go ahead, make my data

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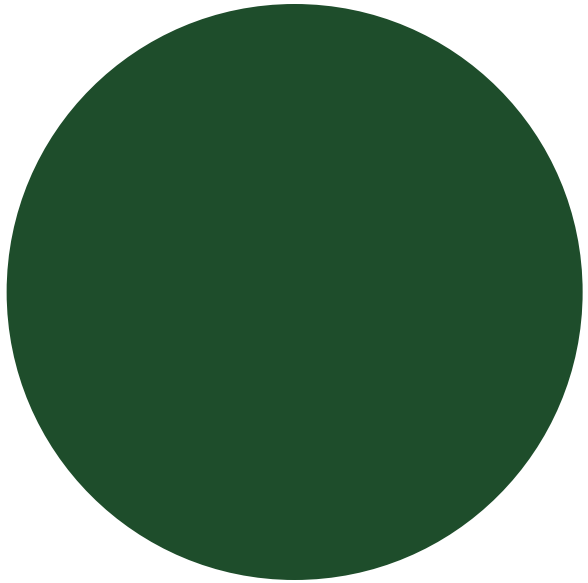
Thanks Isaac and Nick!

“Science should be transparent, it should be inclusive”

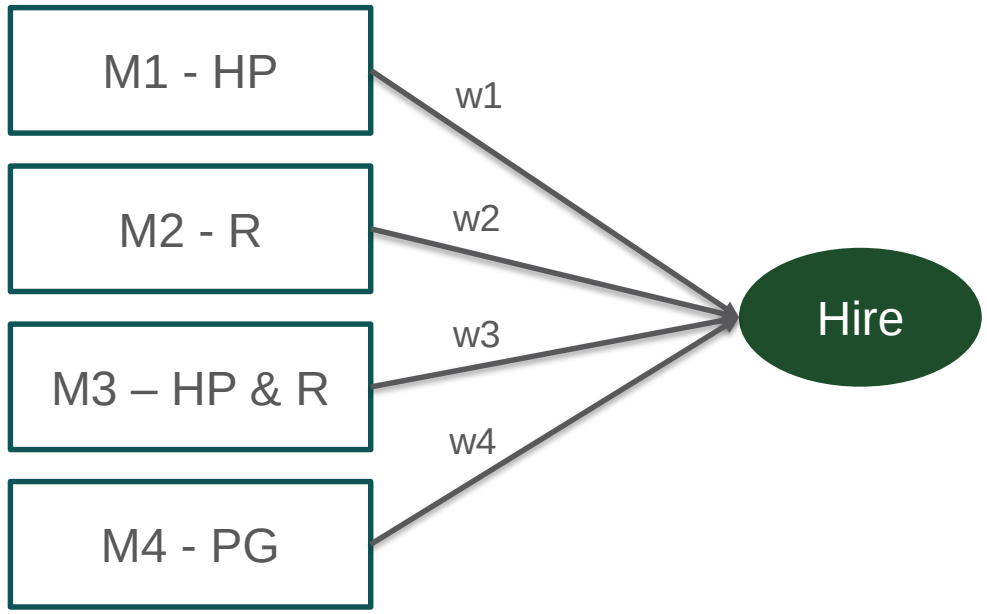


Initial approach,
no code

Final approach,
with code

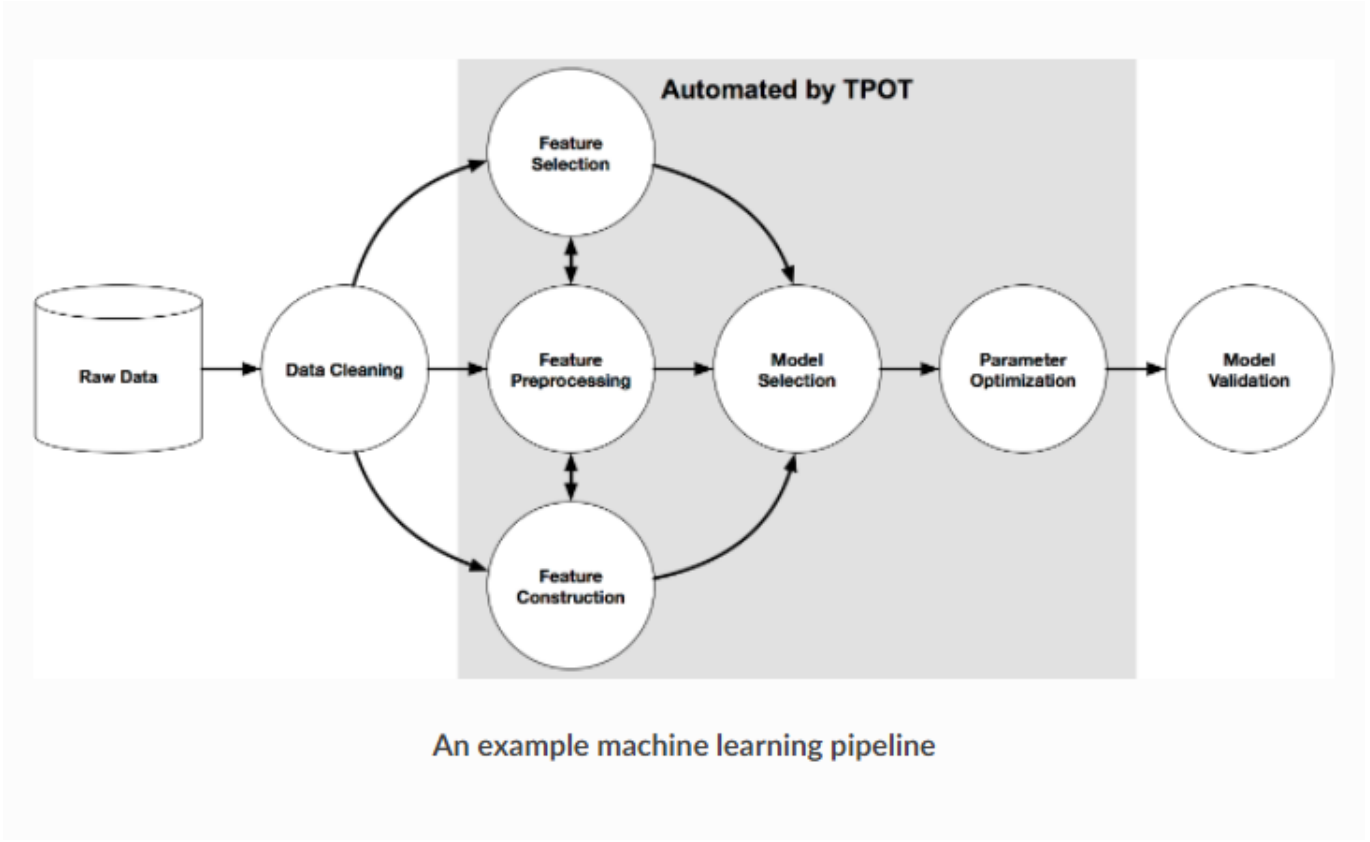
Initial approach (“no code”)

