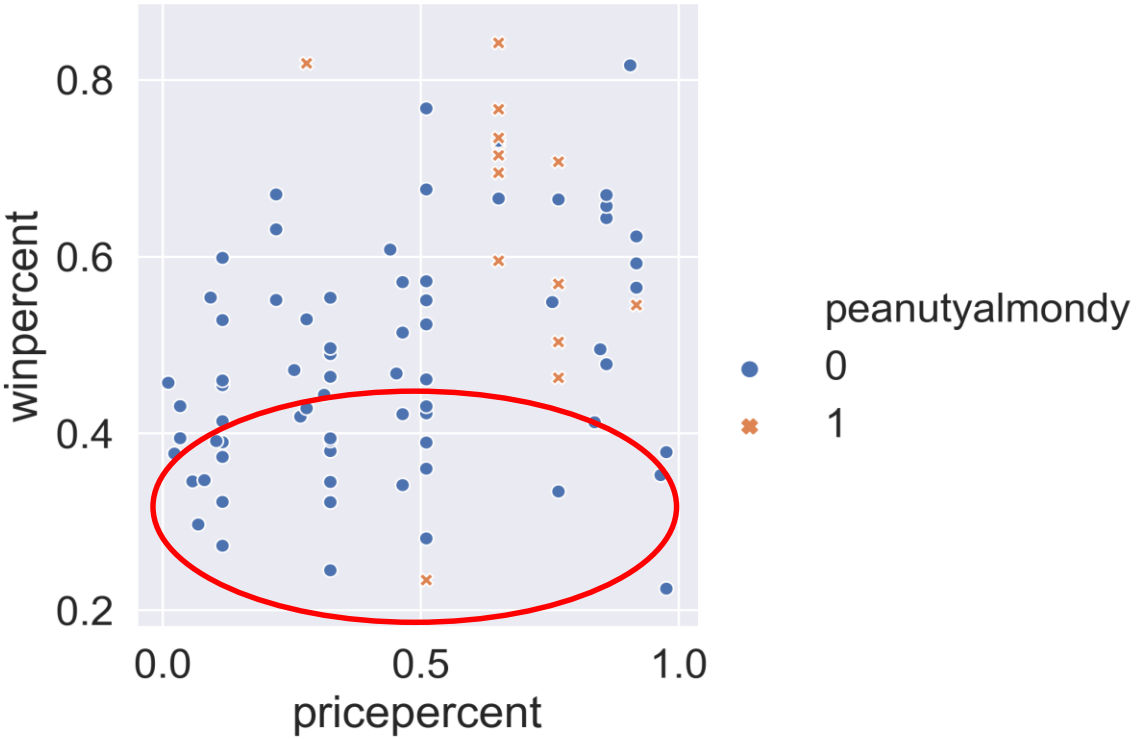
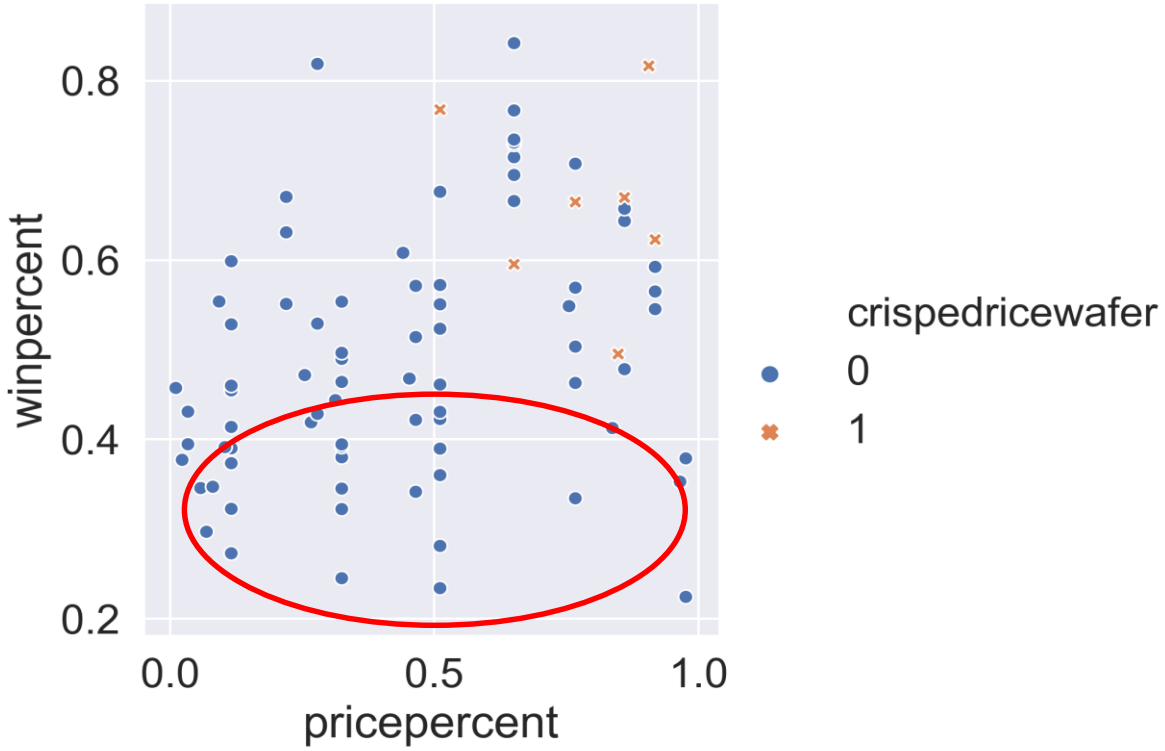
First glance of data



