LARGE LANGUAGE MODELS IN THE SOCIAL SCIENCES:

An Example Using Humour

BY JANICE BUTLER
EUROPEAN UNIVERSITY INSTITUTE, ITALY

Structure of this talk

NATURAL LANGUAGE MODELS

APPLICATION EXAMPLE OF NLMS

Why would you need NLMs?

Structure of Project

1ST PHASE

Creating a reliable mechanism for automatic humour detection

For Type and Degree

2ND PHASE

Examine political communication on Twitter using humour-detection mechanism

Actors:

- Politicians (All UK MPs on Twitter)
- Political Journalists
- Control: Comedians

Why would you want to do this?

Humour is important to support communication

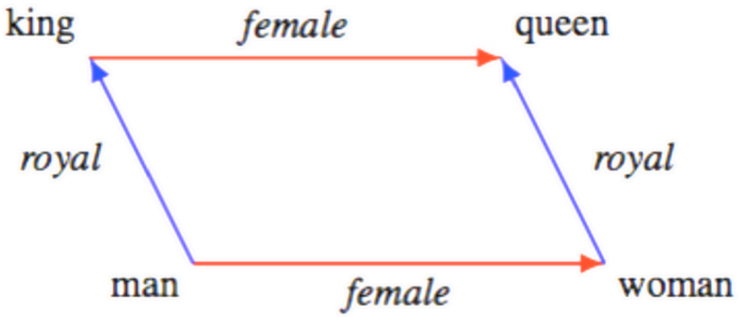
- Attracting attention
- Building rapport

- Optimise messaging
- New research which solves the previous lack of differentiation

Method

Word Embeddings

$$\overrightarrow{king} - \overrightarrow{man} + \overrightarrow{woman} \approx \overrightarrow{queen}$$



Vector Representations of Words and their Relationships

Available for download:

- GloVe (Pennington, Socher & Manning, 2014)
- Word2Vec (Mikolov et al., 2013)
- fastText (Joulin et al., 2016)

No need for stemming & lemmatization

Taking into account non-standard semantics

- emoticons
- acronyms
- common misspellings

NLMs

Neural Language Models
Deep-Learning Networks infused with Language

Sources:

- Wikipedia
- News Articles
- Books
- etc

Generalistic + Task-specific fine-tuning

An example: Employing NLMs in humour detection

Data collection/annotation

Comedic Styles (Ruch et al., 2018):

- Fun
- Benevolent Humour
- Wit
- Irony
- Sarcasm
- Satire
- Cynicism
- & Non-humorous

Data:

Humorous Texts:

- Reddit (incl various subreddits)
- interactive TV show @midnight
- Jokes from Comedians

Non-humorous Texts:

- @AP
- @BBCworld
- @ITN
- @ITVnews,
- @SkyNewsPolitics
- @TheEconomist

Tools

Hugging Face

- Models & Framework

Google Colab

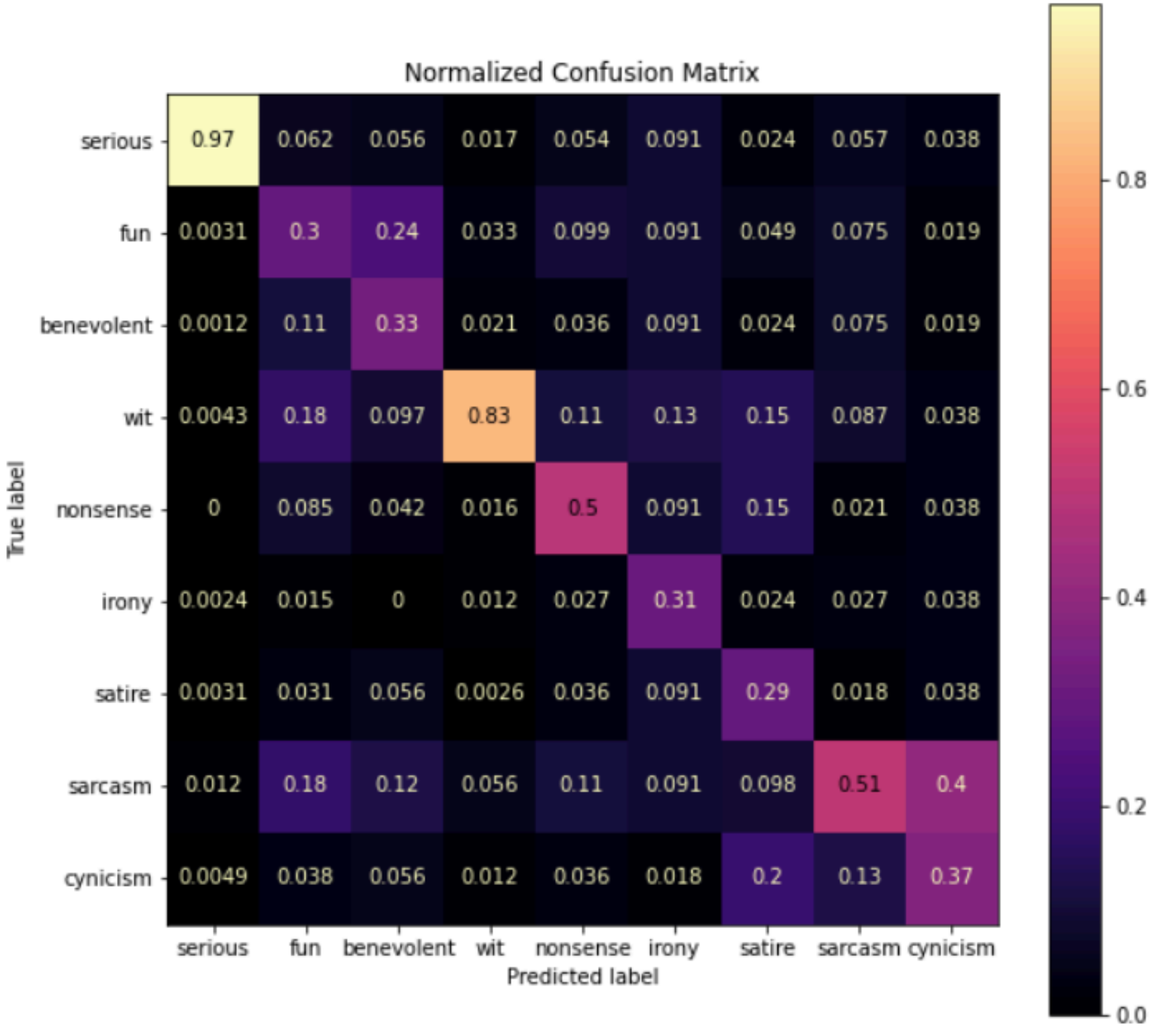
- Access to GPUs

Weights & Biases (wandb.ai)

