Incorporating Dialectal Variability for Socially Equitable Language Identification

David Jurgens, Yulia Tsvetkov, and Dan Jurafsky



McNamee, P., “Language identification: *a solved problem* suitable for undergraduate instruction” Journal of Computing Sciences in Colleges 20(3) 2005.

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“This paper describes […] how even the most simple of these methods **using data obtained from the World Wide Web achieve accuracy approaching 100%** on a test suite comprised of ten European languages”

Whose language are we identifying?

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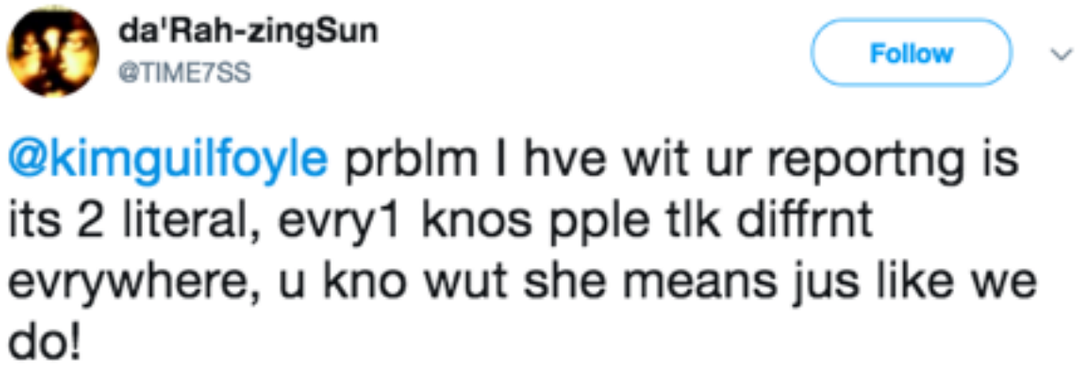


Whose language are we identifying?

The Royal Family ✓
@RoyalFamily

Follow

Taking place this week on the river Thames is 'Swan Upping' – the annual census of the swan population on the Thames.

da'Rah-zingSun
@TIME7SS

Follow

@kimguilfoyle prblm I hve wit ur reportng is its 2 literal, evry1 knos pple tlk diffrnt evrywhere, u kno wut she means jus like we do!

Mooktar
@bossmukky

Follow

"@Ecstatic_Mi: @bossmukky Ebi like say I wan dey sick sef wlh 'Flu' my whole body dey weak"uw gee...

Ebenezer·
@Physique_cian

Follow

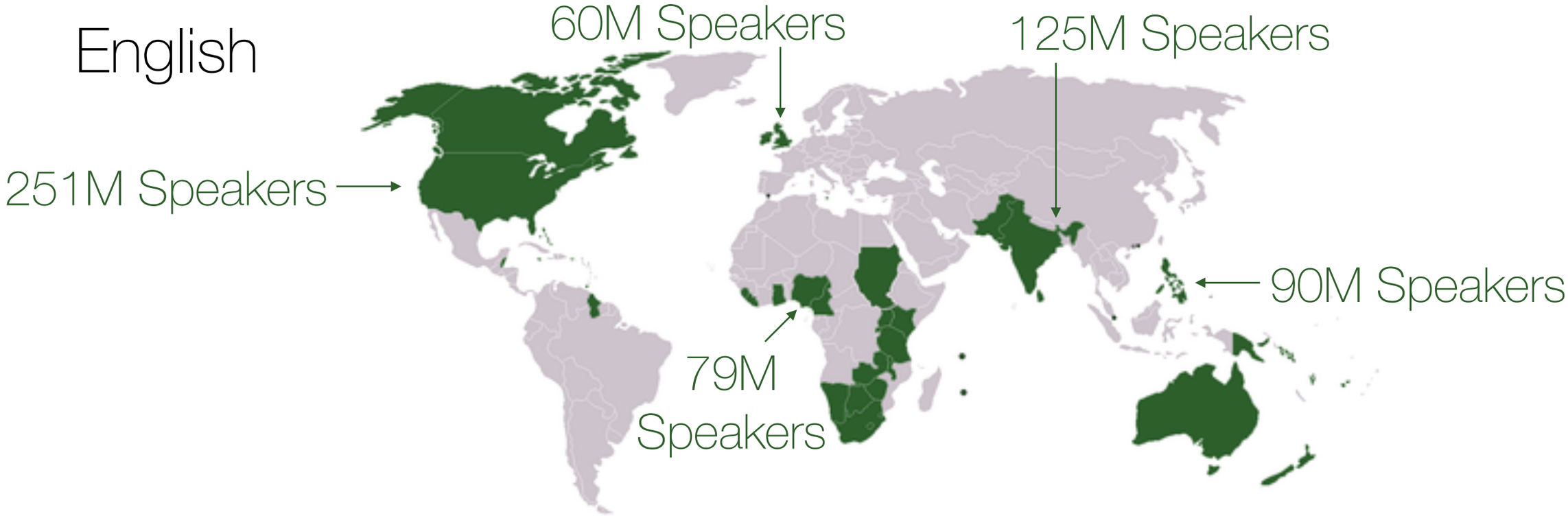
@Tblazeen R u a wizard or wat gan sef : in d mornin- u tweet, afternoon - u tweet, nyt gan u dey tweet.beta get ur IT placement wiv twitter

Global platforms attract global diversity in a language

English

Global platforms attract global diversity in a language

English



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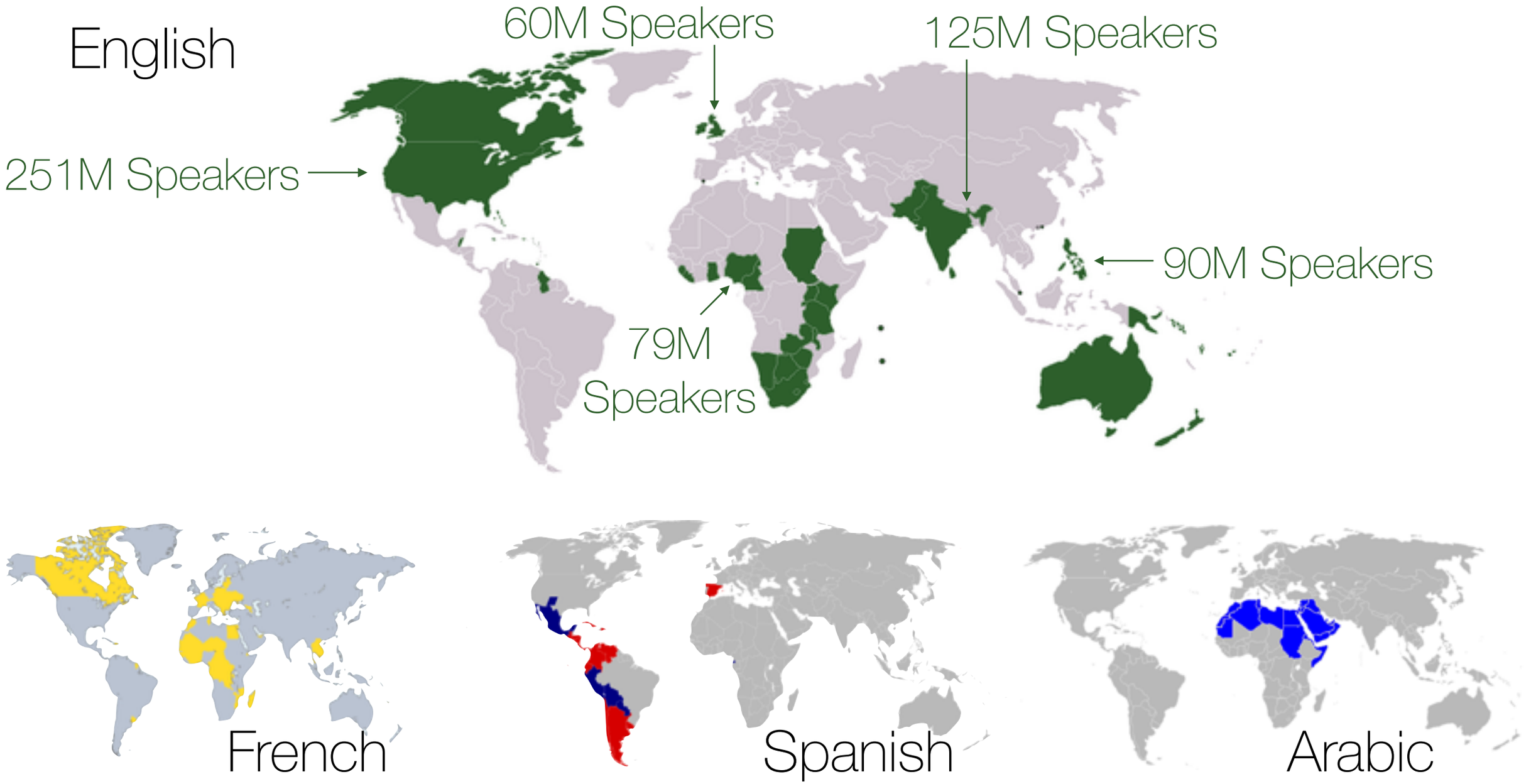
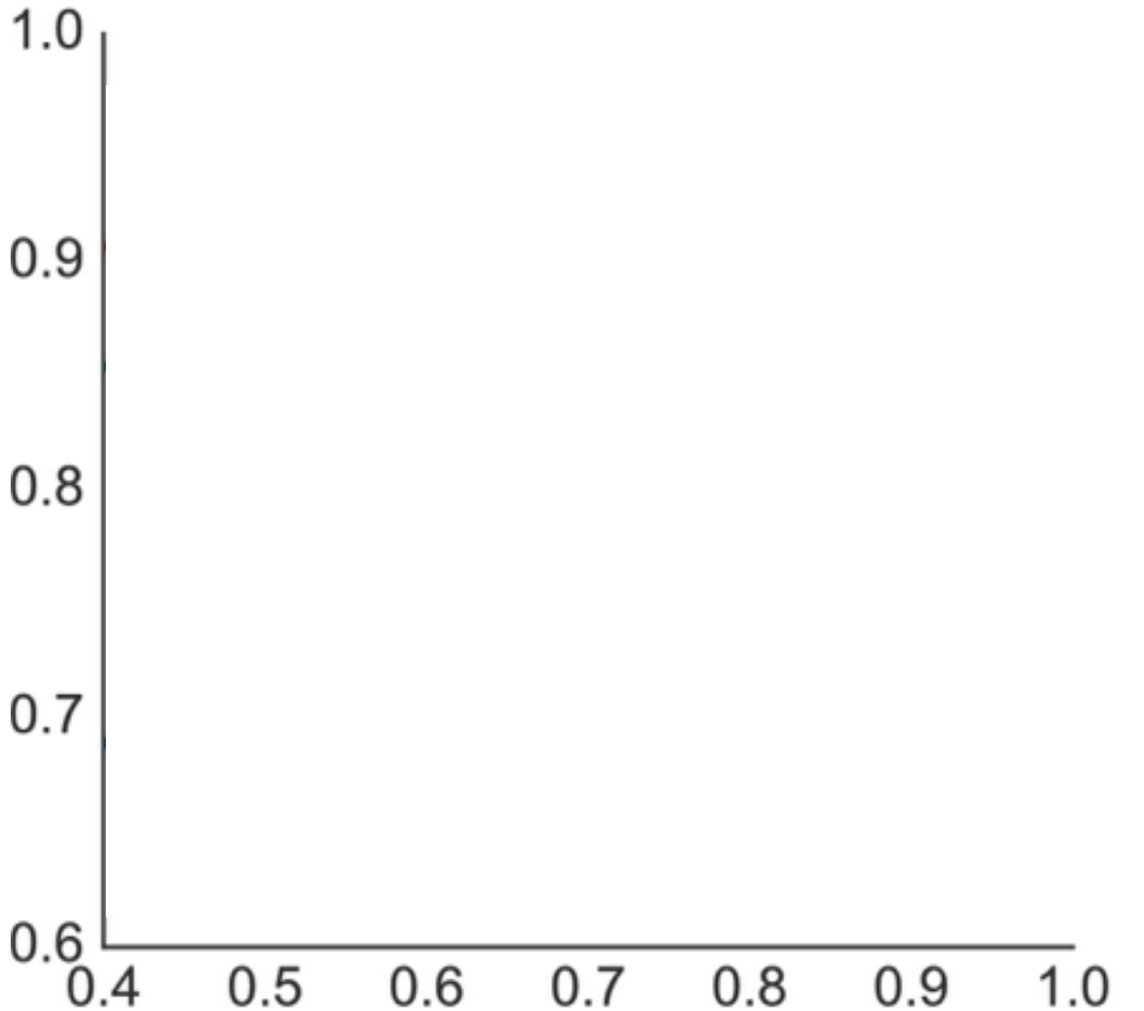


Estimated LID accuracy for English tweets



Human Development Index of text's origin country

- Education
- Life expectancy
- Income

(Labov, 1964; Ash, 2002)