Low ranking, no peanutyalmondy

First glance of data



Low ranking, no crispedricewafer

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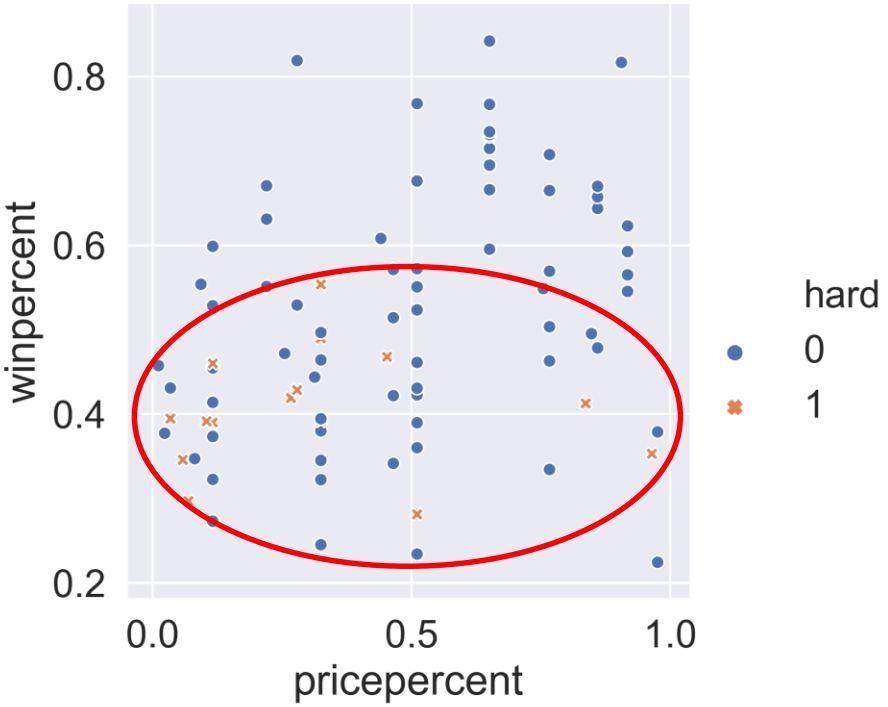
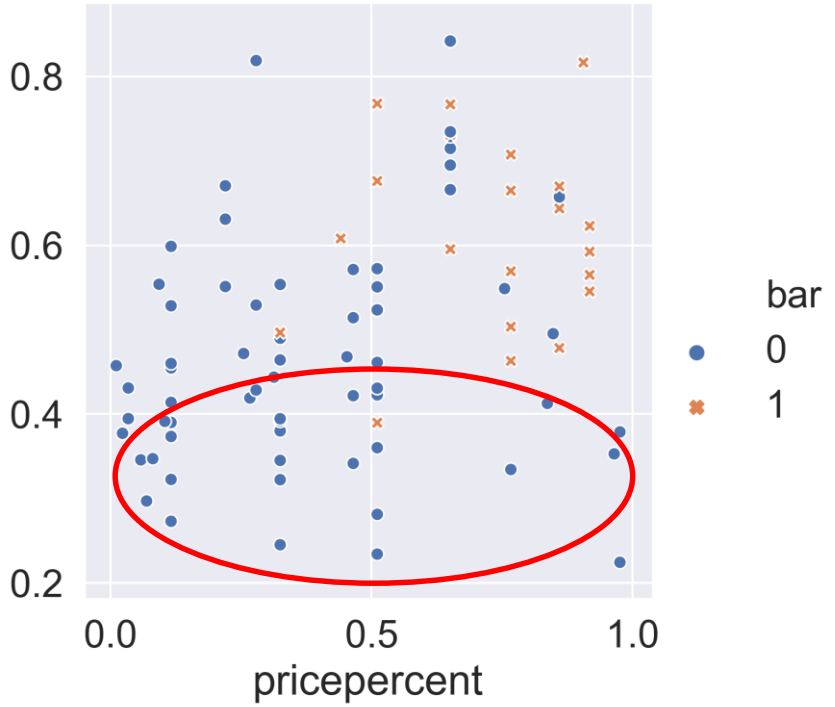
First glance of data



High ranking, no hard



Low ranking, no bar

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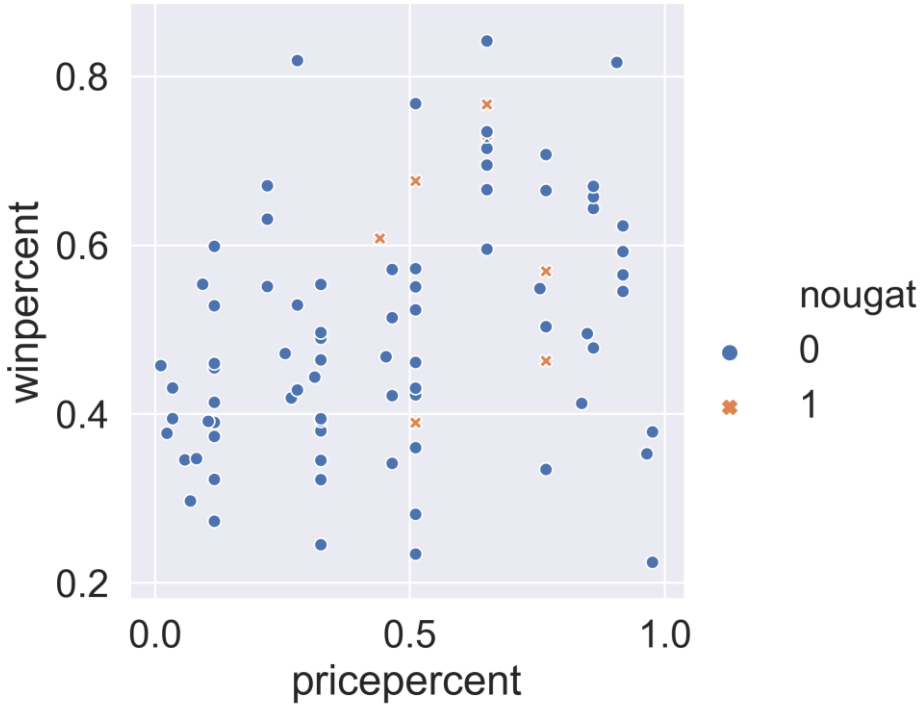
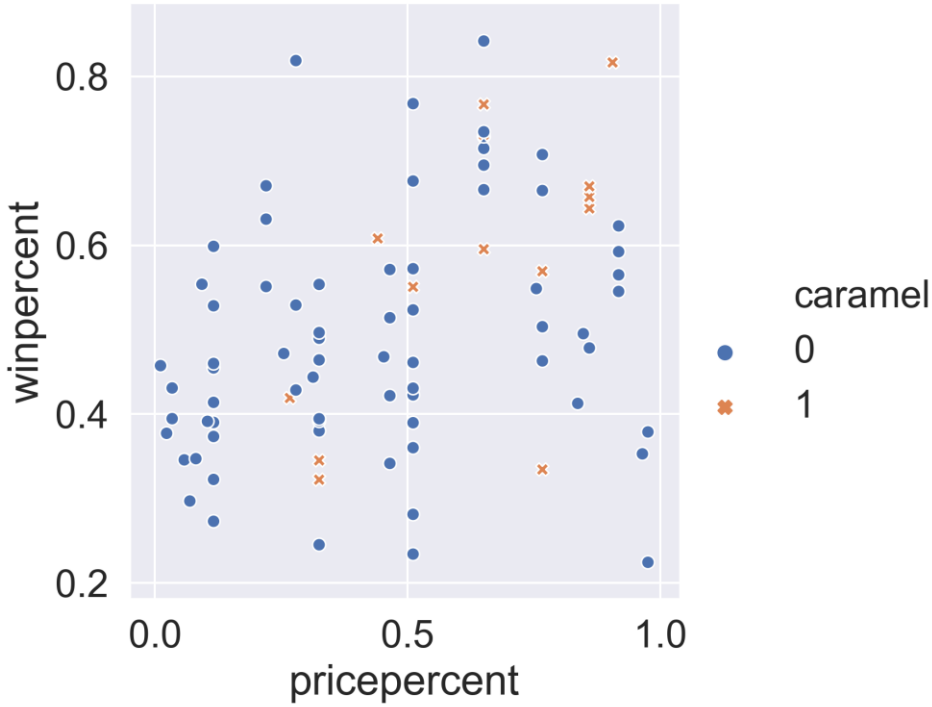
First glance of data

