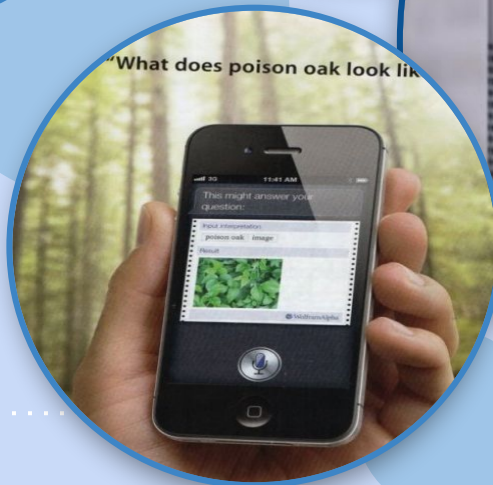




# **Analyzing Vocal Bias via Accents in Voice Recognition Technologies**

“

*Everyone who speaks a language,  
speaks it with an accent.*





**A** DATA CE

# Donate your voice so Siri doesn't just work for white men

Want AI to be less biased? Cherish

## 'Okay Google, Play 'Dura.': Voice Assistants Still Can't Understand Bilingual Users

By Ximena N. Larkin



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How might vocal differences caused by factors such as regional background, socioeconomic status, or speech impediments affect the accuracy of voice to text algorithms?

**In short, are voice-to-text algorithms biased?**



# Our Methods



# the speech *accent* archive

- how to
- browse
- search
- resources
- about



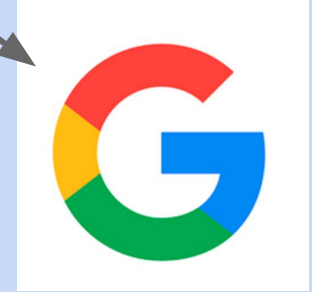
The speech accent archive uniformly presents a large set of speech samples from a variety of language backgrounds. Native and non-native speakers of English read the same paragraph and are carefully transcribed. The archive is used by people who wish to compare and analyze the accents of different English speakers.

practice your phonetic transcription for the speech accent archive: [click here](#)

last updated: 1 december 2018    2775 samples

  Tweet  Tweet 







# the speech accent archive

*"Please call Stella. Ask her to bring these things with her from the store: Six spoons of fresh snow peas, five thick slabs of blue cheese, and maybe a snack for her brother Bob. We also need a small plastic snake and a big toy frog for the kids. She can scoop these things into three red bags, and we will go meet her Wednesday at the train station."*