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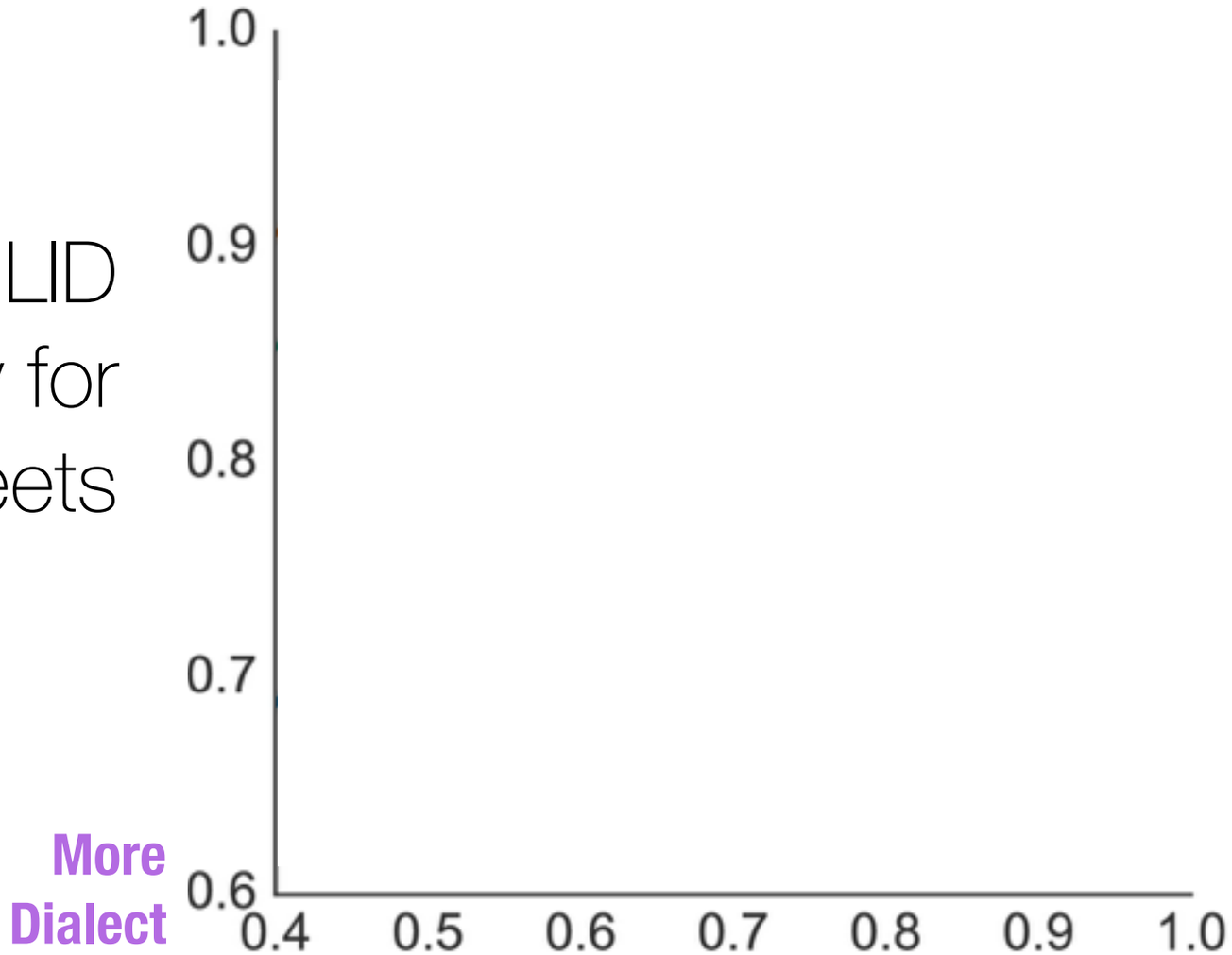

More Dialect

Less Dialect

Human Development Index of text's origin country

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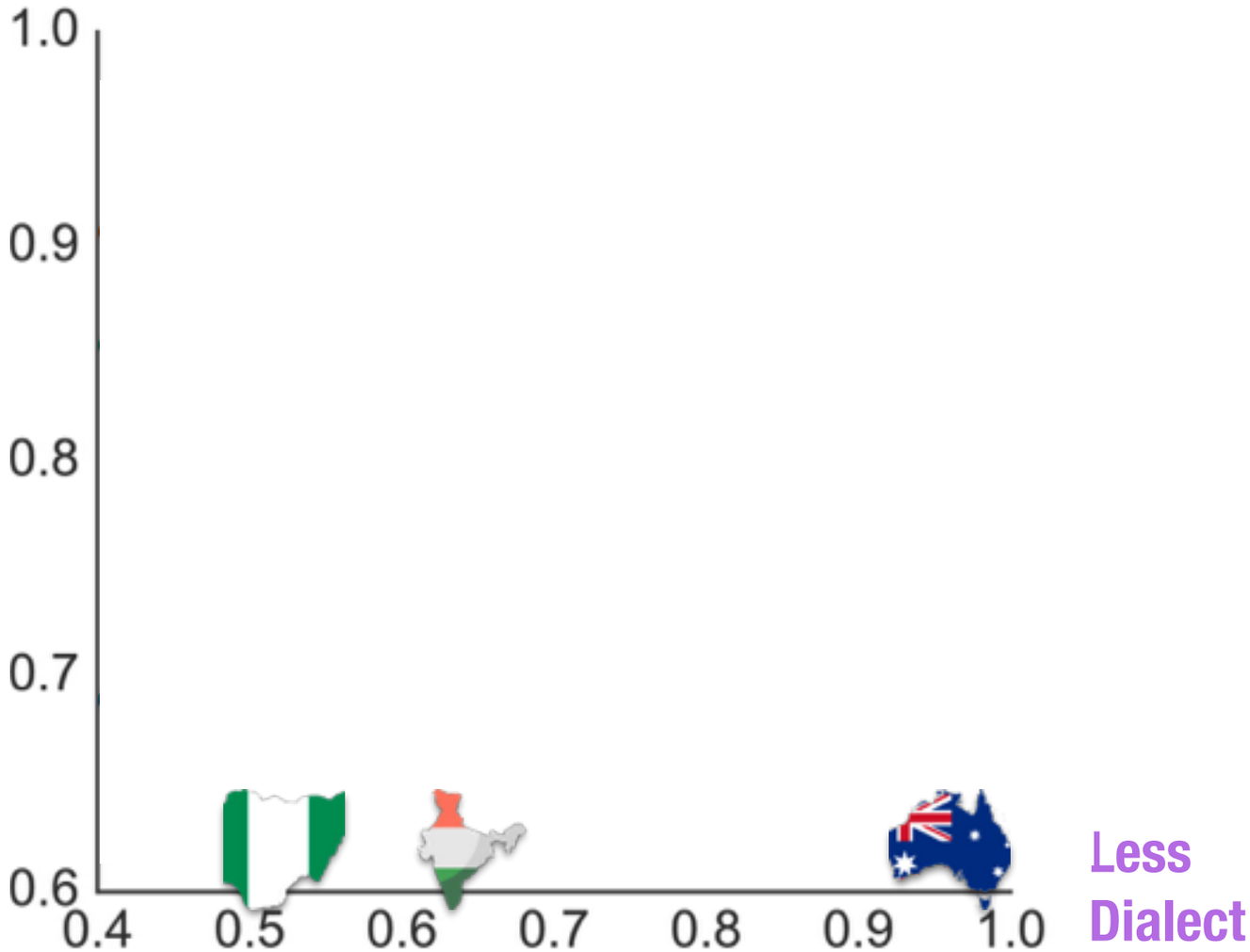
Estimated LID accuracy for English tweets



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Current language detection methods perform significantly worse in less-developed countries

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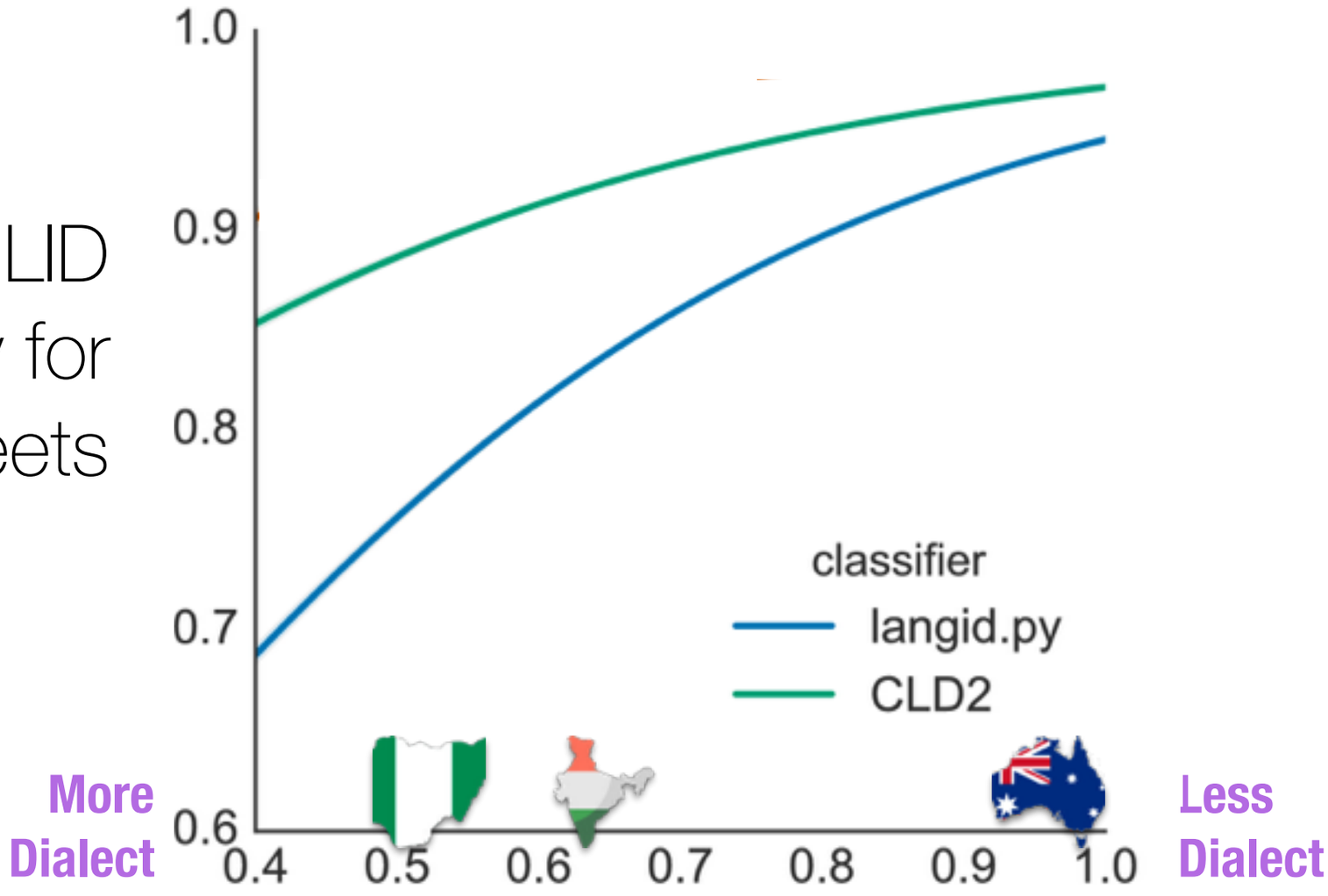

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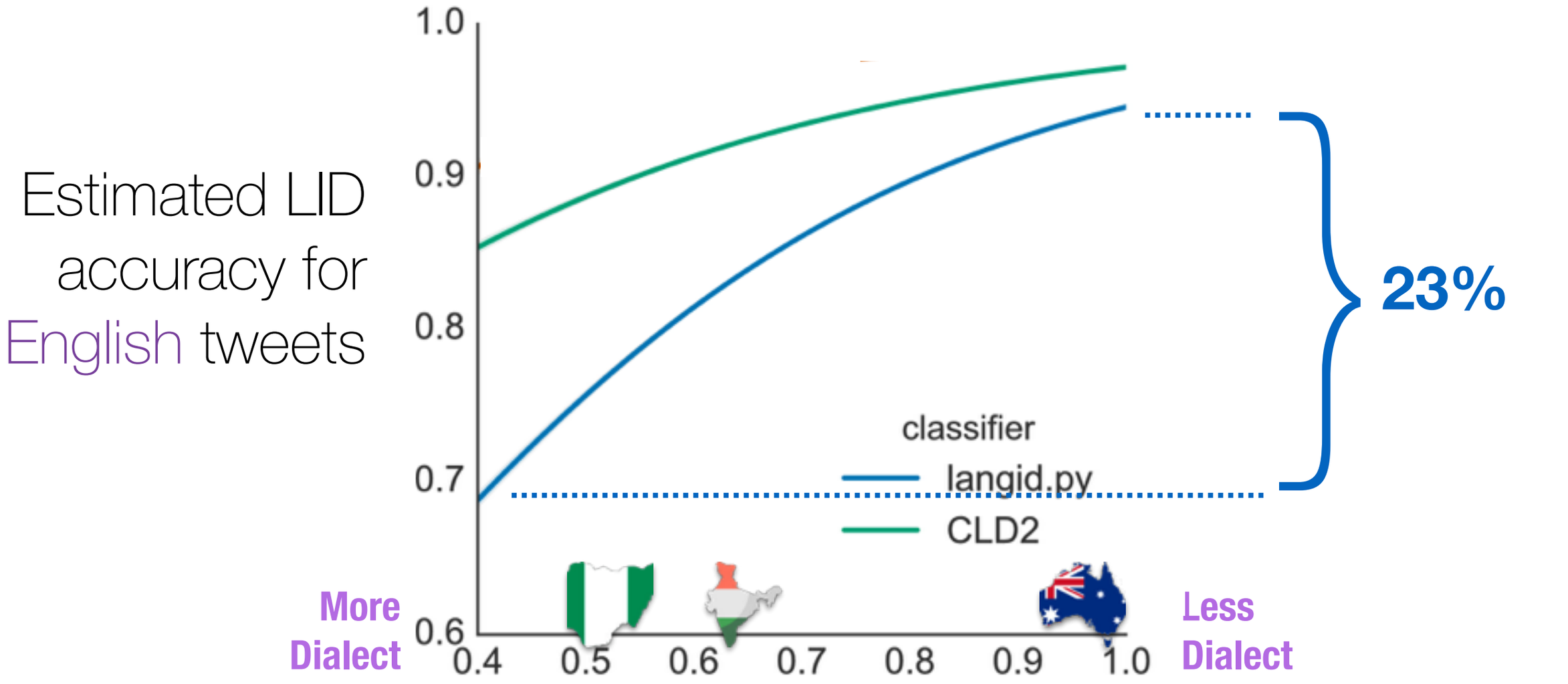

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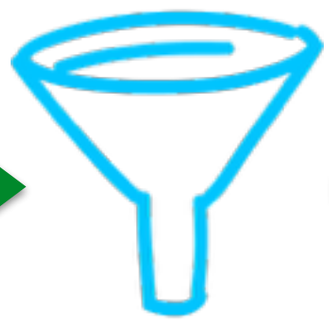
Practical Motivation: Epidemic Detection

Keyword Filter
"flu", "sick"

NLP
Which symptoms?