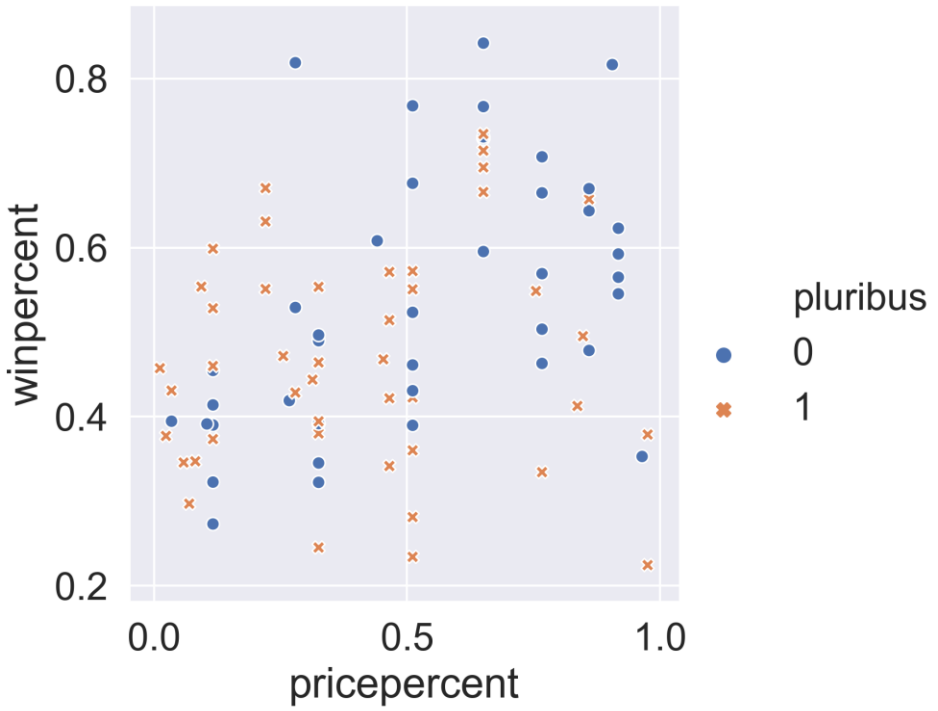


Not dominant



Not dominant

First glance of data



Not dominant

First glance of data: short summary

Overview of winpercent

- data imbalance
- 5 of 7 products with nougat rank 27 of 85 products
- 6 of 7 products with crispedricewafer rank 23 of 85 products
- top 29 products are not hard; 15 products are hard; 14 of 15 hard products has rank below 42
- 20 of 21 products with bar shape rank 47 of 85 products