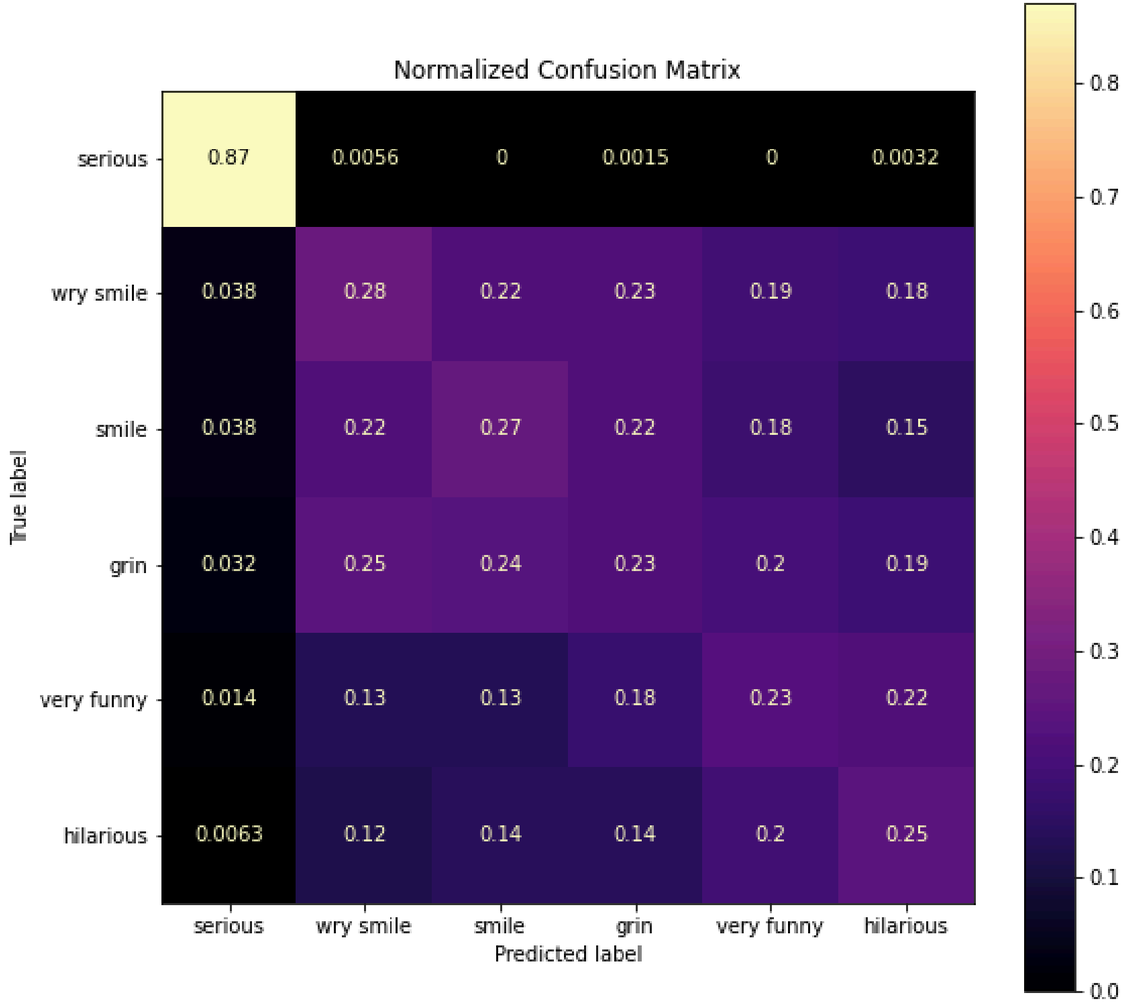
- Storing Data, Results & Models
- Analysis