Practical Motivation: Epidemic Detection



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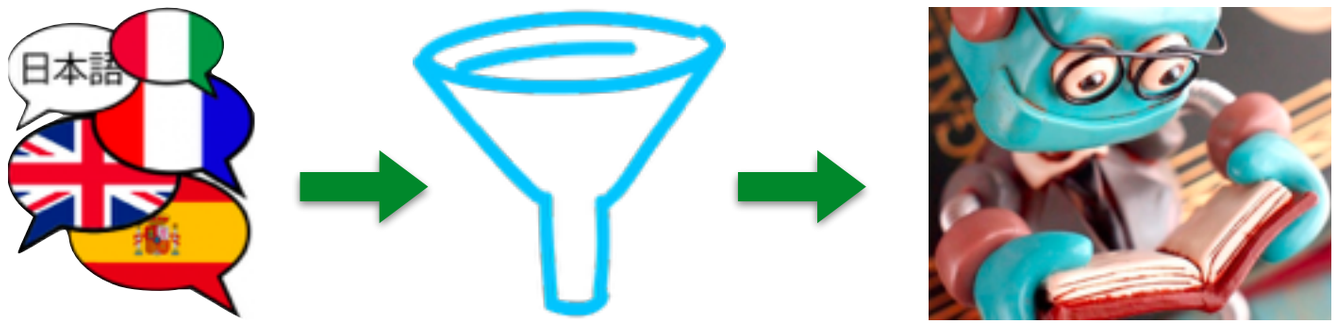


Language Detection

Keyword Filter
"flu", "sick"

NLP
Which symptoms?

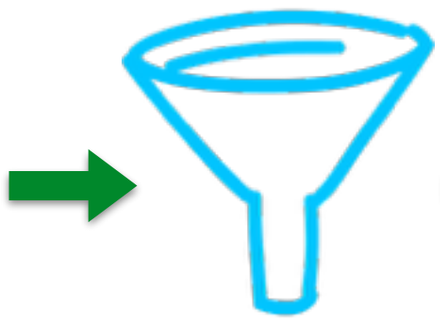
non-English

Practical Motivation: Epidemic Detection

Brooke
@Brookiepoo134

Follow

got the flu over the weekend and I didn't know until today, & I somehow managed to give it to FIVE of my friends!!!!!!



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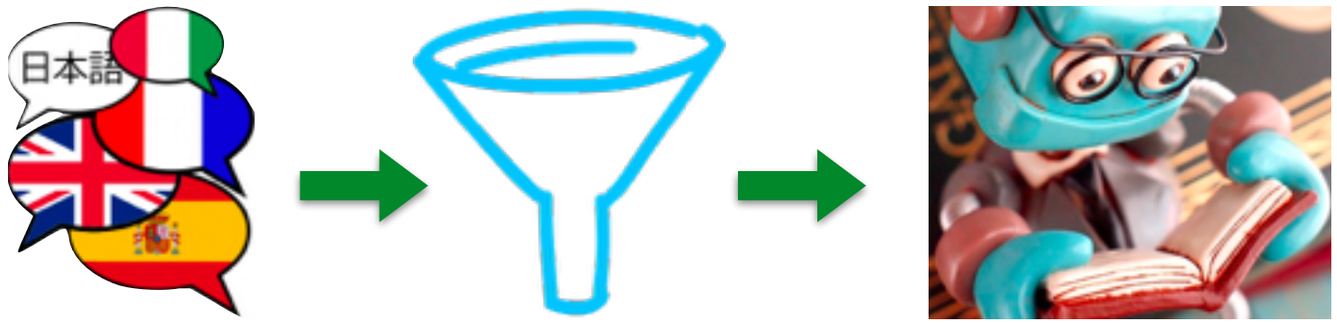

Language Detection

Keyword Filter
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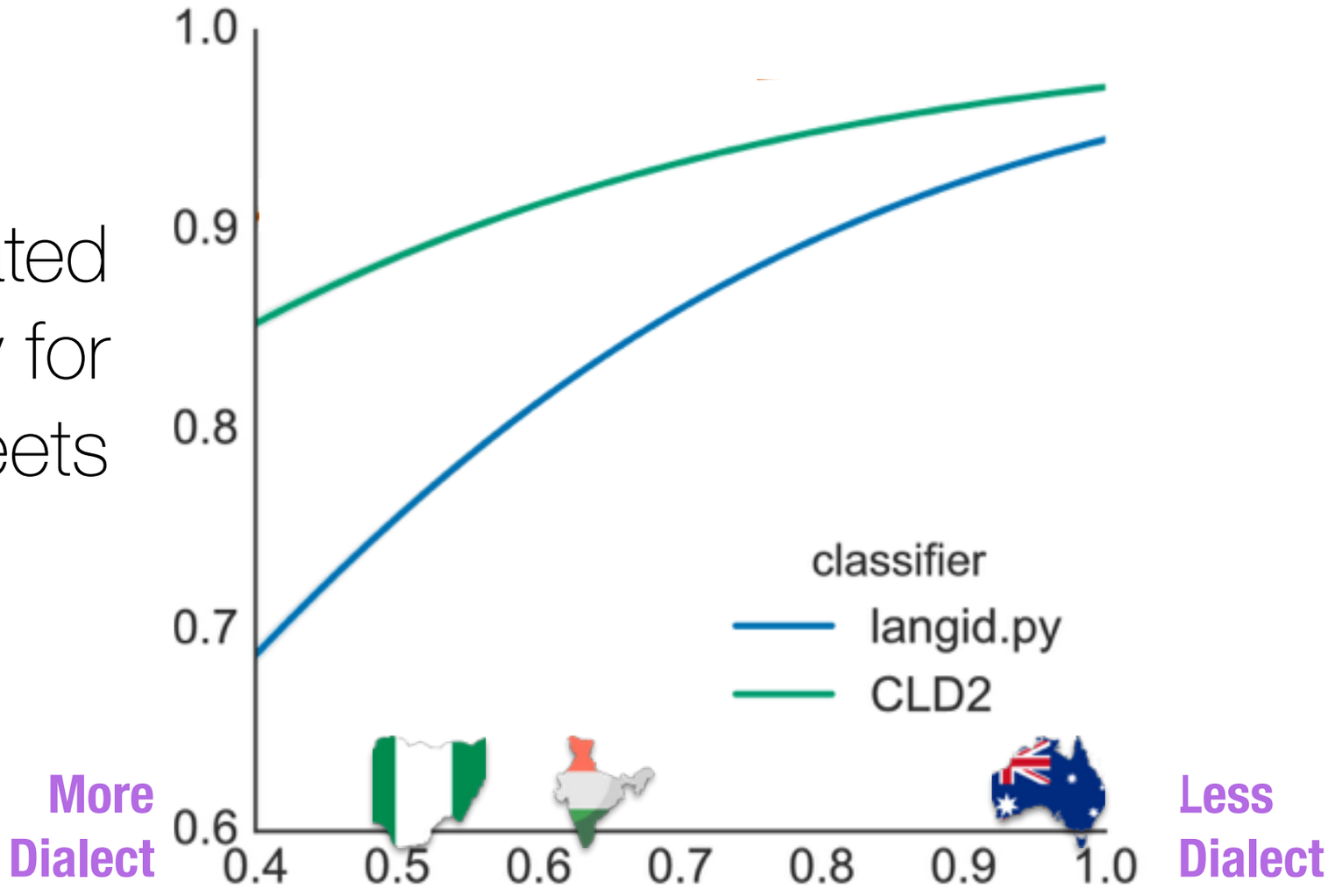
NLP
Which symptoms?

non-English?


Failing to recognize a language silences its speakers’ voices

Current language detection methods perform significantly worse in less-developed countries

Estimated accuracy for English tweets



Human Development Index of text's origin country

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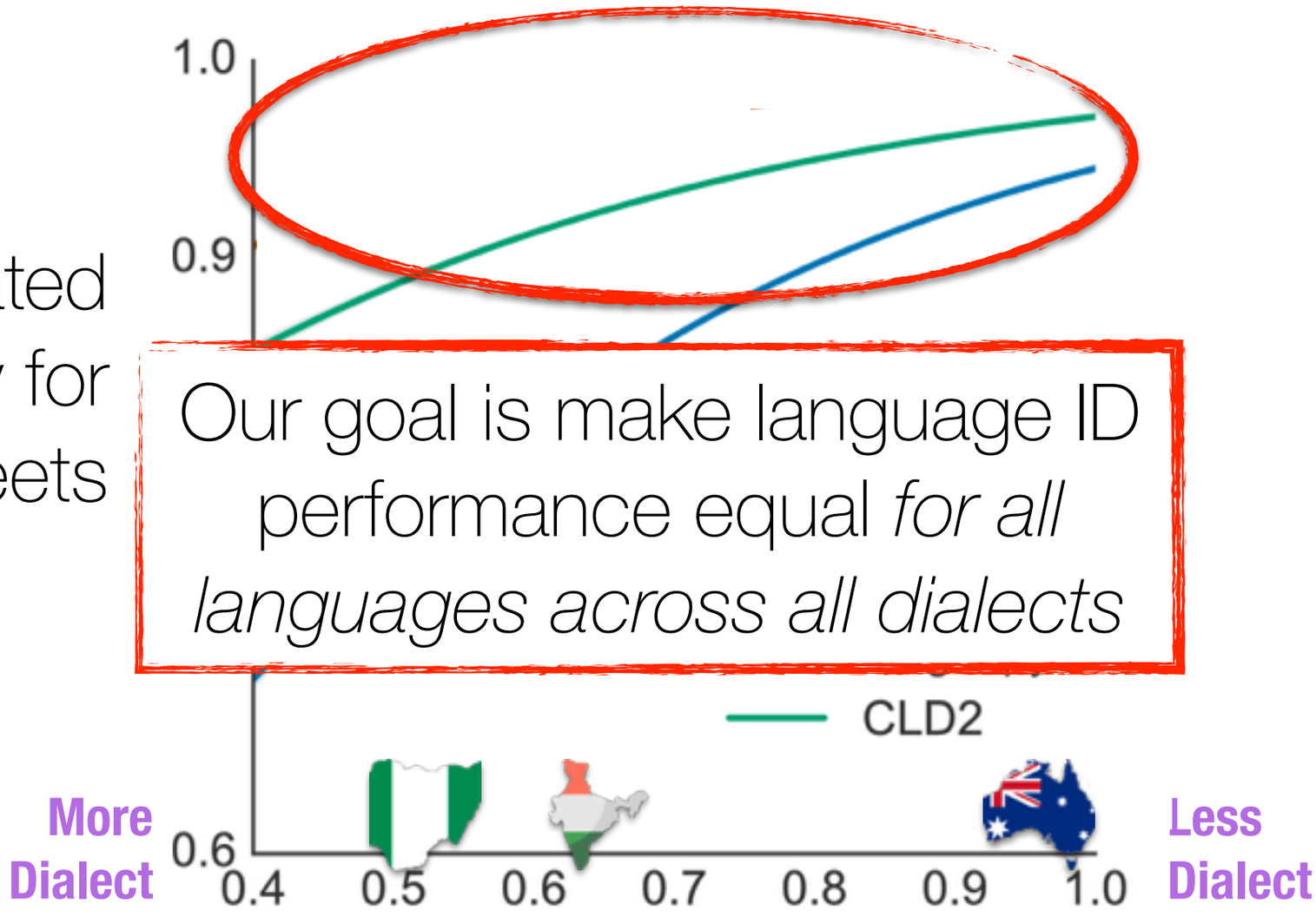


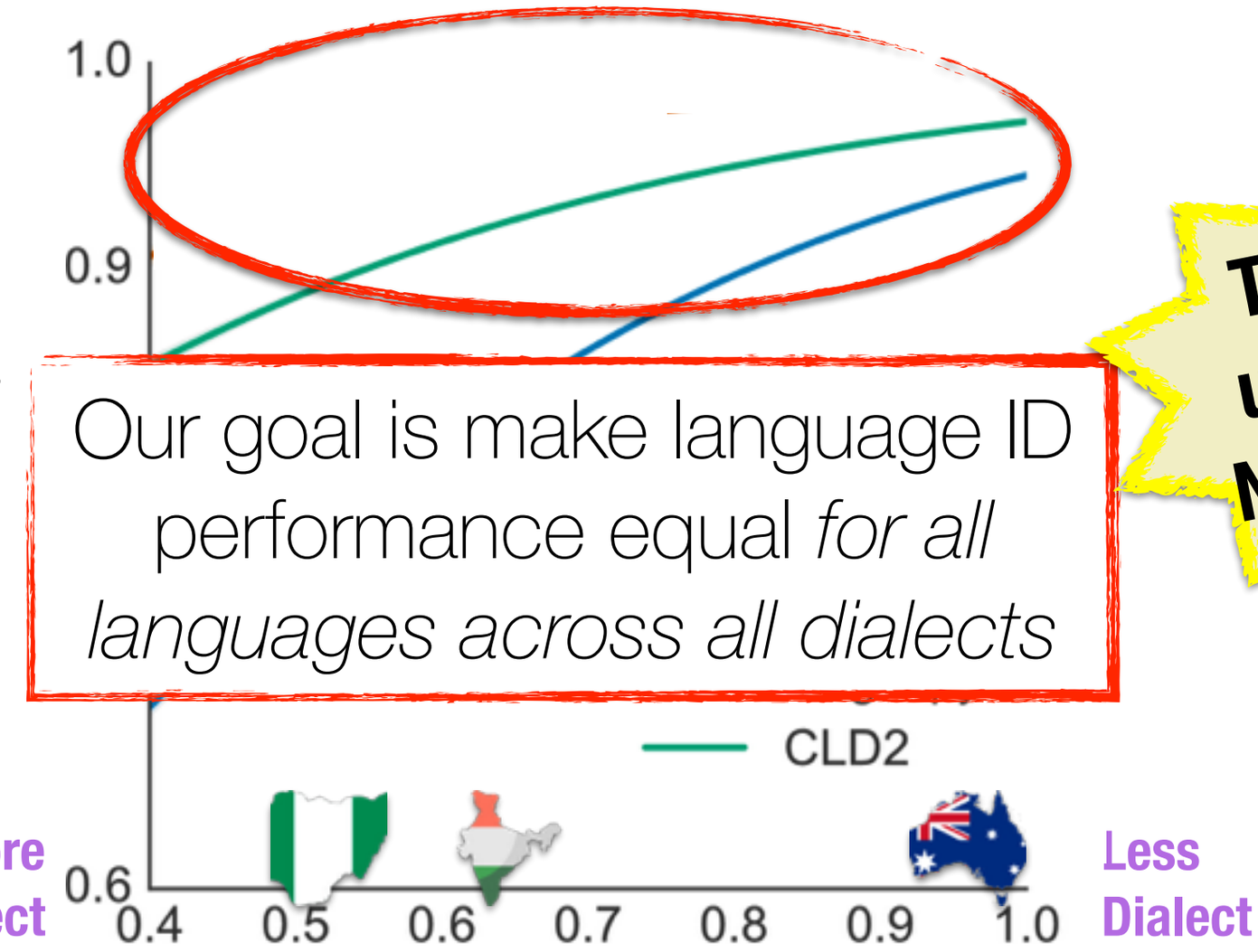
Our goal is make language ID performance equal *for all languages across all dialects*

Human Development Index of text's origin country

(Labov, 1964; Ash, 2002)

Current language detection methods perform significantly worse in less-developed countries

Estimated accuracy for English tweets



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This is a universal NLP issue!

