


# Grade Prediction

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# Purpose



**How can personal characteristics affect academic performance?**

# Data

- Class of nearly 700 kids gave us factors ranging from daily activities and family dynamics and personal traits.
- My challenge was, can I use only these personal factors to predict how they will perform on the final.
- Do so so I built multiple models, producing varied results

	Linear Regression (All Variables)	Linear Regression	Decision Tree	Decision Tree	Random Forest	Random Forest
Sample Method	75% Test/25% Train	75% Test/25% Train	75% Test/25% Train	(pruned,k=10)	75% Test/25% Train	K Means Algorithm (k=10)
Accuracy	34.47%	36.45%	43.61%	43.75%	46.64%	47.31%
R Squared	0.3765	0.3594	0.356	0.238	0.328	0.35
MAE	2.877	2.868	2.73	2.84	2.64	2.65

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# Decision: Random Forest (k=10)

- Our best prediction was with the random forest model, getting 47% to the exact score of an individual on their final test.
- On on average we were only 2.6 points off of the actual score of the student using this model.
- We could thus predict the letter and + or - score of each student with nearly perfect accuracy simply based on personal characteristics.

# Analyze

- Based on our accuracy scores of the students, our predictive model provides interesting insight concerning the seemingly unrelatable personal characteristics.
- Our random forest model gave us the most important personal characteristics that affect a student's performance
  1. Parents marital status (is the father present)
  2. Family size
  3. Do they have internet at home
  4. Did they attend nursery school (head start program)
  5. Do they have a current significant other

# Act

- Hold parents more accountable through more collaboration efforts/events.
- Open and frequent communication between students, faculty, and the family's head of household
- Work with local governments to offer discounted internet to students or families with kids in school, because the presence of internet at home is absolutely vital
- Allow teachers more time to work with students who would find themselves in unfavorable situations to allow them to not fall behind