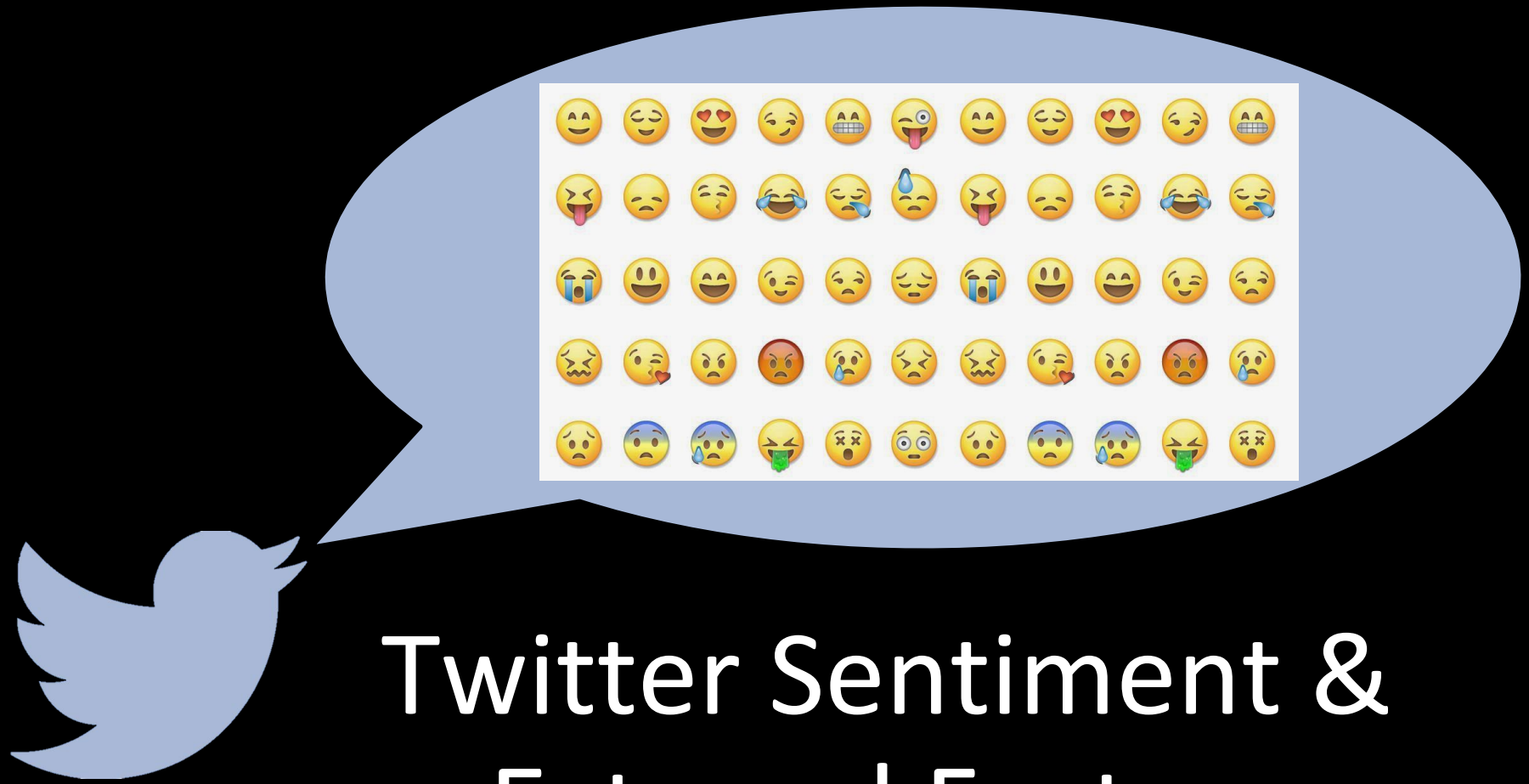


Twitter Sentiment & External Factors

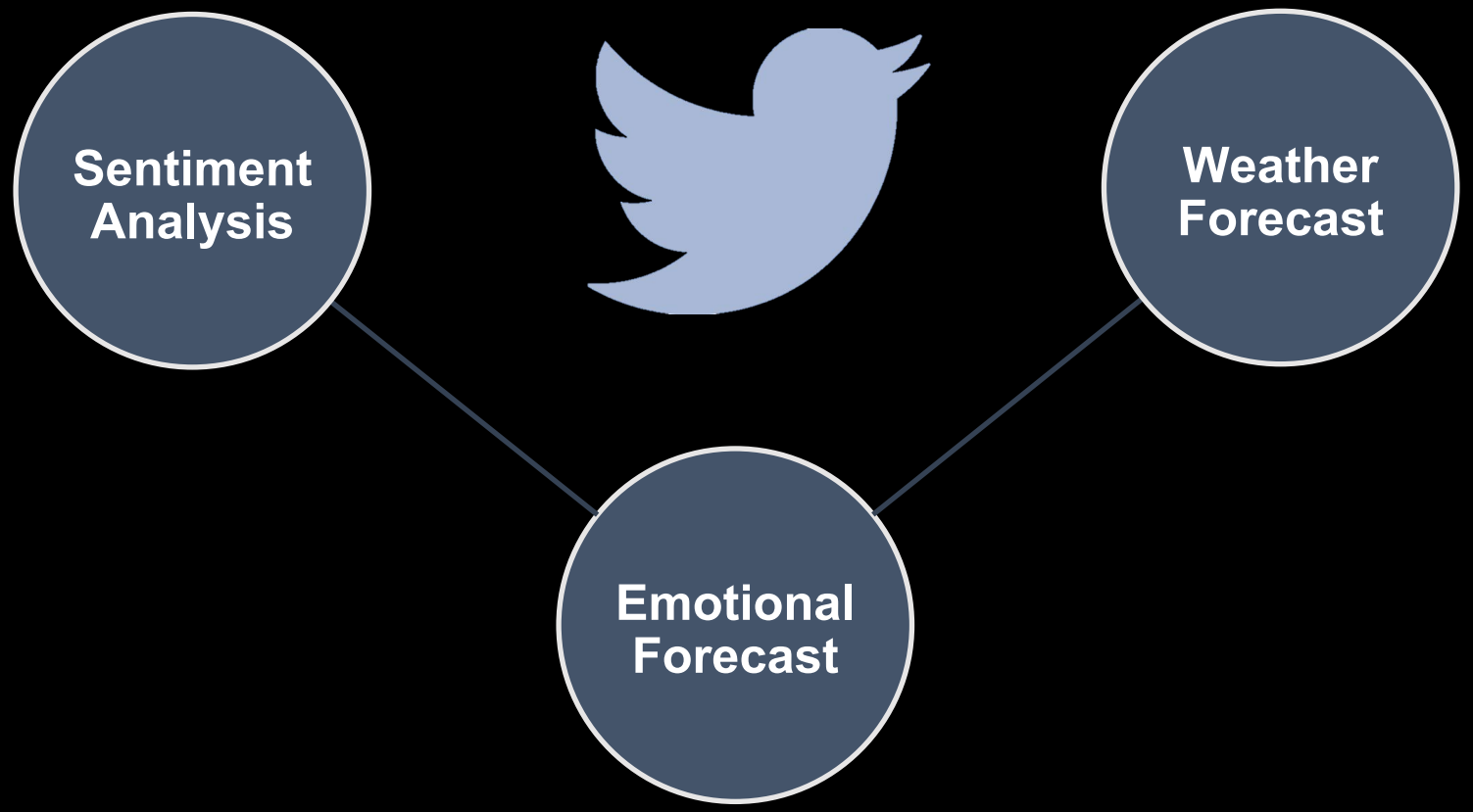
Projects in Data Science: Python

Zach Bogart, Josh Feldman, Joe Gamse, Ramy Jaber, Pit Kauffmann

INTRO

What external factors influence how people tweet?

Eg can we create a weekly ‘emotion forecast’ for Twitter based on the weather forecast?



DATA

TWEETS

- Use tweepy streamer to stream tweets from specified locations – running on Google Cloud
- ~200k total tweets from 3 cities
- 18500-word list with sentiment scores between -1 and 1

WEATHER

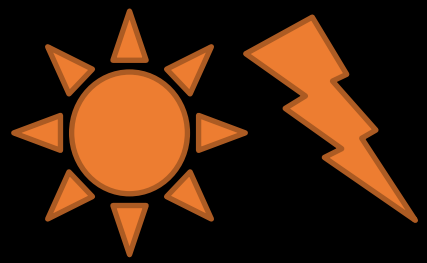
- Get weather data for specific weather stations from NOAA (ftp.ncdc.noaa.gov), corresponding with specified locations for Tweets
- Includes temperature, wind speed, cloud coverage, precipitation

METHODOLOGY

TWEETS – Stream in for each location

SENTIMENT SCORE – calculate sentiment of each tweet using wordlist

WEATHER – add weather data for each tweet from closest weather station



TRAIN – train model on weather/tweet data using Random Forest, Extra Trees and Bagging Classifiers