Human Development Index of text's origin country

(Labov, 1964; Ash, 2002)

Key Problems: Current methods struggle in the global setting because

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Data: No corpora that captures global variation in lexicon and dialect

Nana Rayne
@Nana_Rayne

Follow

Like serious dis flu nor dey wan go oooo.... Sick

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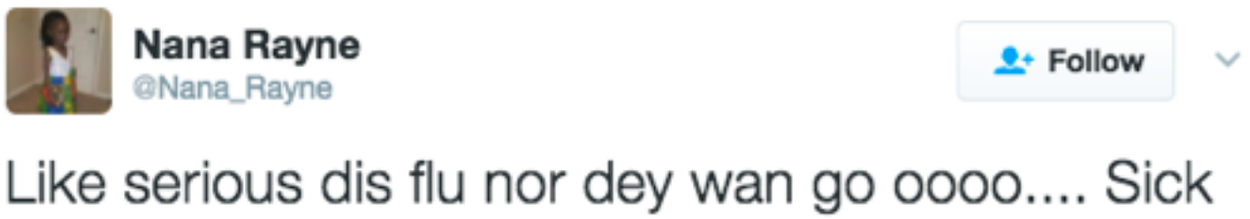
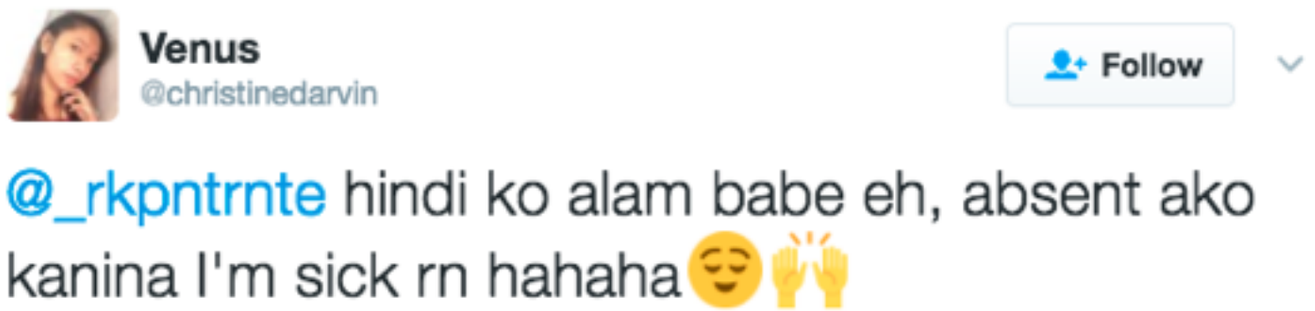
Data: No corpora that captures global variation in lexicon and dialect

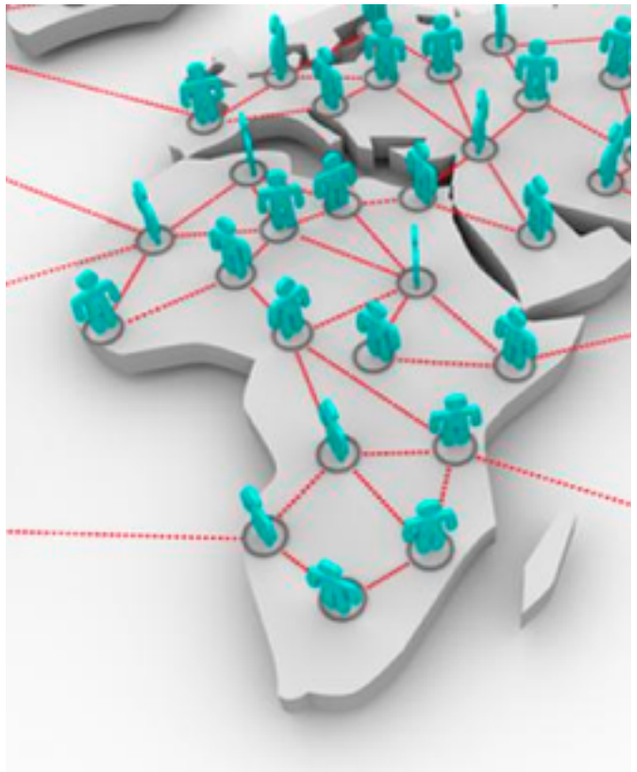


Model: makes simplistic assumptions about how multilinguals communicate

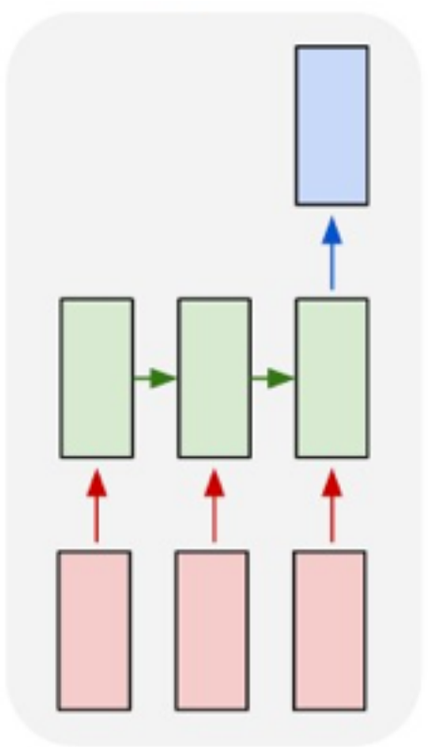


Our approach

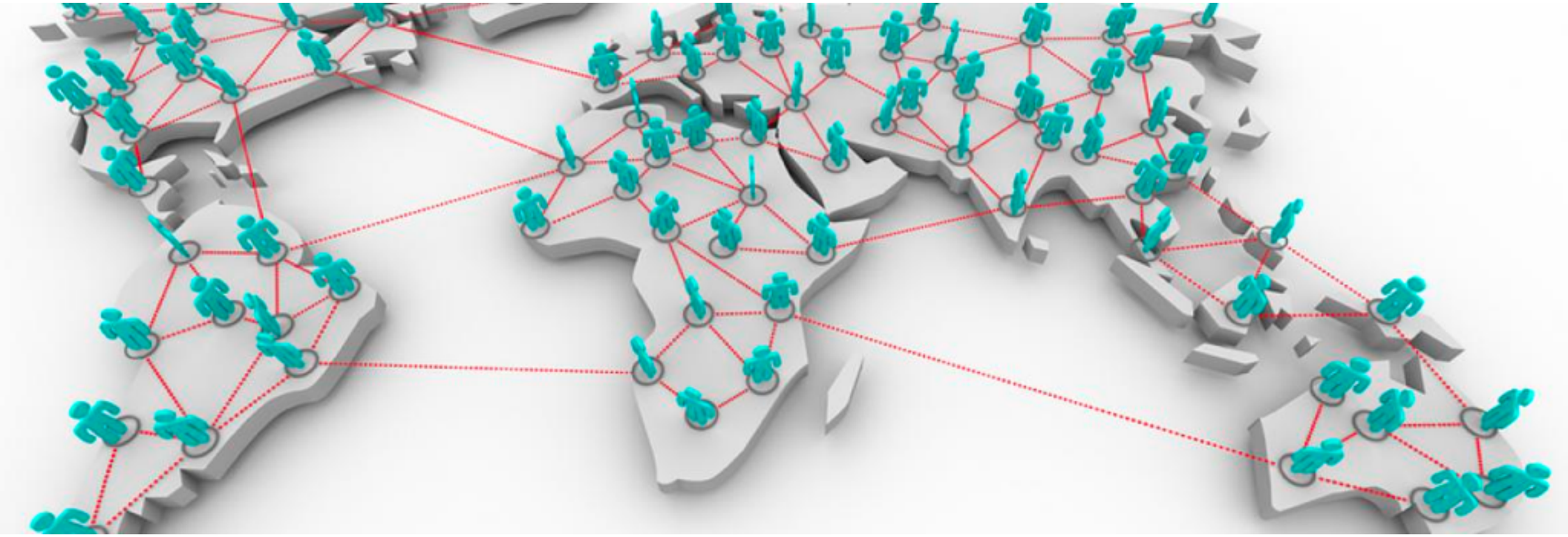
Better **social representation** through network-based sampling



NLP methodologies capable of handling **linguistic variation**



Our Data Solution: Improve linguistic representation through network-based sampling



Our Data Solution: Improve linguistic representation through network-based sampling

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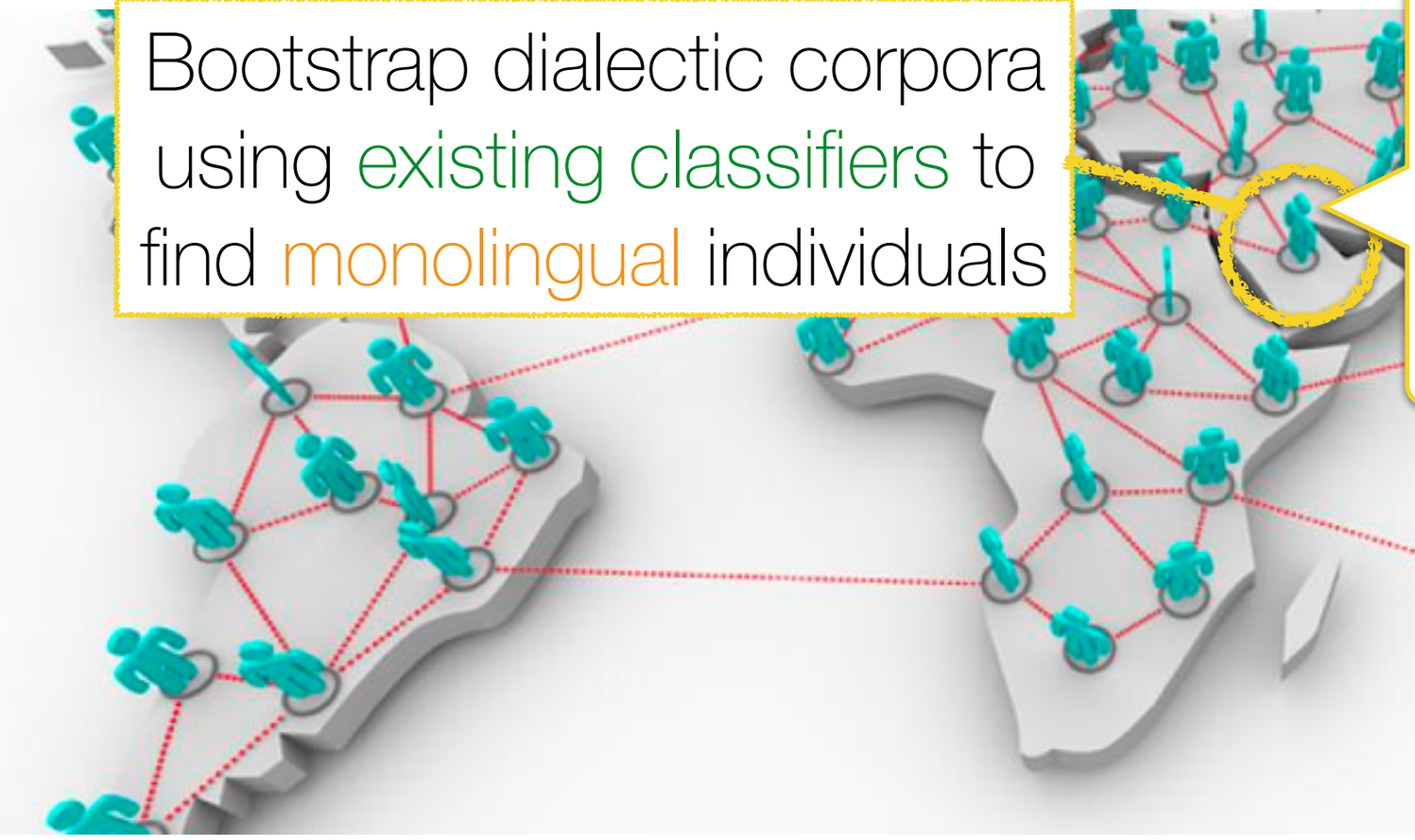
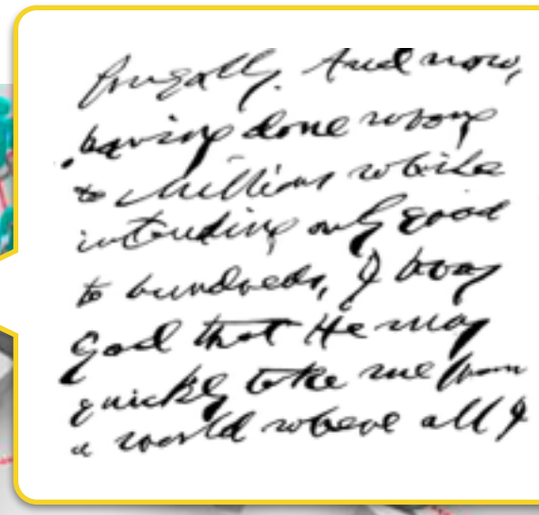
Bootstrap dialectic corpora using existing classifiers to find monolingual individuals