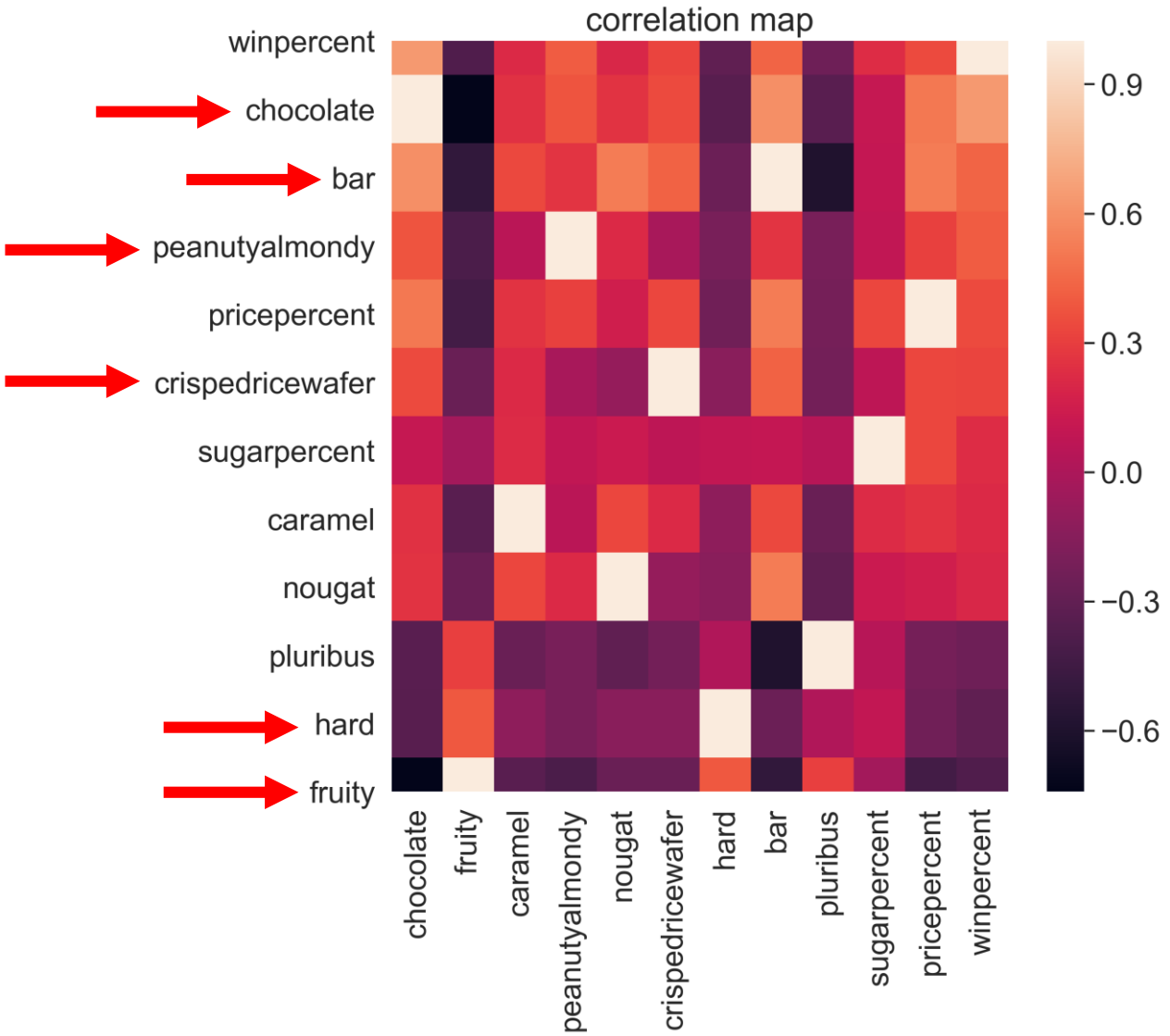
Top 12 products

- chocolate and no fruity
- either caramel or peanutyalmondy
- 8 of top 12 products have peanutyalmondy
- sugarpercent (0.57) is around 20% higher than average (0.48)
- pricepercent (0.63) is higher above the average (0.47), except reeses miniature
- Exception: reeses miniatures has low pricepercent and low sugarpercent

12 lowest ranking products

- No chocolate

Correlation map



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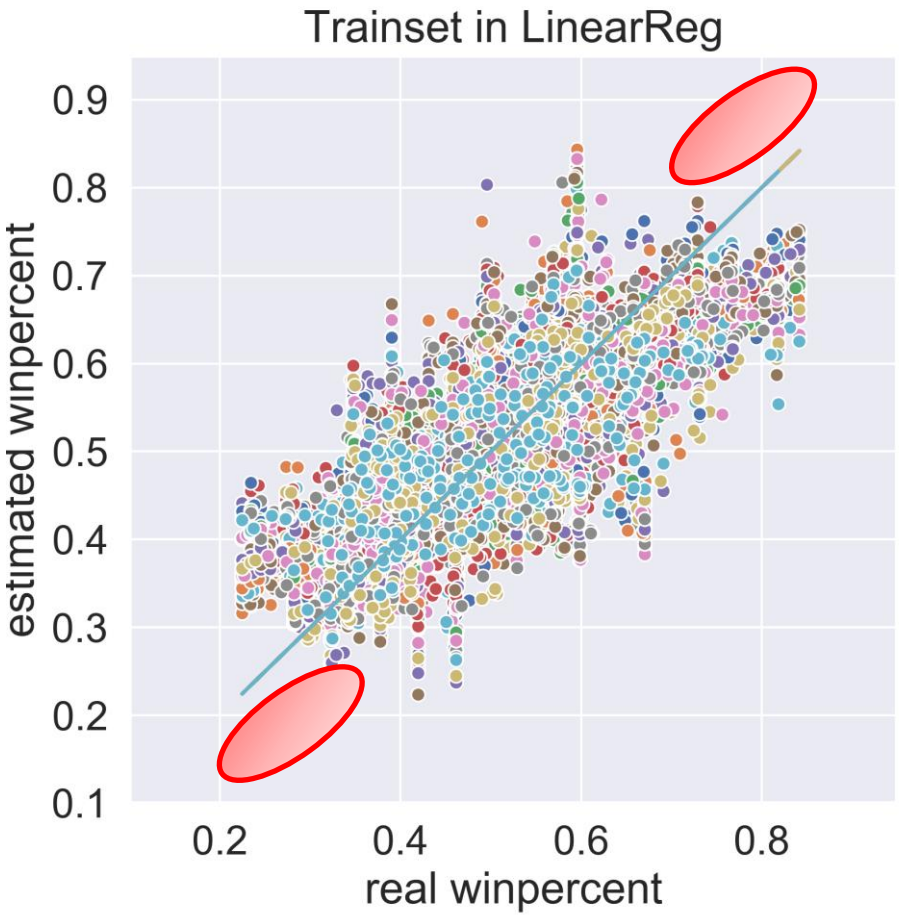
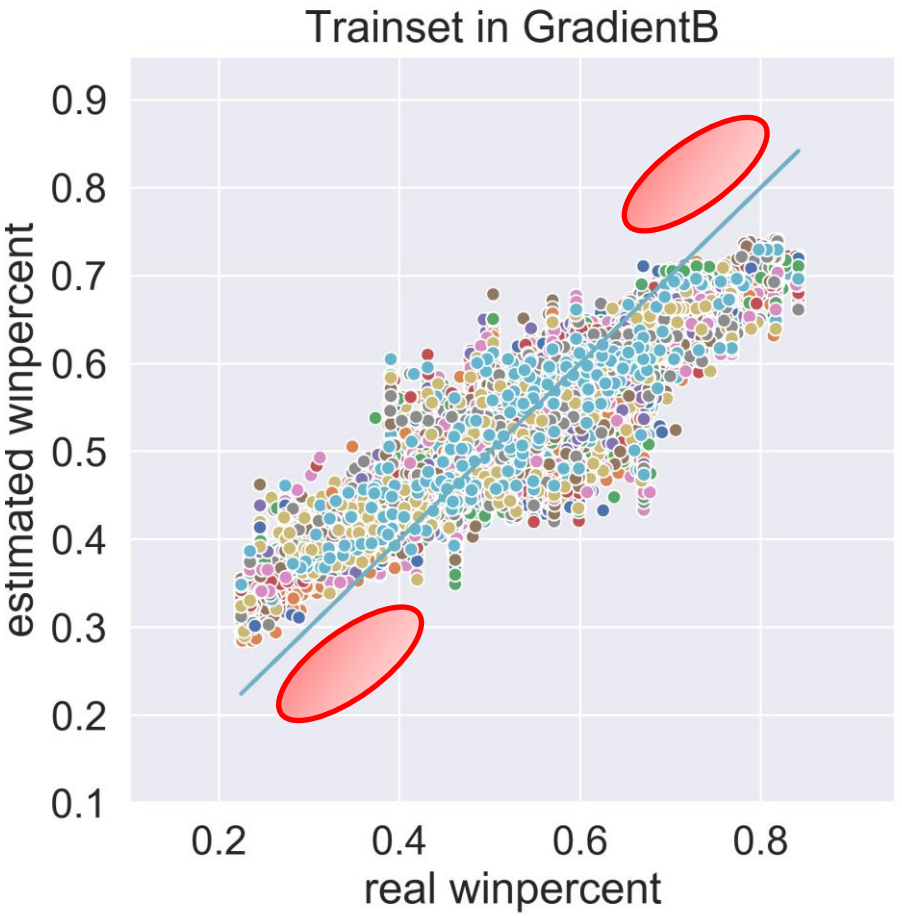
Evaluation (train set)





R2 score: 0.63

R2 score: 0.77

Boosting performs better than LinearRegessor.