PREDICT – use forecast weather data to predict change in sentiment by location

PRELIMINARY RESULTS

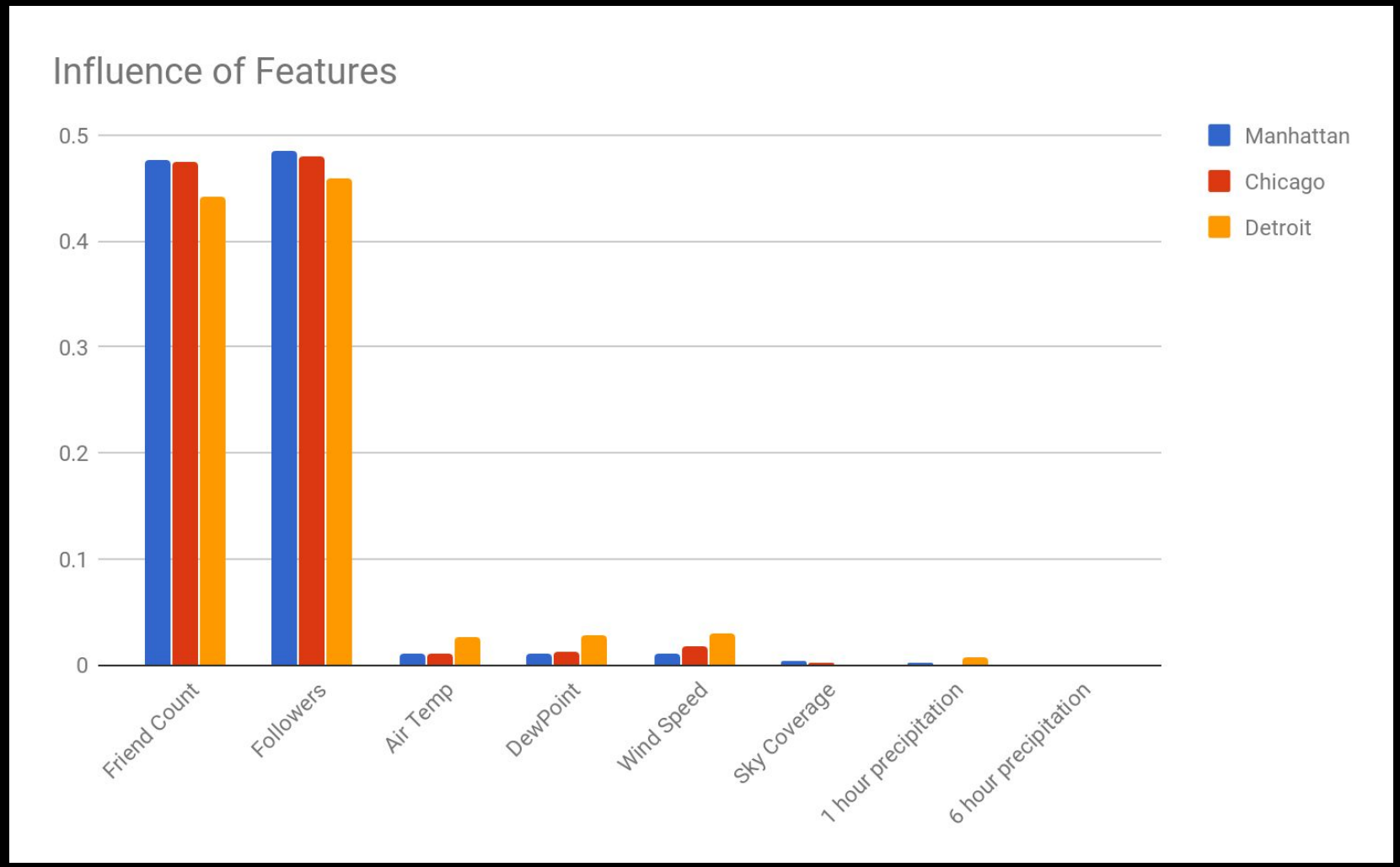
Goal: Classify each tweet as either positive, negative, or neutral sentiment

Features: Friend Count, Followers, Air Temp, Dew Point, Wind Speed, 1 hour precipitation, 6 hour precipitation

All Factors	# Tweets	Training Accuracy	Test Accuracy
Manhattan	~85K	0.845	0.425
Chicago	~65K	0.818	0.4
Detroit	~12K	0.815	0.405

Weather Only		Training Accuracy	
Manhattan	~85K	0.400	0.394
Chicago	~65K	0.377	0.381
Detroit	~12K	0.388	0.377

PRELIMINARY RESULTS (cont'd)



PRELIMINARY RESULTS (cont'd)

Confusion Matrixes (Manhattan - testing on 25% of tweets)

ALL FACTORS	Predictions				
Actual		Neutral	Positive	Negative	Total
	Neutral	**1987**	1966	1540	**5493**
	Positive	1715	**4129**	**2607**	**8451**
	Negative	1493	2977	2978	**7448**
	Total	**5195**	**9072**	**7125**	

WEATHER ONLY	Predictions				
Actual		Neutral	Positive	Negative	Total
	Neutral	**0**	5171	388	**5559**
	Positive	0	**7919**	608	**8527**
	Negative	0	6782	**524**	**7306**
	Total	**0**	**19872**	**1520**	

CONCLUSION & NEXT STEPS

- Collect tweets for even more locations and across a longer time period
- Run each classifier with more parameters to find the best fit
- Run more classifiers: K-means, Support Vector Machines, K-nearest neighbours, Naive Bayes
- Make sentiment analysis more granular & precise -- Ex: n-grams
- How do other factors, such as crime rates, sports events, etc. affect overall sentiment?

QUESTIONS?