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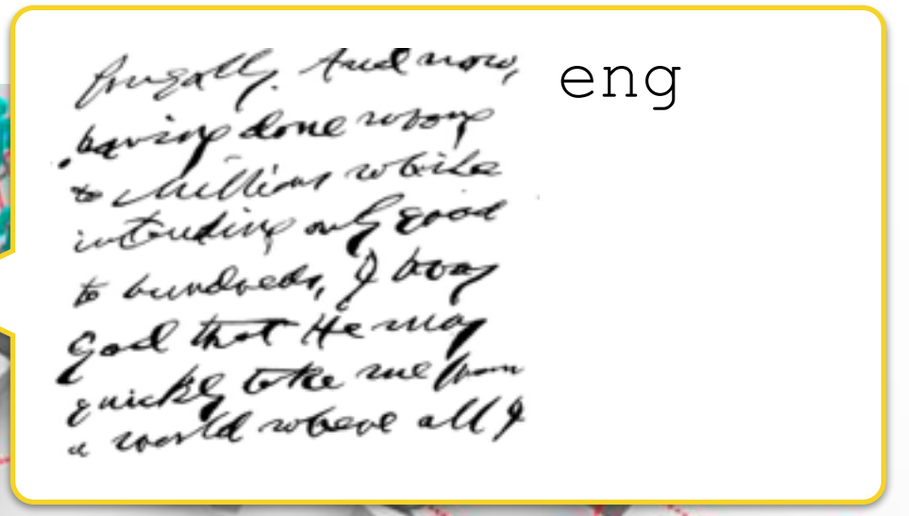

eng

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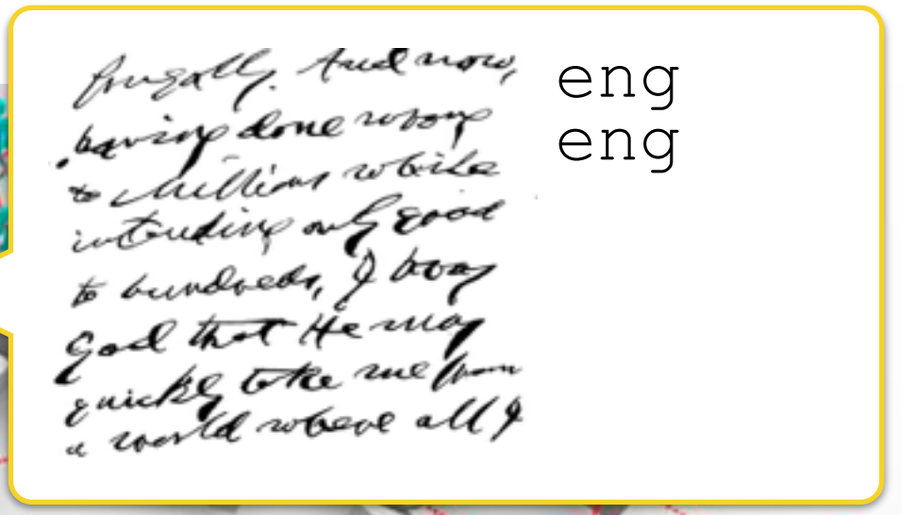

eng
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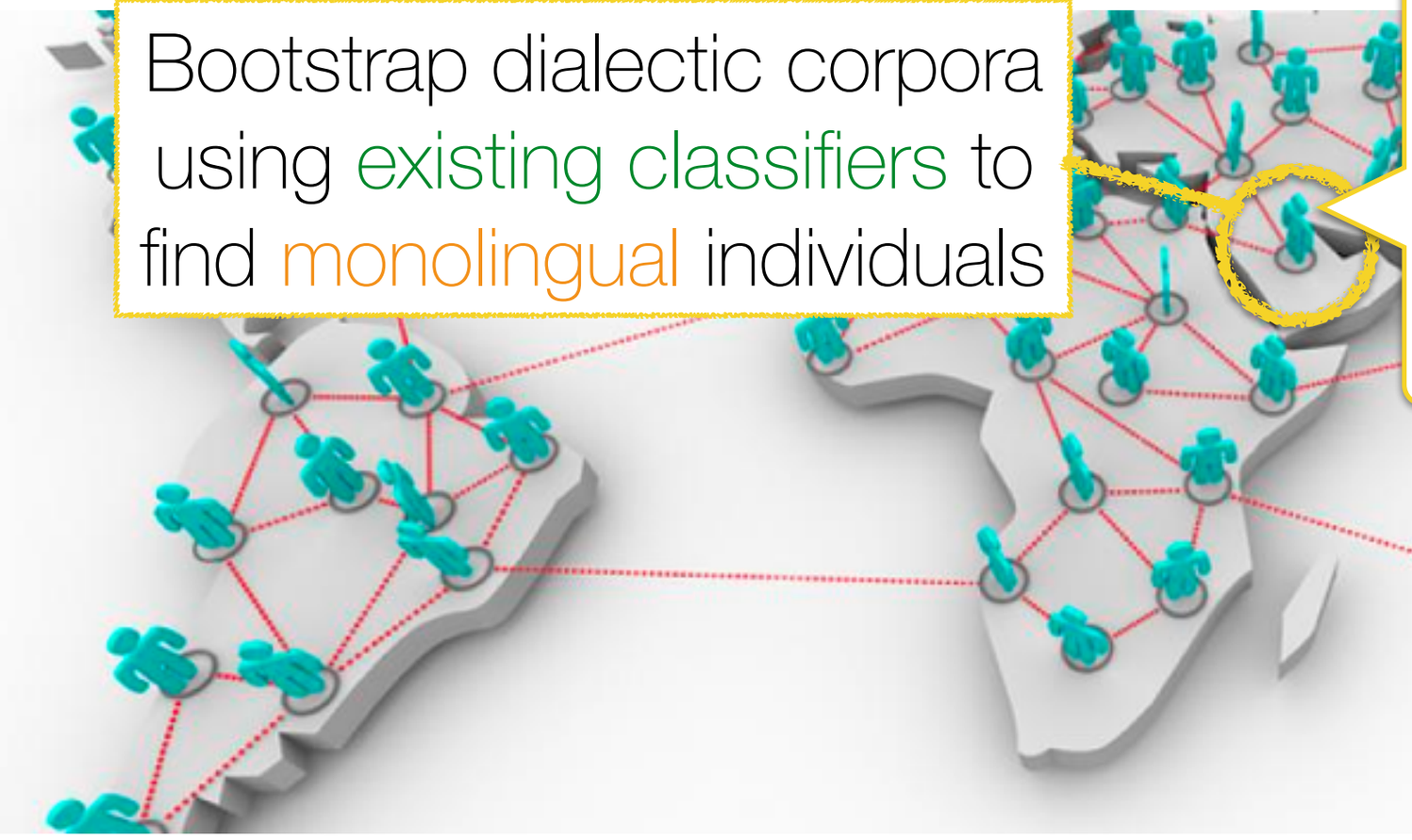

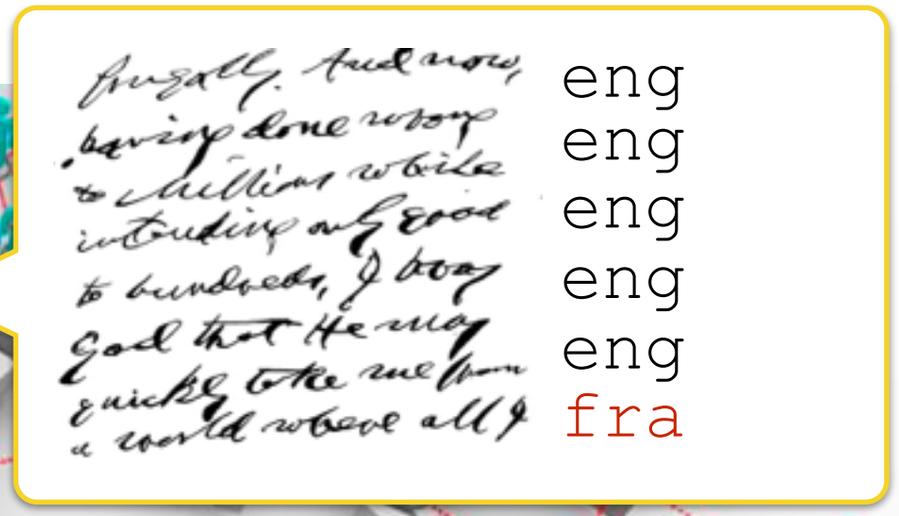

eng
eng
eng
eng
eng
fra

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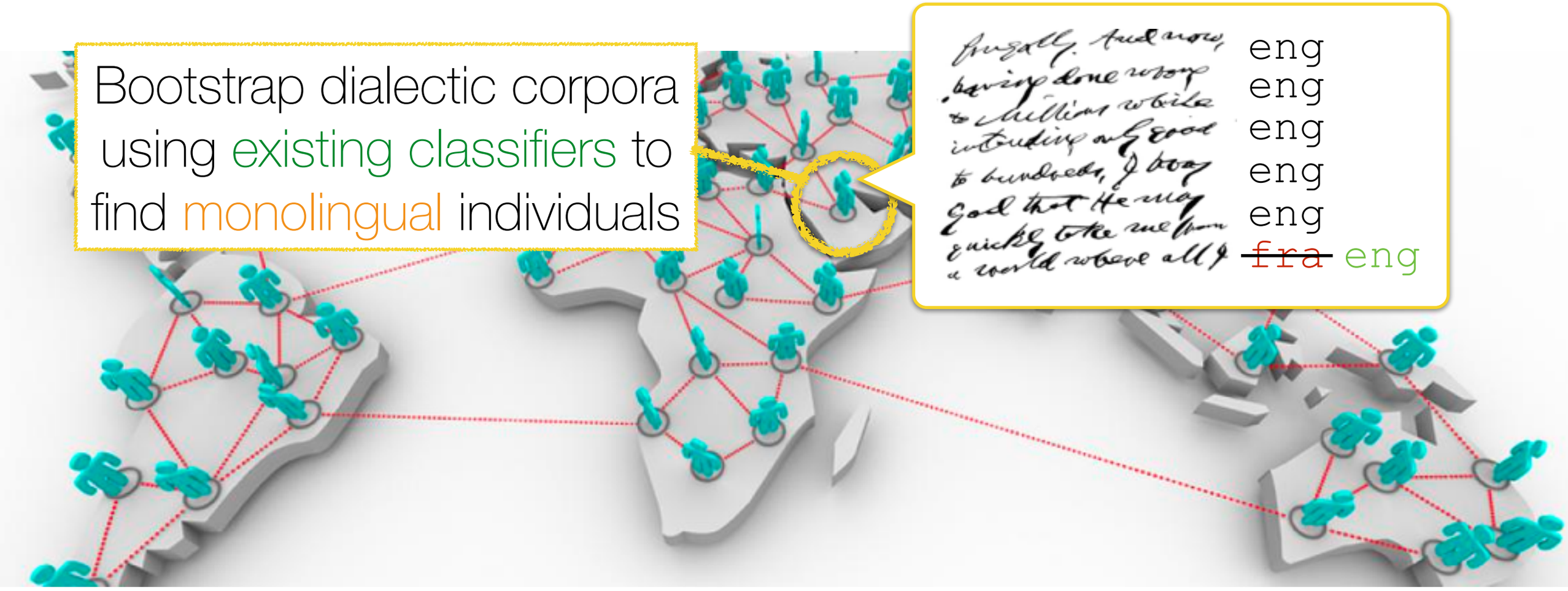

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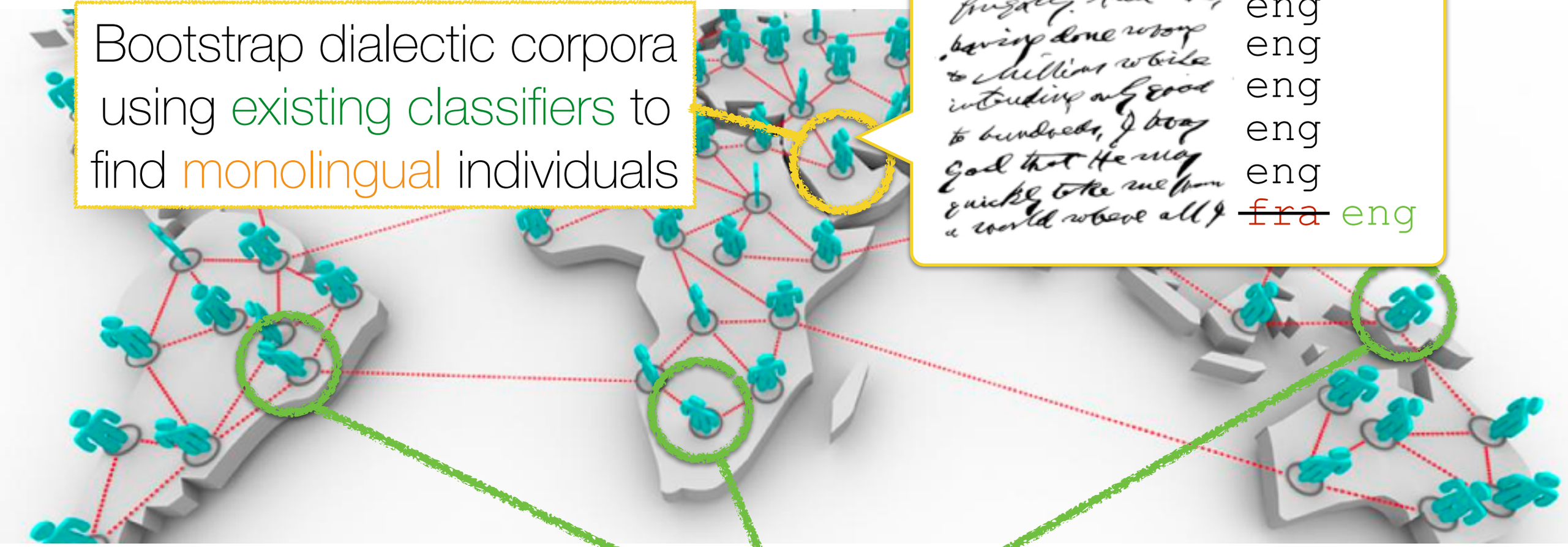

	eng
	eng
	eng
	eng
	eng
	~~fra~~ eng

Sample from the geolocated Twitter social network to include text from people at all locations

Build a strategically-diverse corpora

Build a strategically-diverse corpora

Topical

Build a strategically-diverse corpora

Topical

Geographic

Build a strategically-diverse corpora

Topical

Geographic

Social

Build a strategically-diverse corpora and synthesize code-switched examples

Topical

Geographic

Social

Multilingual

Our model solution: treat language identification as a character-based sequence to sequence task.