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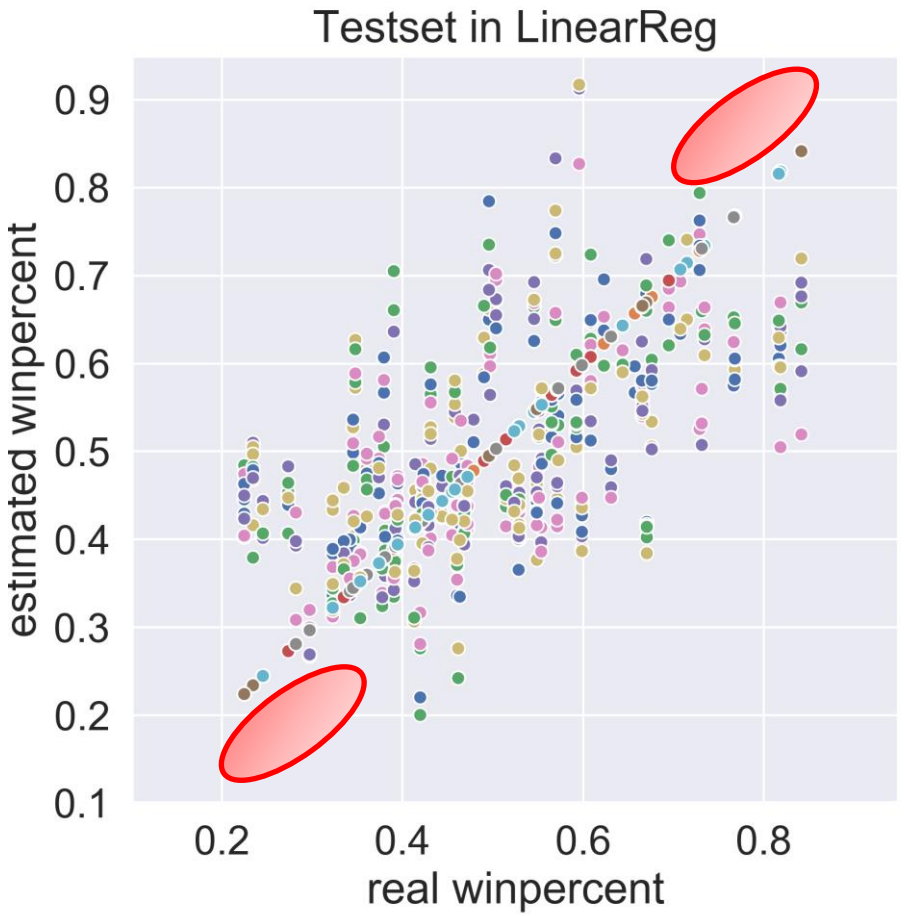
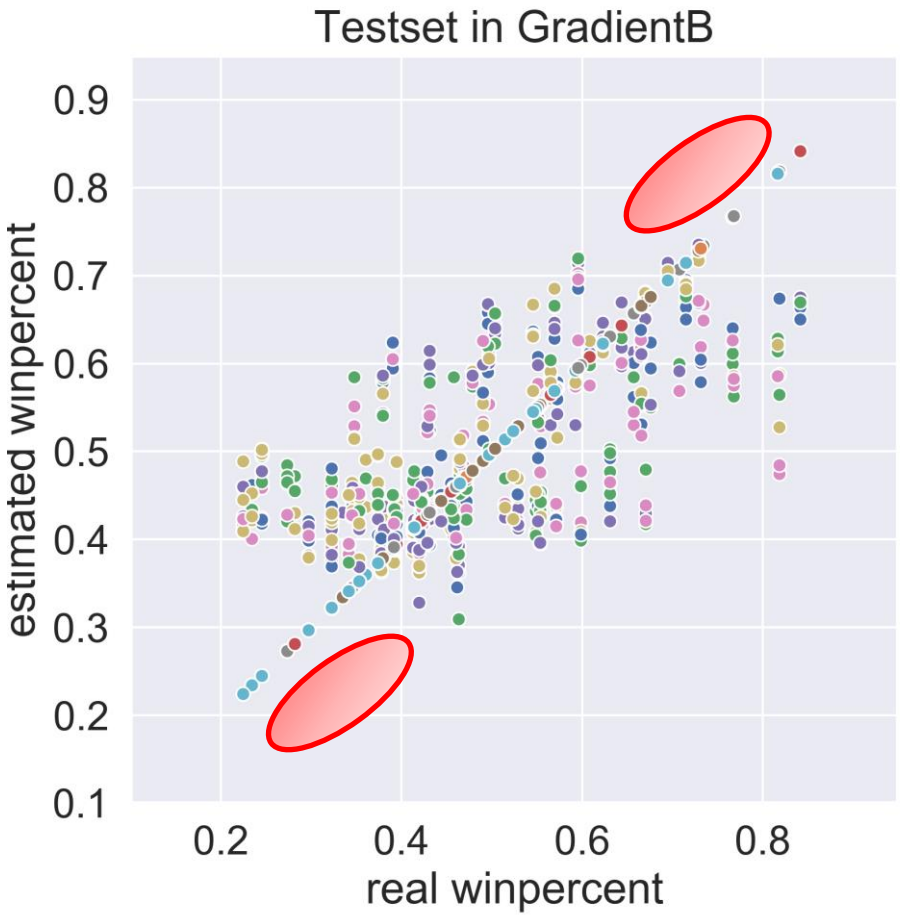
Evaluation (test set)





R2 score: 0.24

R2 score: 0.33

Boosting performs better than LinearRegessor.