Results

Confusion Matrix for Humour-Type Detection, Ernie-large



Confusion Matrix for Humour-Degree Detection, Electra-large



Political Communication

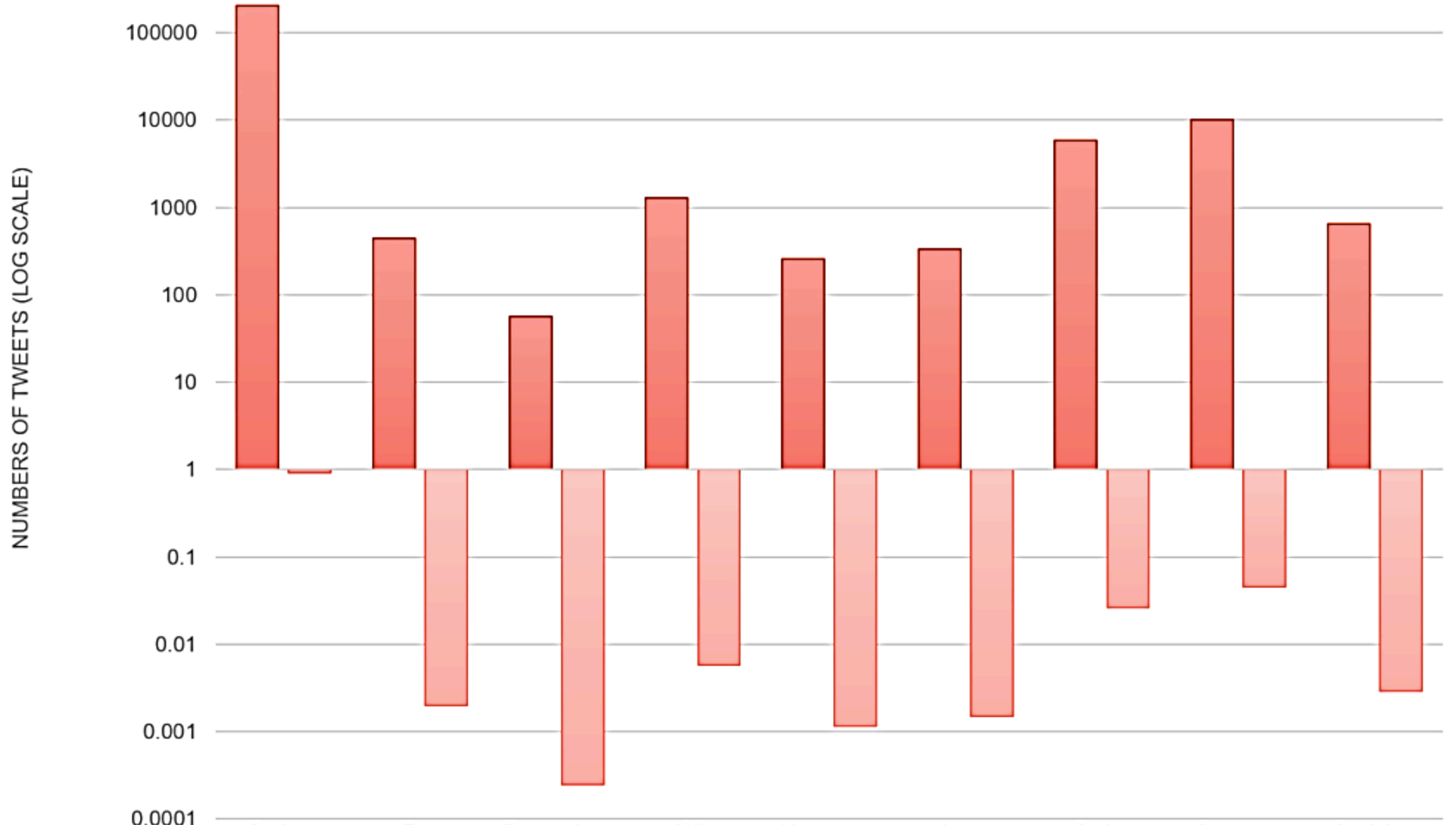
Political Texts:

- Twitter handles from UK political journalists (N = 232)
- Twitter handles from all UK Members of Parliament (MPs) (N = 588)
- British Comedians (N = 92)