Decoder

Encoder

Je vais commander à emporter. I'm too lazy to cook.

Jaech et al. 2016; Samih et al. 2016

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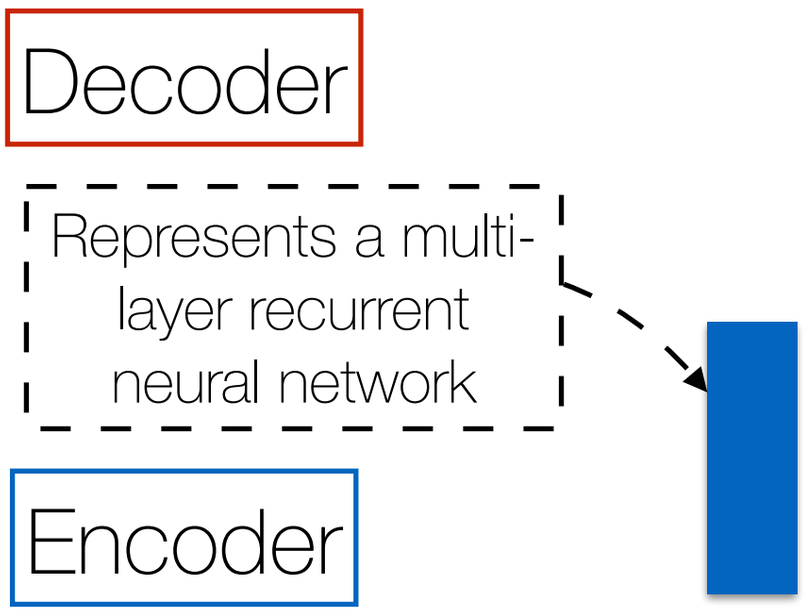

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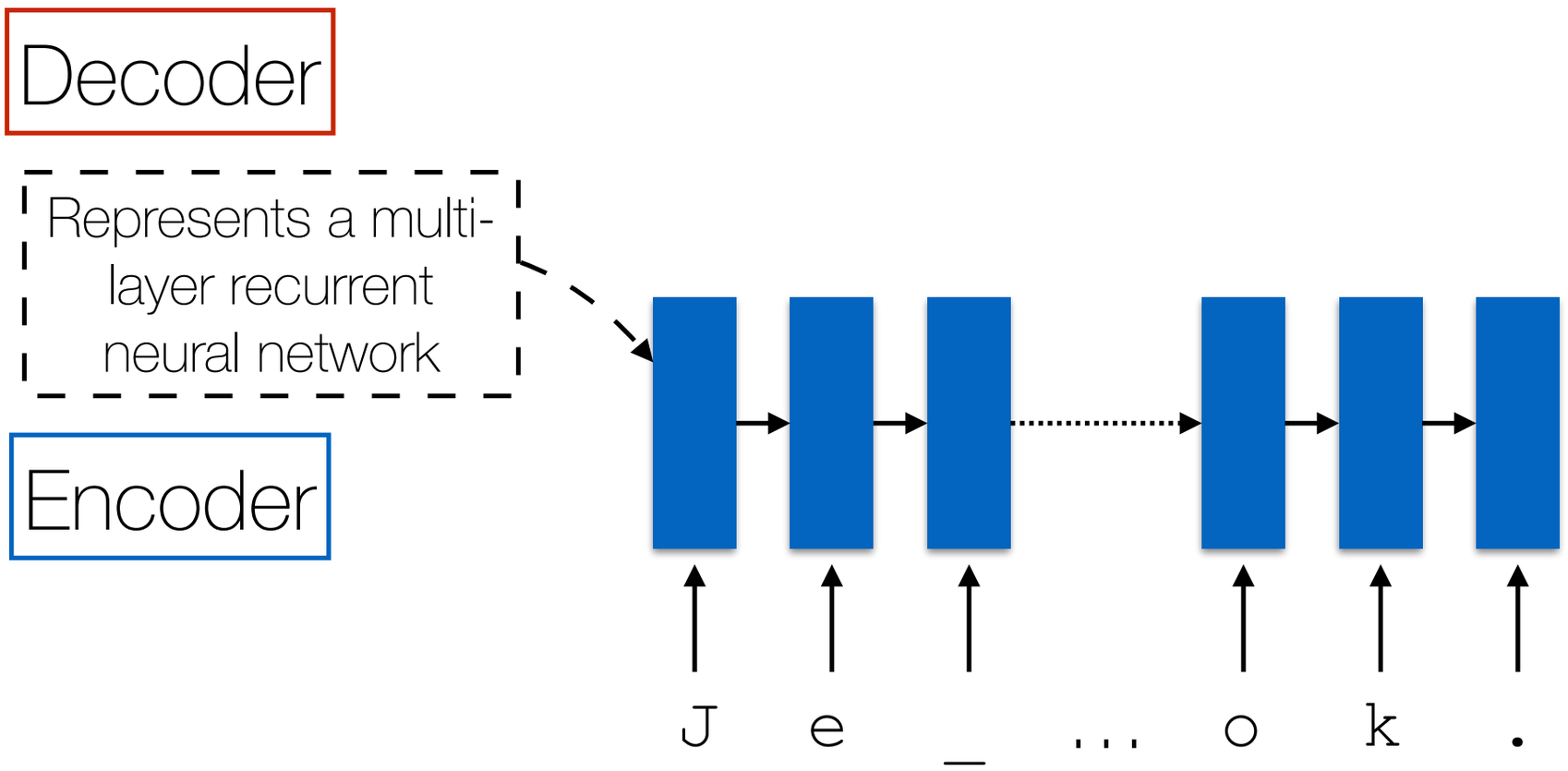

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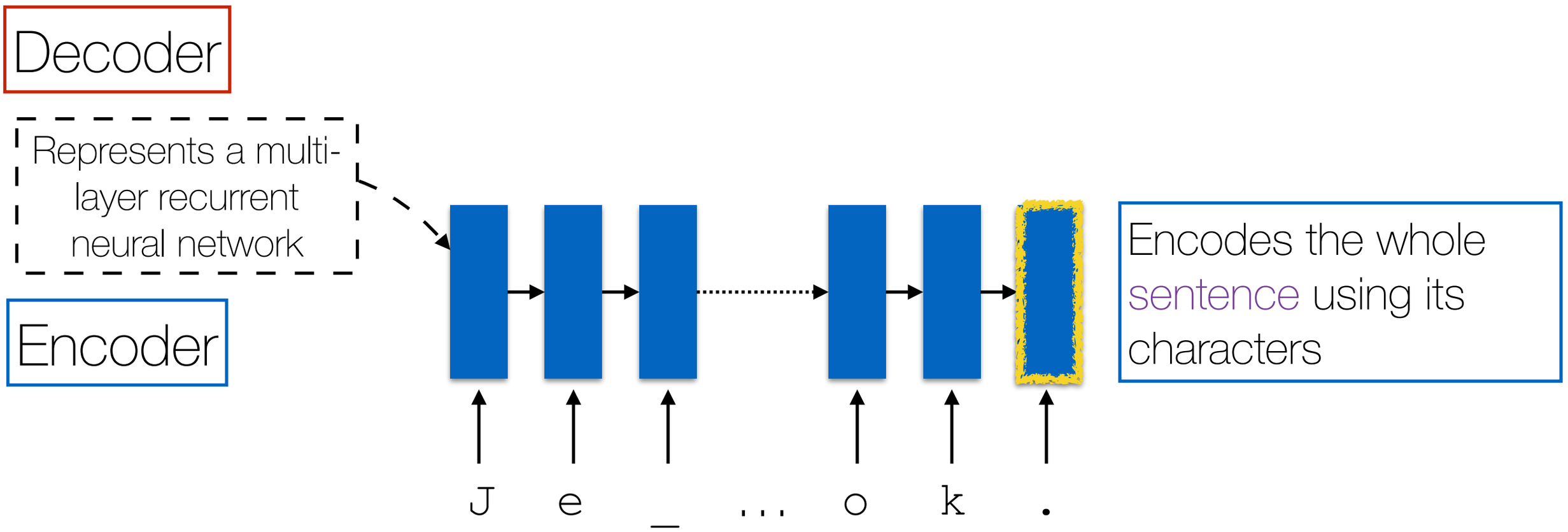

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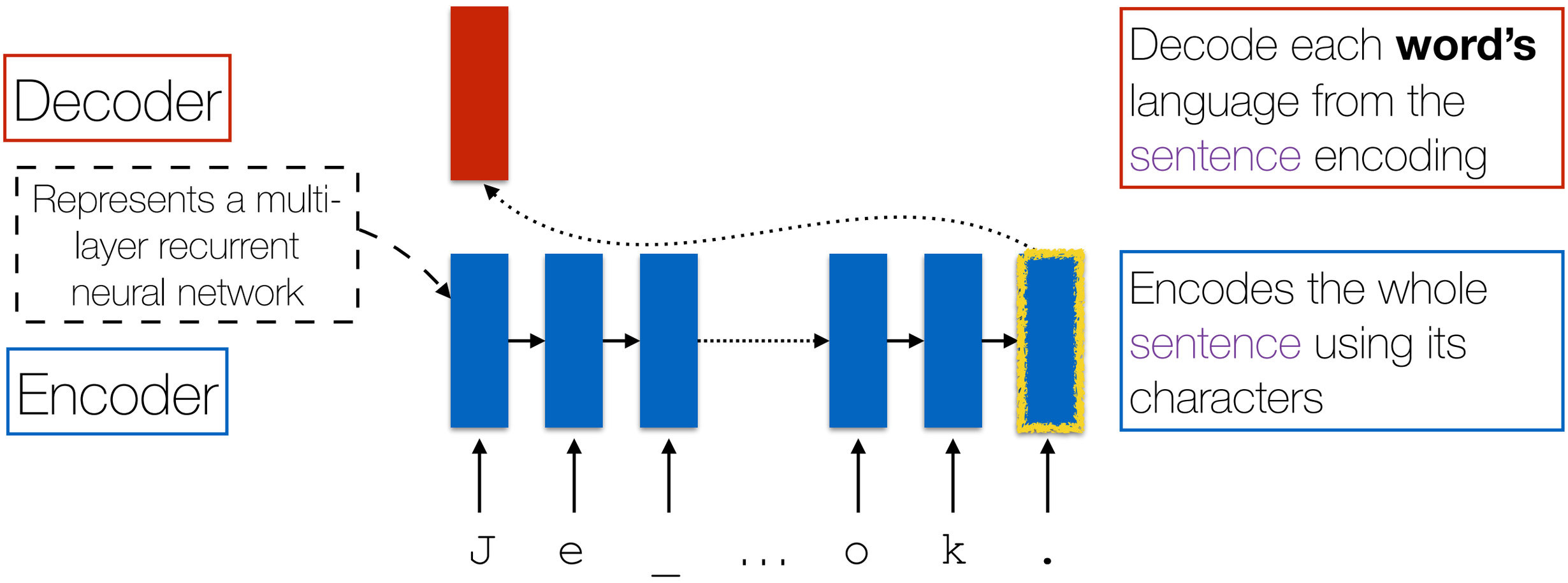

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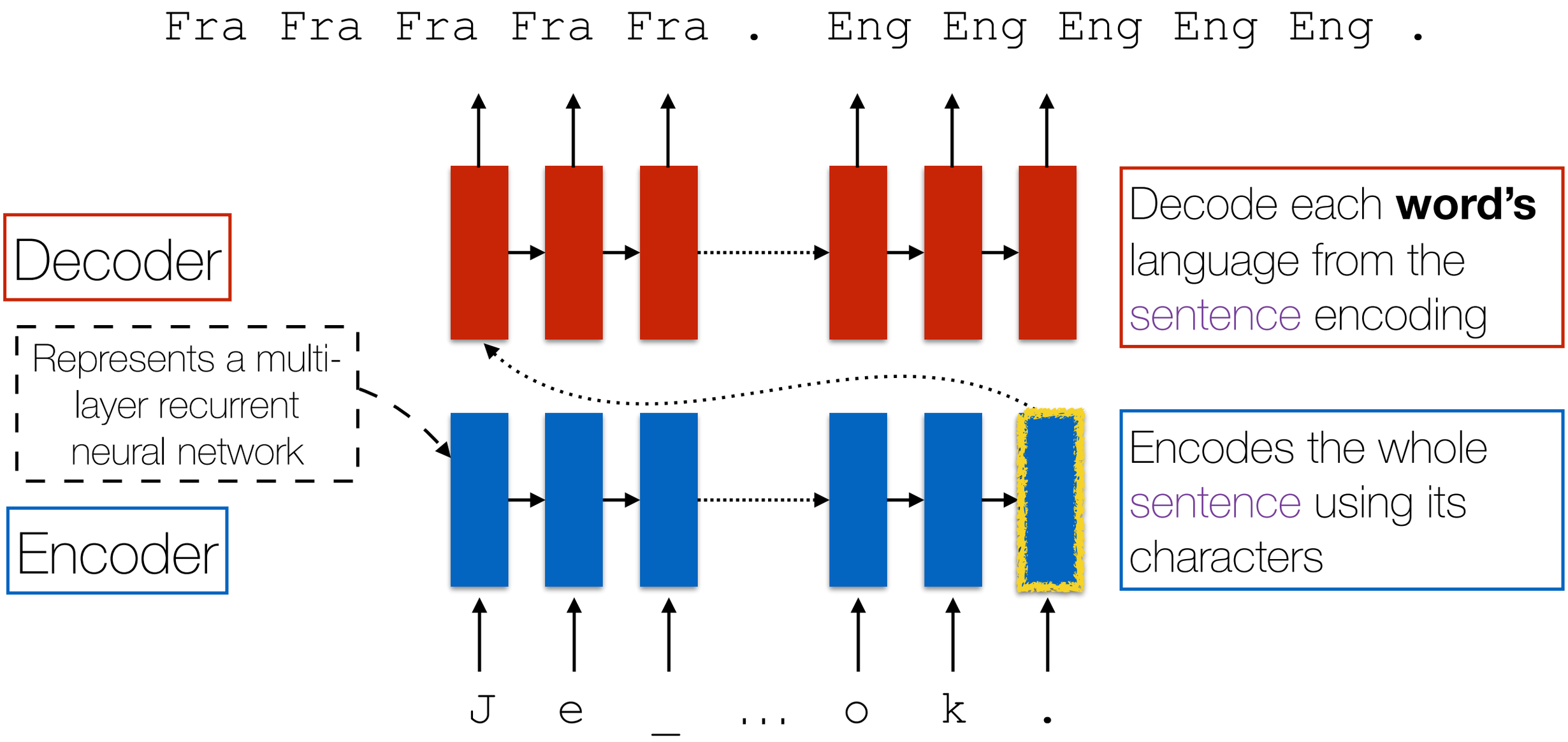