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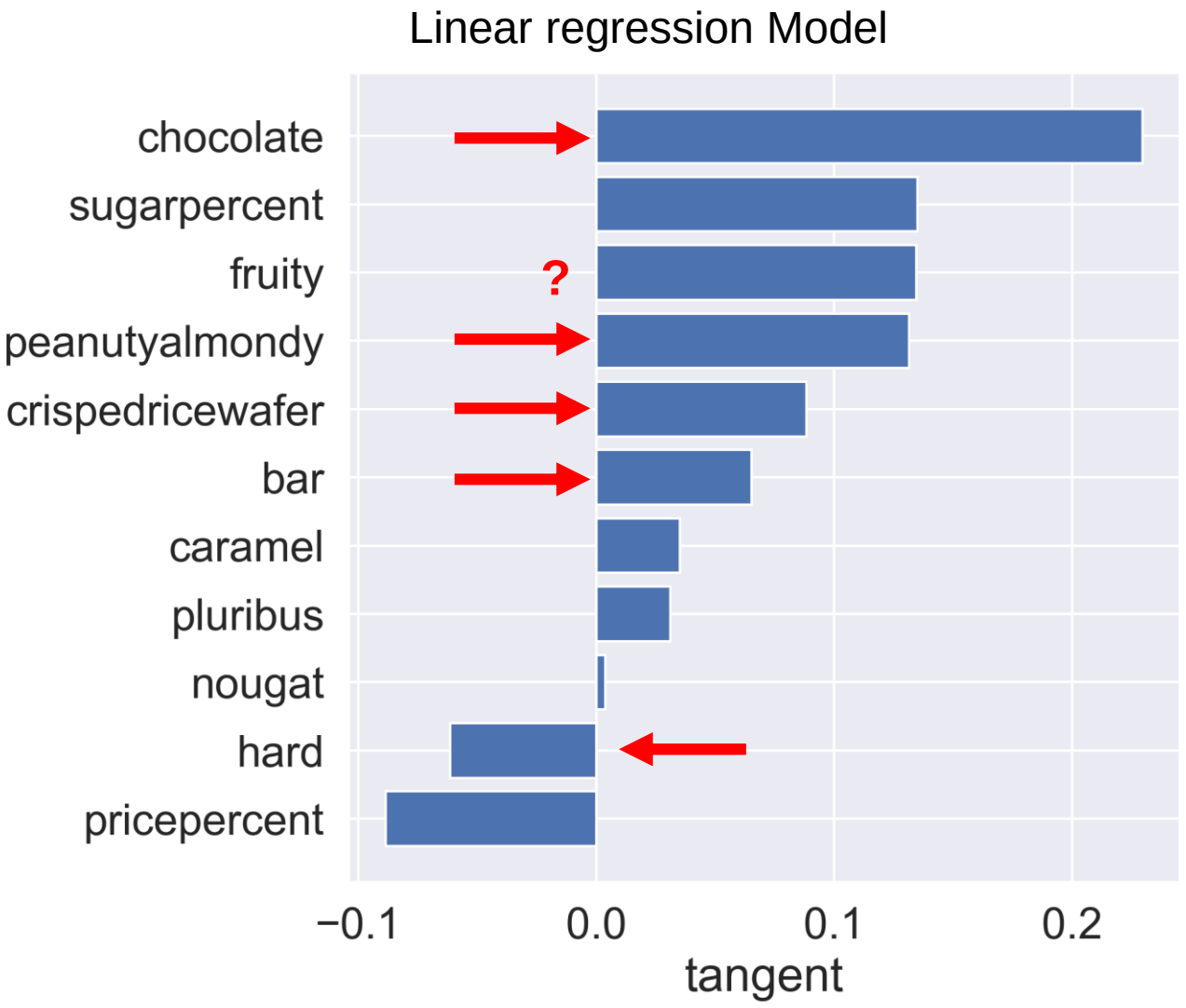
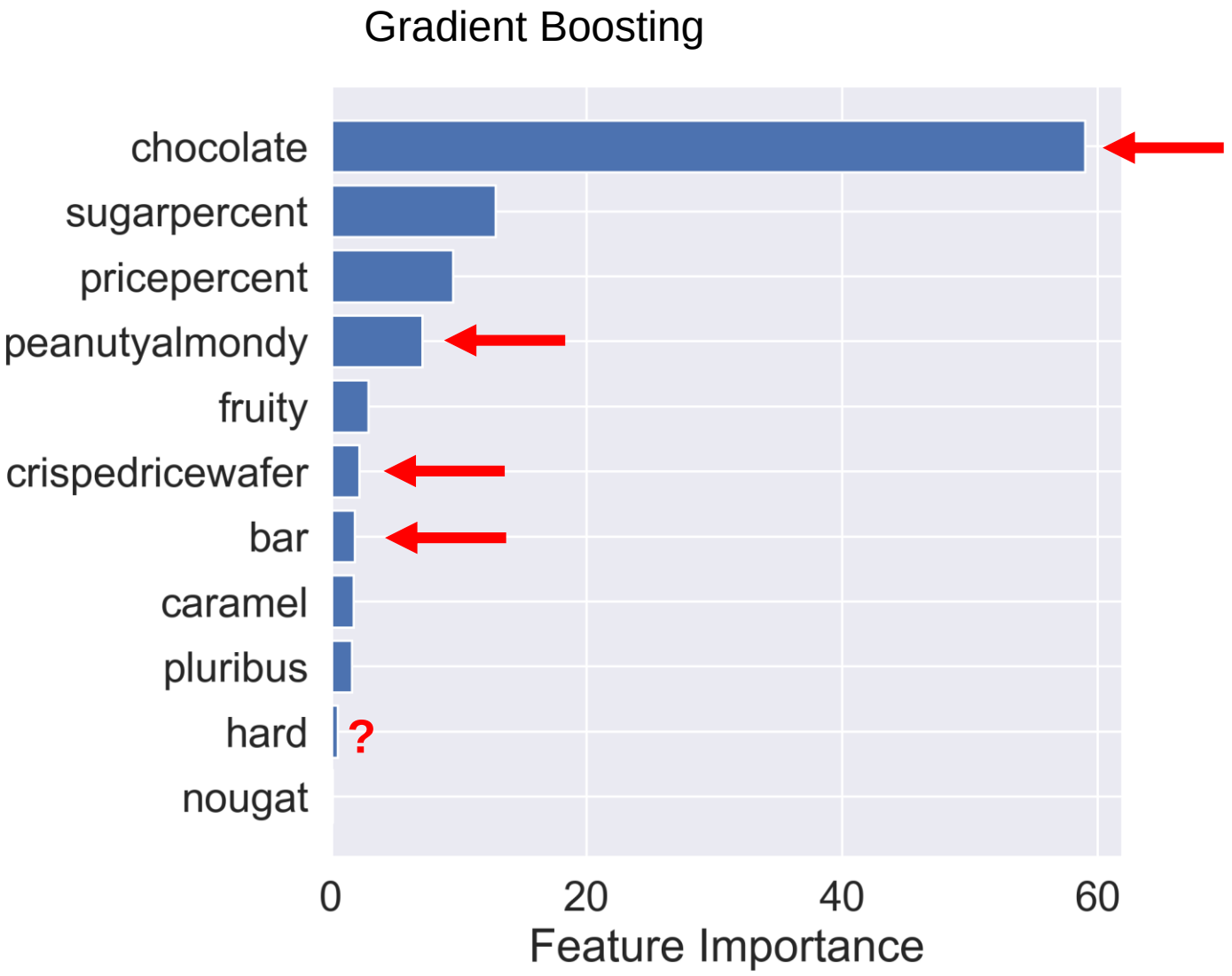
Useful information