- Missing data handled via median imputation
- Dump all the data in (Putka, Beatty, Reeder, 2018)
- Weighted model voting to handle multiple criteria
  - Each logistic regression model predicts a single outcome
  - Predicted class probabilities combined via weighted average to yield hiring decision
  - Weights established through trial & error on dev set



Final approach (“with code”)

- Logistic Regression models swapped with ML Algorithms
- AutoML implemented using TPOT (Le, Fu, & Moore, 2020)



An example machine learning pipeline

Final problem set up (“with code”)


```
pipeline_optimizer = TPOTClassifier(generations=2, population_size=20, cv=5,
                                    random_state=42, verbosity=2)
pipeline_optimizer.fit(allpred_df, high_performer_df)
pipeline_optimizer.export('tpot_exported_pipeline_HP.py')
```

```
Best pipeline: RandomForestClassifier(MinMaxScaler(input_matrix), bootstrap=True, criterion=gini, max_features=0.2, min_samp
les_leaf=6, min_samples_split=4, n_estimators=100)
```

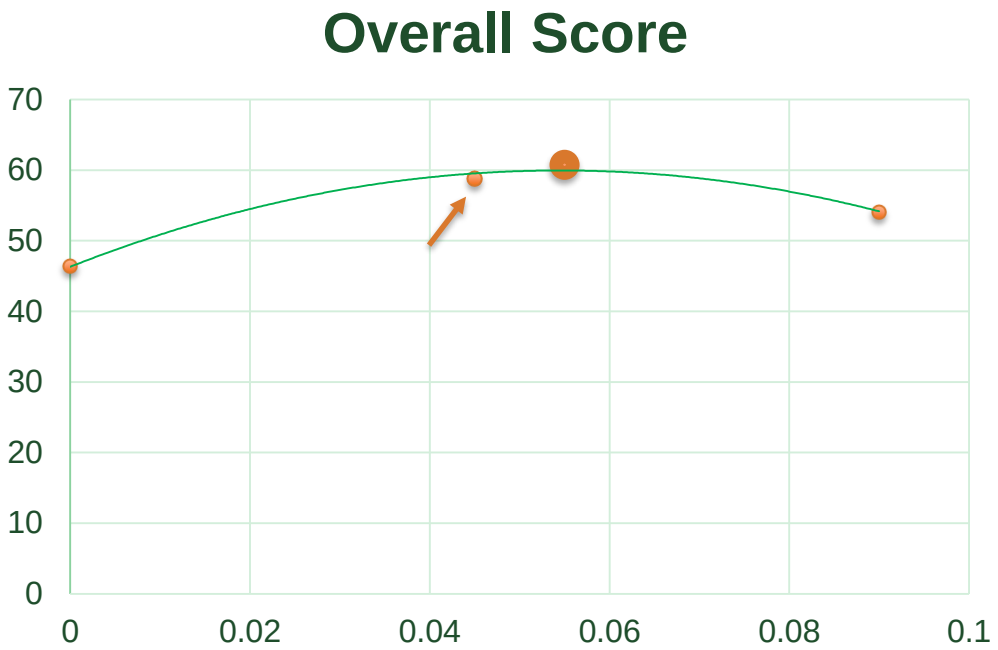
Final problem set up (“with code”)

- AutoML implemented using TPOT (Le, Fu, & Moore, 2020)
- “Rational” model weights assigned according to Expectancy Value Theory models predicting 1) HP, 2) R, and 3) HP & R
  - Expectancy – how probable outcome is – Model Accuracy
  - Value – how valuable outcome is – Competition Parameters
  - E.g. weight assigned to High Performer model = (High Performer Model Accuracy) * ½
- Protected Group weights “fudged” until Adverse Impact ratio was closest to 1 as possible
- Stuck with median imputation and “data dump”

```
# Average CV score on the training set was: 0.6283903675538657
```

Epilogue

- "Each team can make a total of 5 submissions on the test phase, ***so use them carefully***"
- As Protected Group model weight increases, Overall Score should increase and then decrease
  - Made 3 submissions of various weights to inform selection of final submission weight



Conclusion

- Perhaps maximizing diversity comes from predicting diversity directly
- Algorithm general techniques to fairness may have staying power
- “Be lazy” – Thompson & Tonindandel (2018)
  - Usability of TPOT
  - “Science should be transparent, it should be inclusive”