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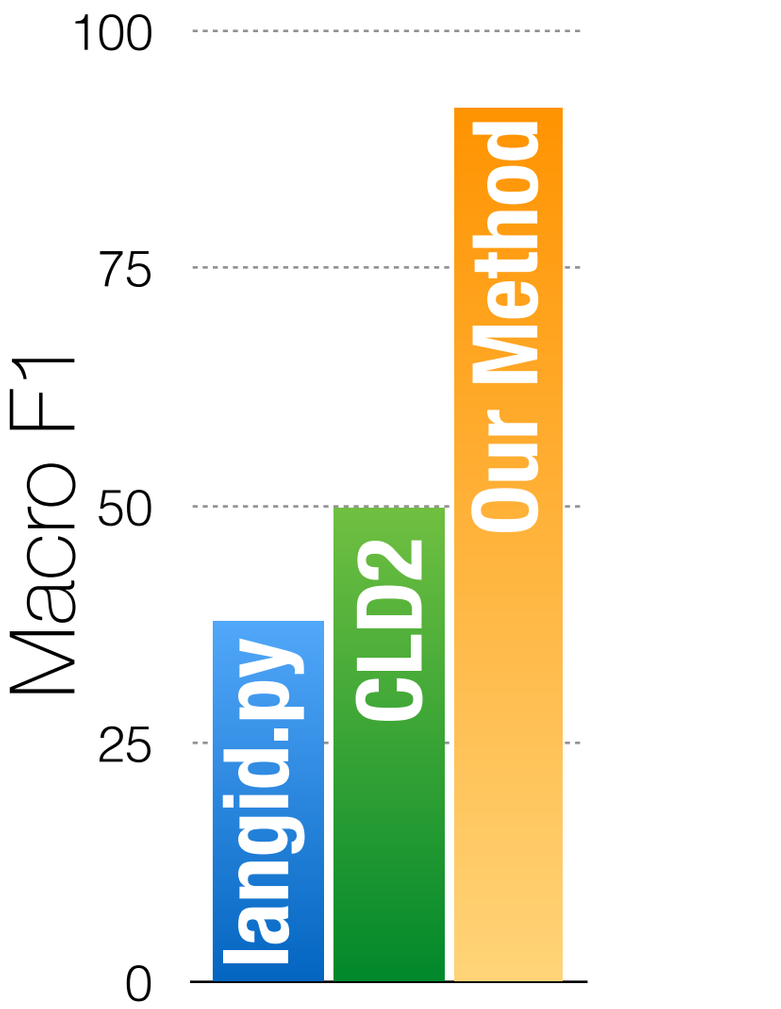
Equilid vs off-the-shelf

Lui et al. 2013, 2014

Equilid vs off-the-shelf



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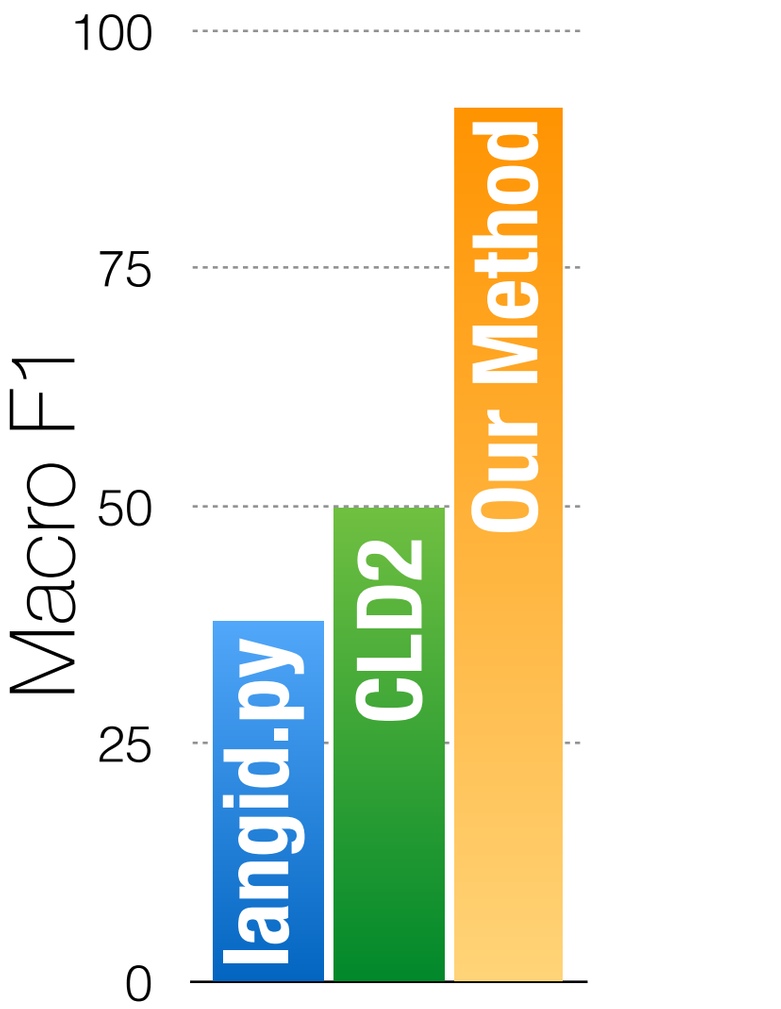
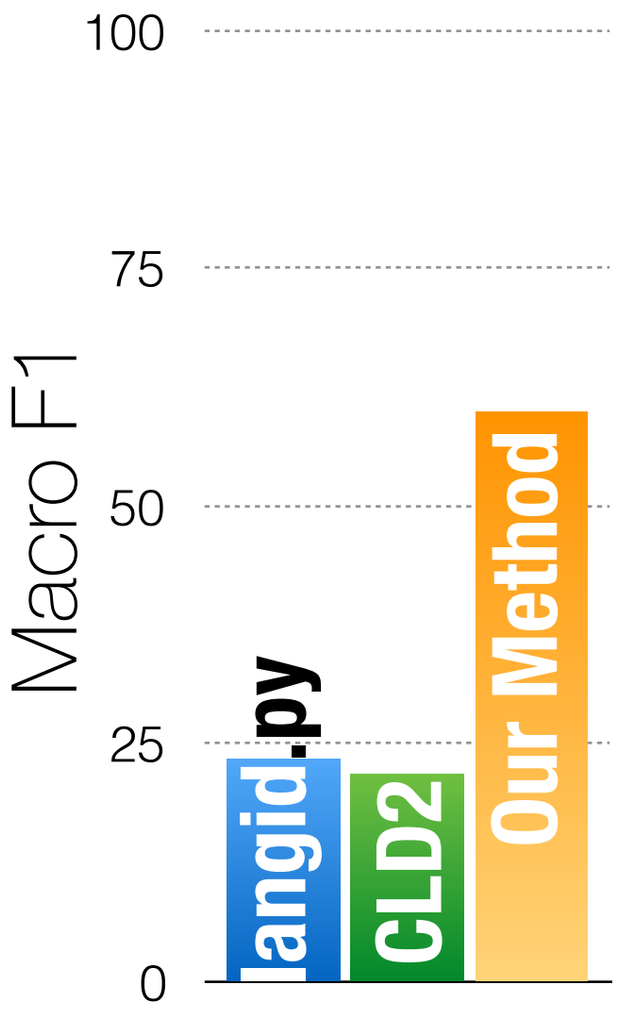


70 Languages on Twitter



Geo-diverse Tweets

Lui et al. 2013, 2014

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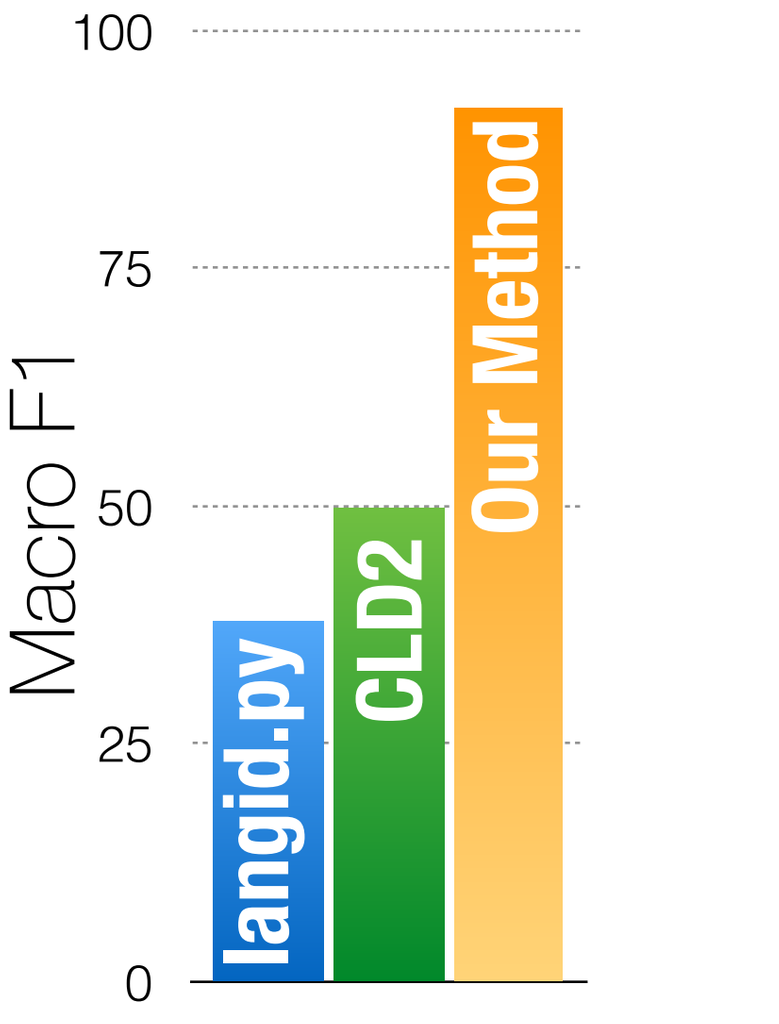

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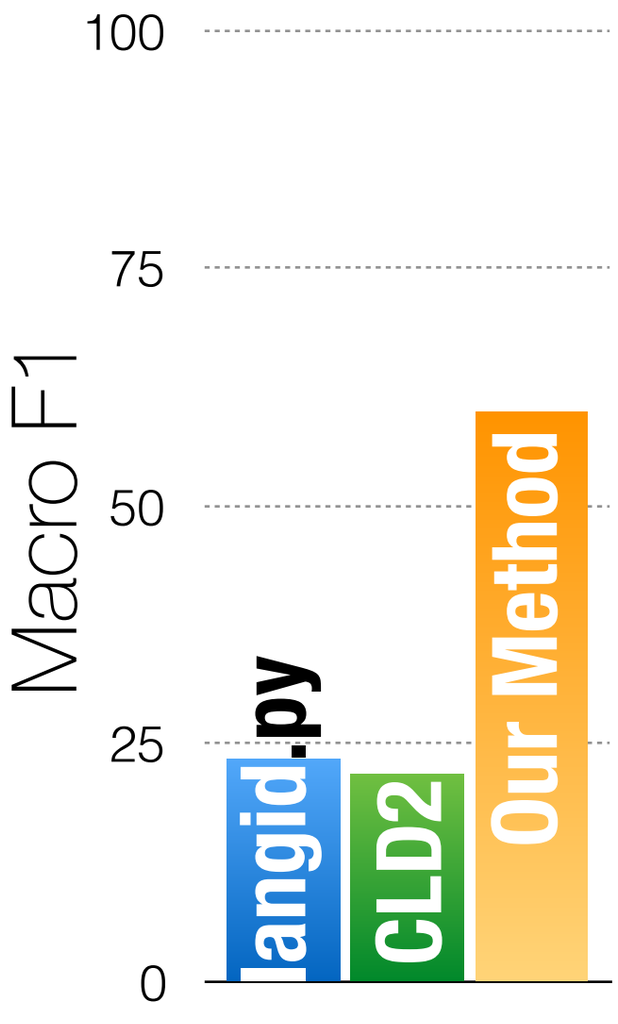