Useful information



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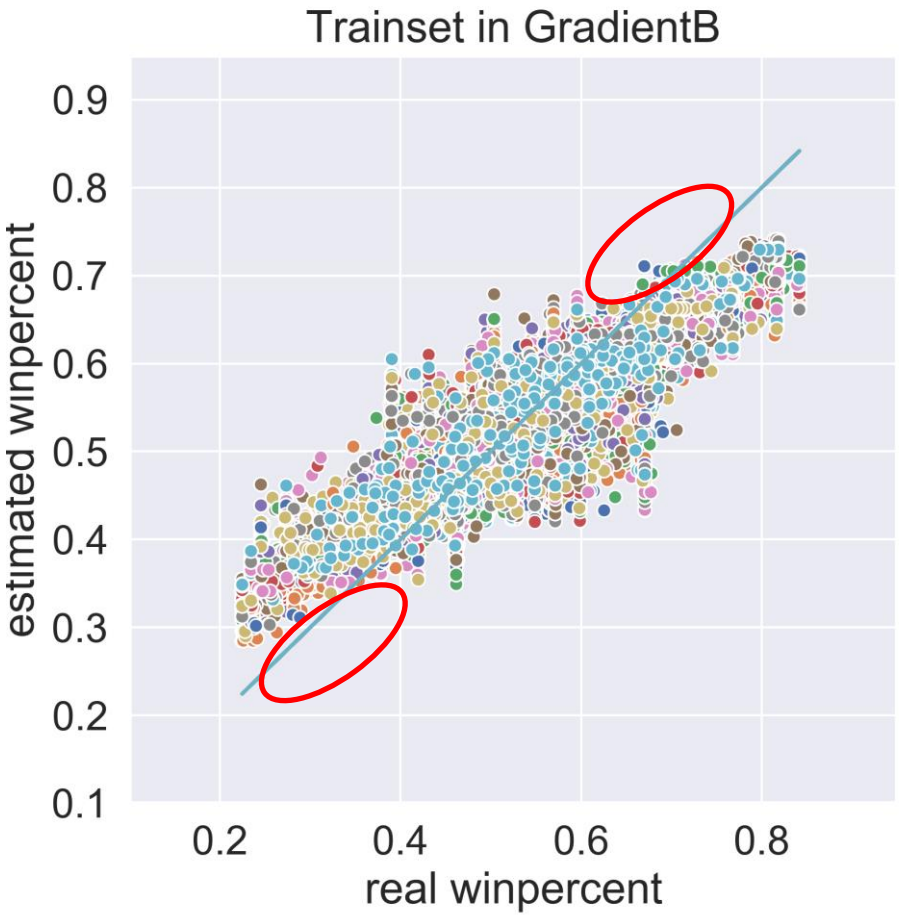
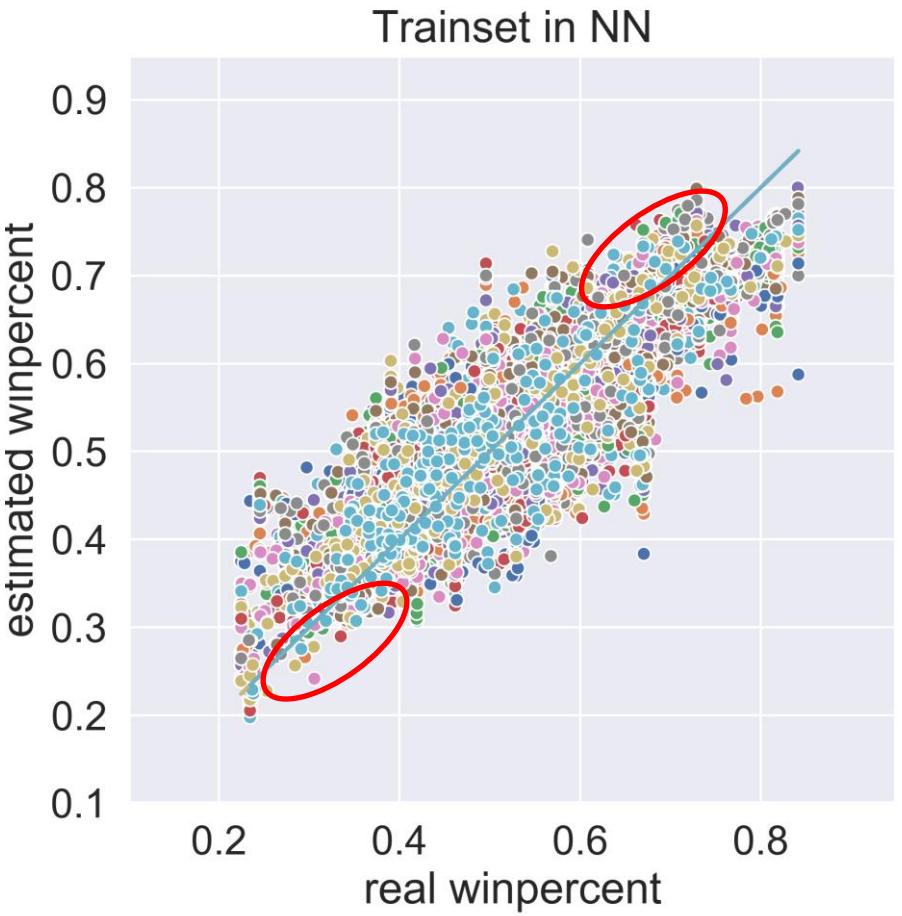
Evaluation (train set)