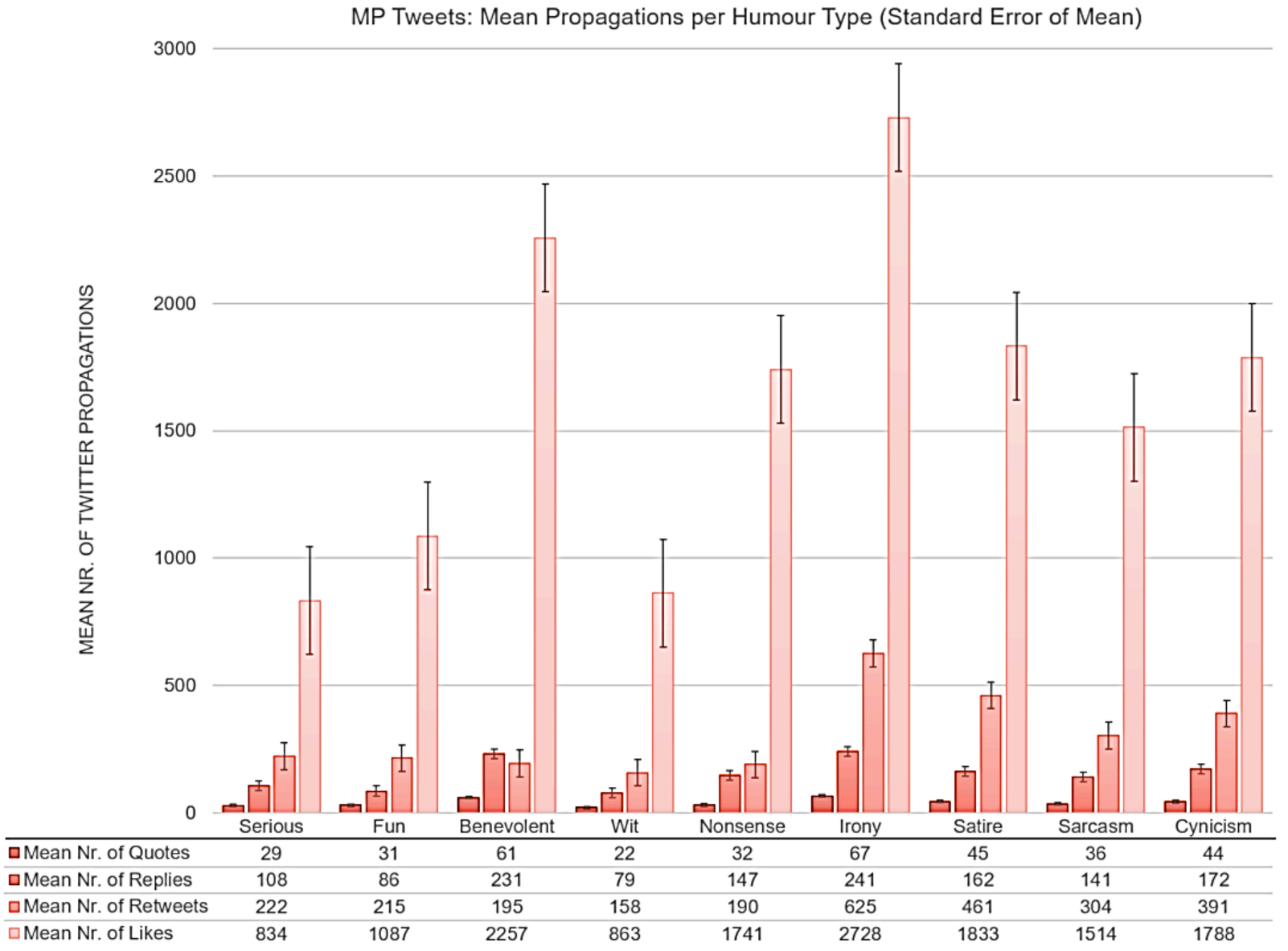
Twitter Metrics of Virality (Riquelme & González-Cantergiani, 2016):

- M3: the number of mentions to the author by other users
- RT3: the number of users who have retweeted author's tweets
- FT3: the number of users that have marked author's tweets as favourite (likes)
- and RP3: the number of users who have replied to the author's tweets

Numbers of MP Tweets per Humour Type



	Serious	Fun	Benevolent	Wit	Nonsense	Irony	Satire	Sarcasm	Cynicism
Nr. of Tweets	206089	445	56	1292	259	337	5858	10104	651
Proportion of Tweets	91.56%	0.20%	0.02%	0.57%	0.12%	0.15%	2.60%	4.49%	0.29%



	Serious	Fun	Benevolent	Wit	Nonsense	Irony	Satire	Sarcasm	Cynicism
Mean Nr. of Quotes	29	31	61	22	32	67	45	36	44
Mean Nr. of Replies	108	86	231	79	147	241	162	141	172
Mean Nr. of Retweets	222	215	195	158	190	625	461	304	391
Mean Nr. of Likes	834	1087	2257	863	1741	2728	1833	1514	1788

Outlook

Classifiers:

- Policy (based on Manifesto Project)
  - external relations, democracy, political system, economy, growth, welfare, society, and social groups
- Emotion (Ekman 6)
  - anger, disgust, fear, joy, neutral, sadness and surprise
- Humour --> re-use from previous project
  - serious, fun, benevolent, wit, nonsense, irony, sarcasm, cynicism
- Binary: EU / non-EU

--> What type of social media engagement equates most closely to political persuasiveness

Findings and Practical Advice

- Quality of annotations --> F1 values
- High Inter-coder Reliability
- Re-use of models
- NLMs are complex statistics
- Inherent language capabilities of models
- Reliable classifier
  - Speed
  - Consistency in inter-coder reliability
  - Re-use for other projects
  - Combination with other classifiers
  - Improve quality of other classifiers

Thank you!