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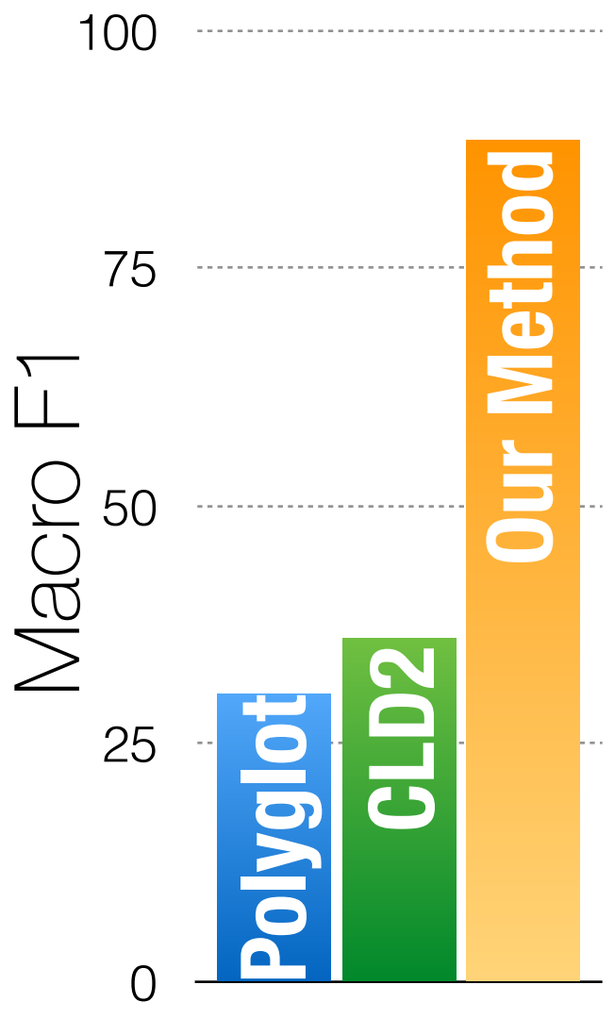
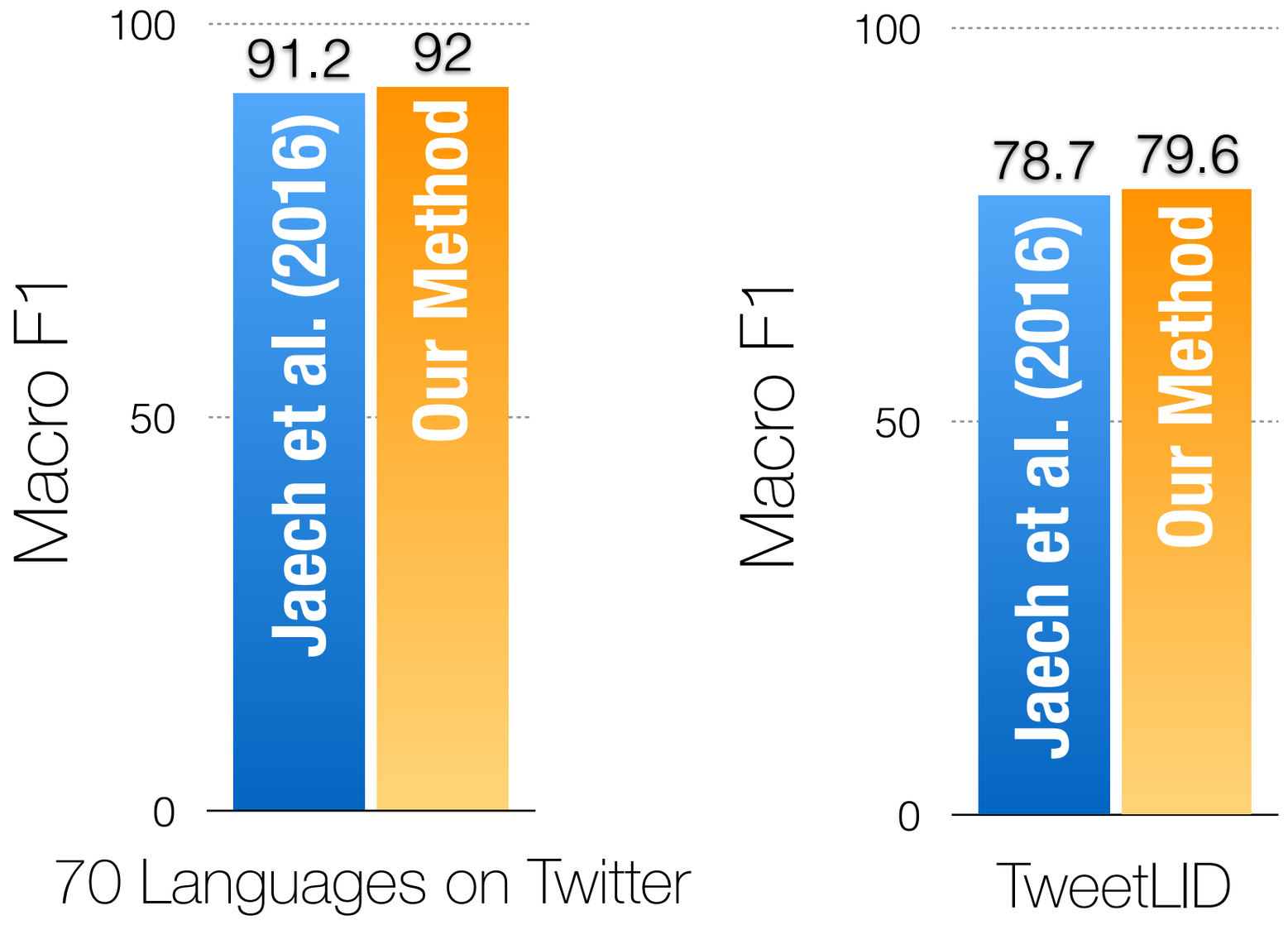


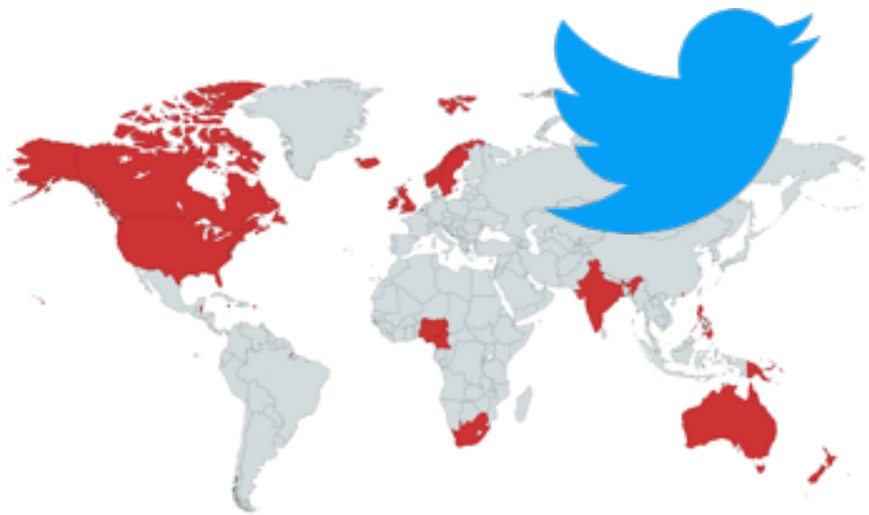
Multilingual Tweets

Lui et al. 2013, 2014

Equilid even outperforms system specifically tuned for each dataset



Case Study: Do our solutions provide socially-equitable language identification for health-related queries?



1M Tweets with any of 385 English terms from established lexicons for influenza, psychological well-being, and social health

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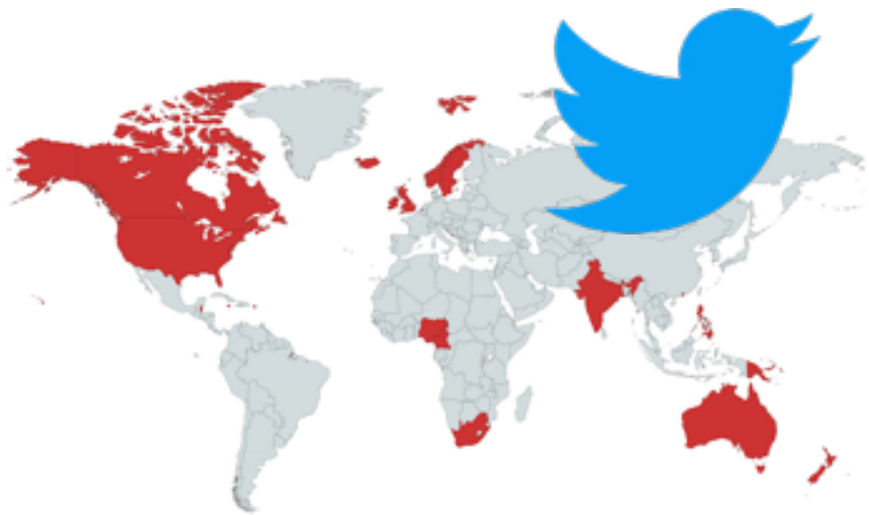

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Lamb et al., (2013); Smith et al., (2016); Preotiuc-Pietro et al., (2015); Park et al., (2016)

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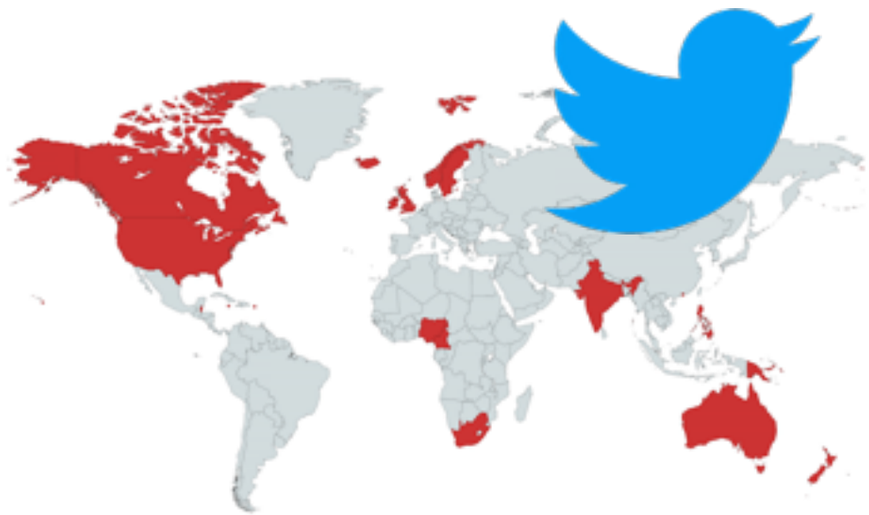
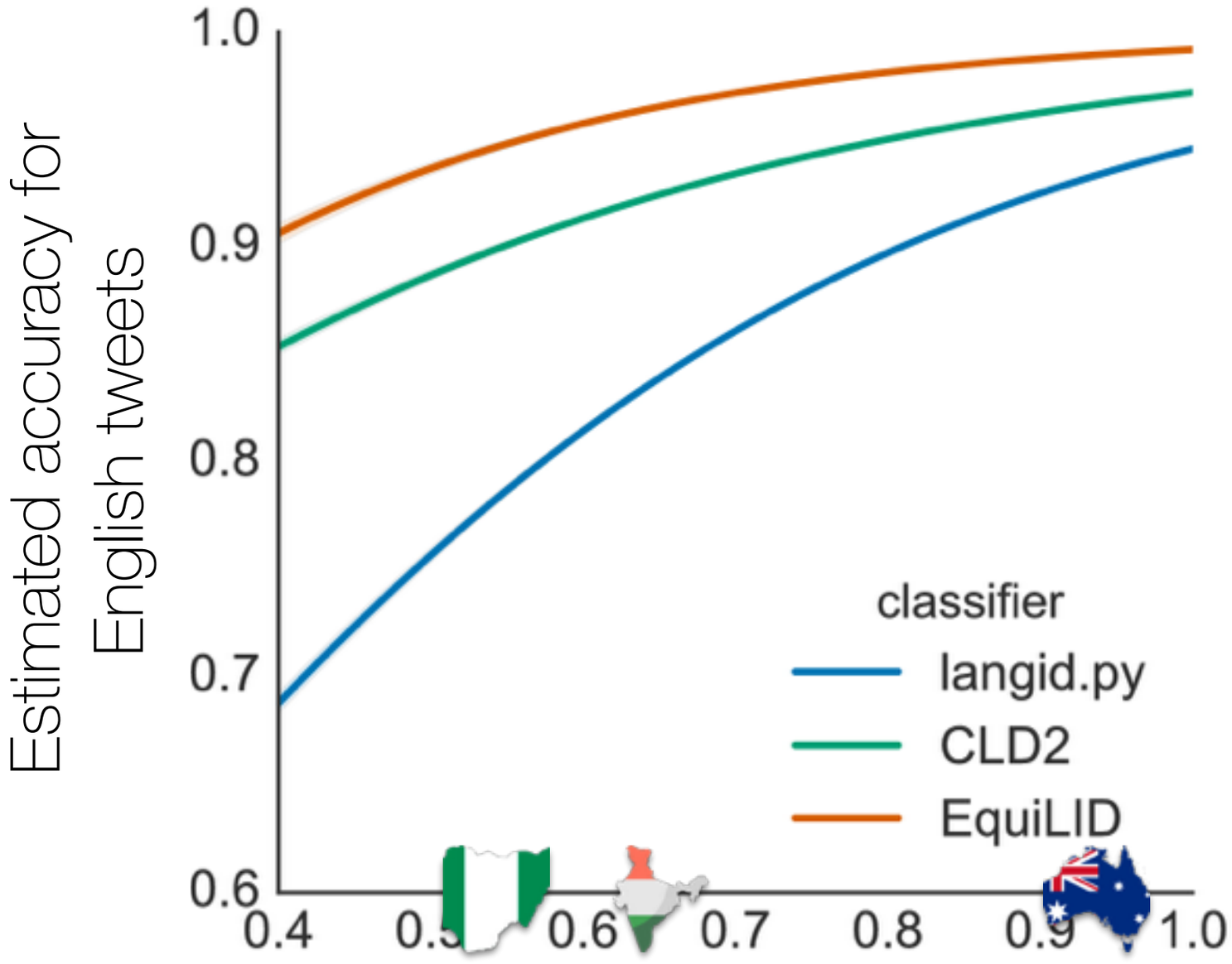


1M Tweets with any of 385 English terms from established lexicons for influenza, psychological well-being, and social health

Task: does the language identification system recognize every tweet as English?

Lamb et al., (2013); Smith et al., (2016); Preotiuc-Pietro et al., (2015); Park et al., (2016)

Equilid raises the bar for socially-equitable language identification



Social Equality doesn’t stop at Language Identification

Better **social representation** in our data

Methodologies capable of handling **language as it is used**

Social Equality doesn’t stop at Language Identification

Better **social representation** in our data

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Be equitable!

https://github.com/davidjurgens/equilid

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