R2 score: 0.73



R2 score: 0.83

NN performs better than boosting

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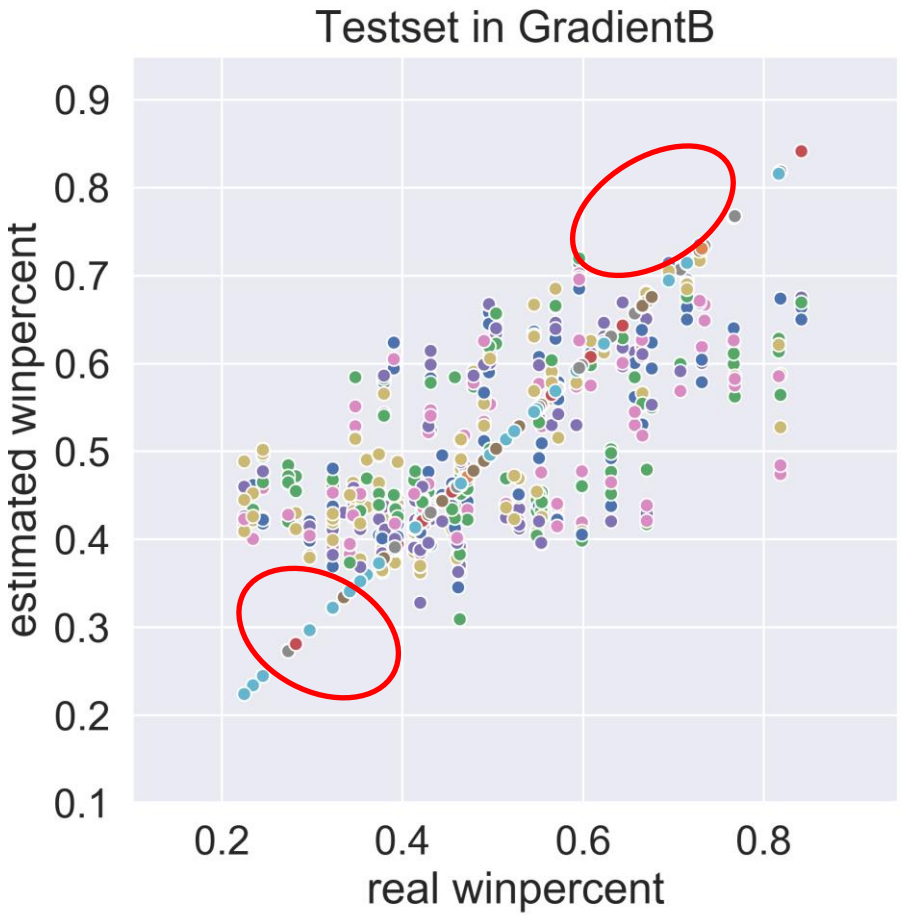
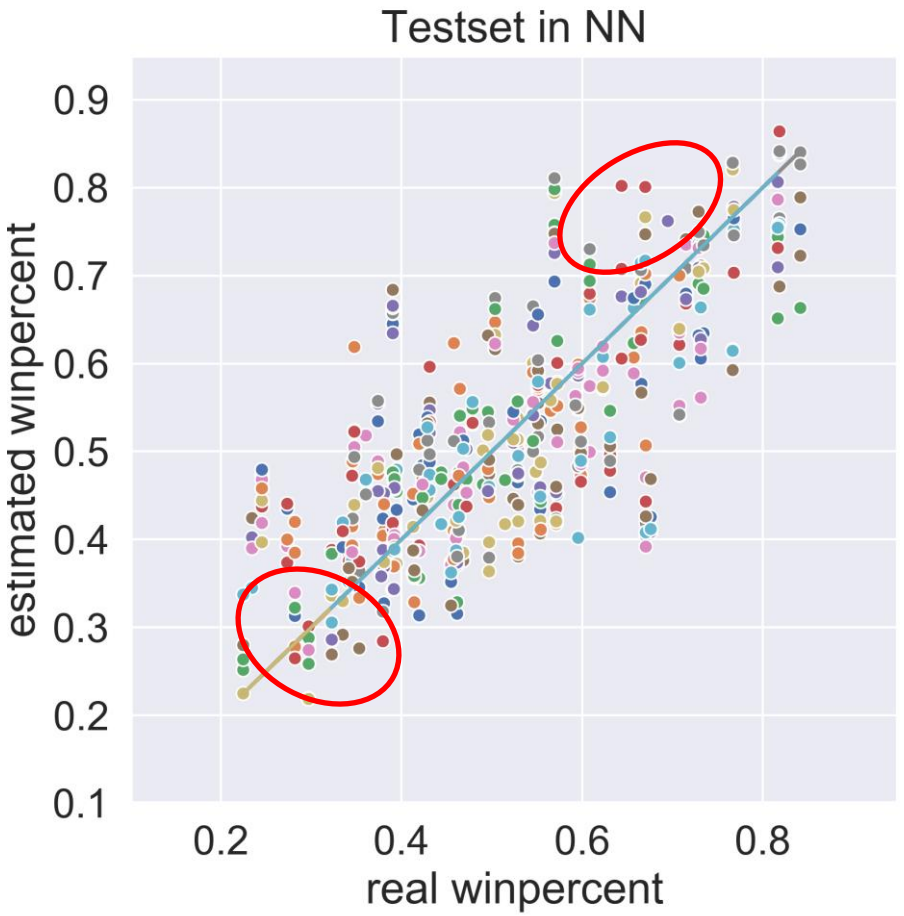
Evaluation (train set)





R2 score: 0.33

R2 score: 0.54

NN: higher prediction power

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Conclusion

Preprocessing:
- Data balancing (helps a lot)
- Data augmentation (little help)

Model:
- LinearRegression, Gradientboost in sklearn (feature extraction)
- NN in pytorch (prediction)

Insights of candy data:
- Chocolate, peanut almond, crispedricewafer, bar (+)
- Hard (-)
- Price, , sugar, Pluribus, caramel (?)
- Many other issues, but prediction can be done in NN!

Problem:
- High and low winpercent is not well predicted (data balancing impoves performance)
- More data?

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