**19,000+**

**seconds of audio  
transcribed.**

**400**

**lines of code  
written.**

# Our Analysis

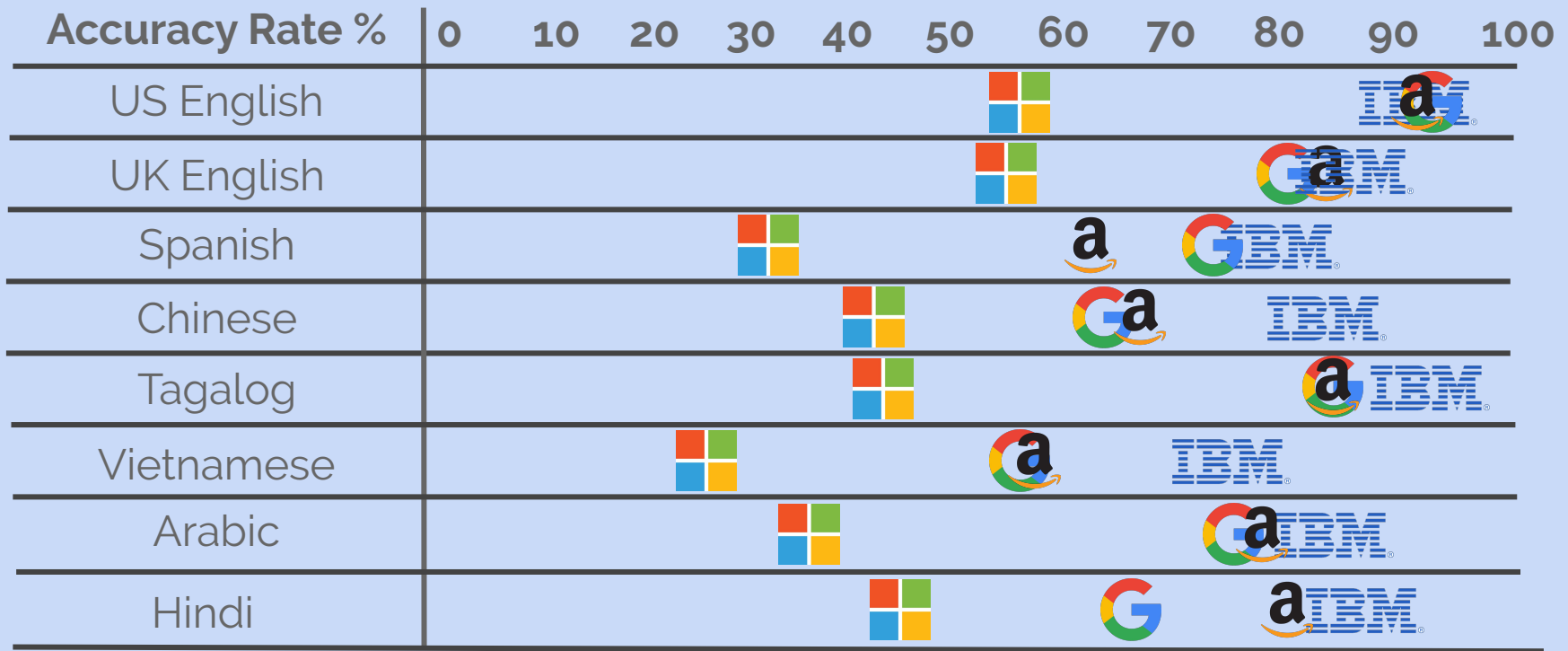


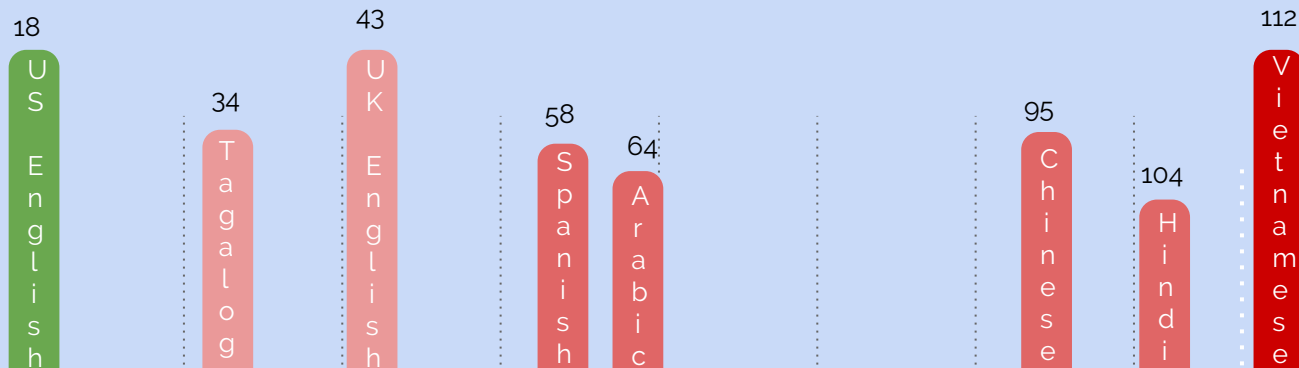
## World Top Languages

1. **Chinese**
2. **Spanish**
3. **English**
4. **Arabic**
5. **Hindi**
6. Bengali
7. Portuguese
8. Russian
9. Japanese

## U.S. Top Languages

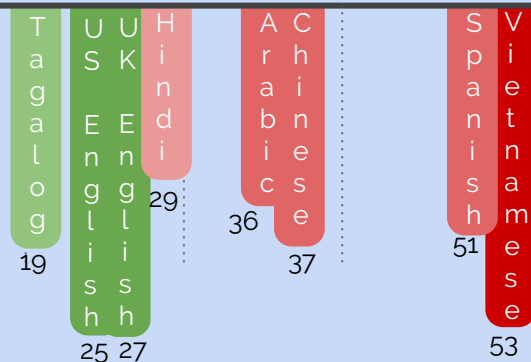
1. **English**
2. **Spanish**
3. **Chinese**
4. **Tagalog**
5. **Vietnamese**
6. **Arabic**
7. French
8. Korean
9. Russian
10. German



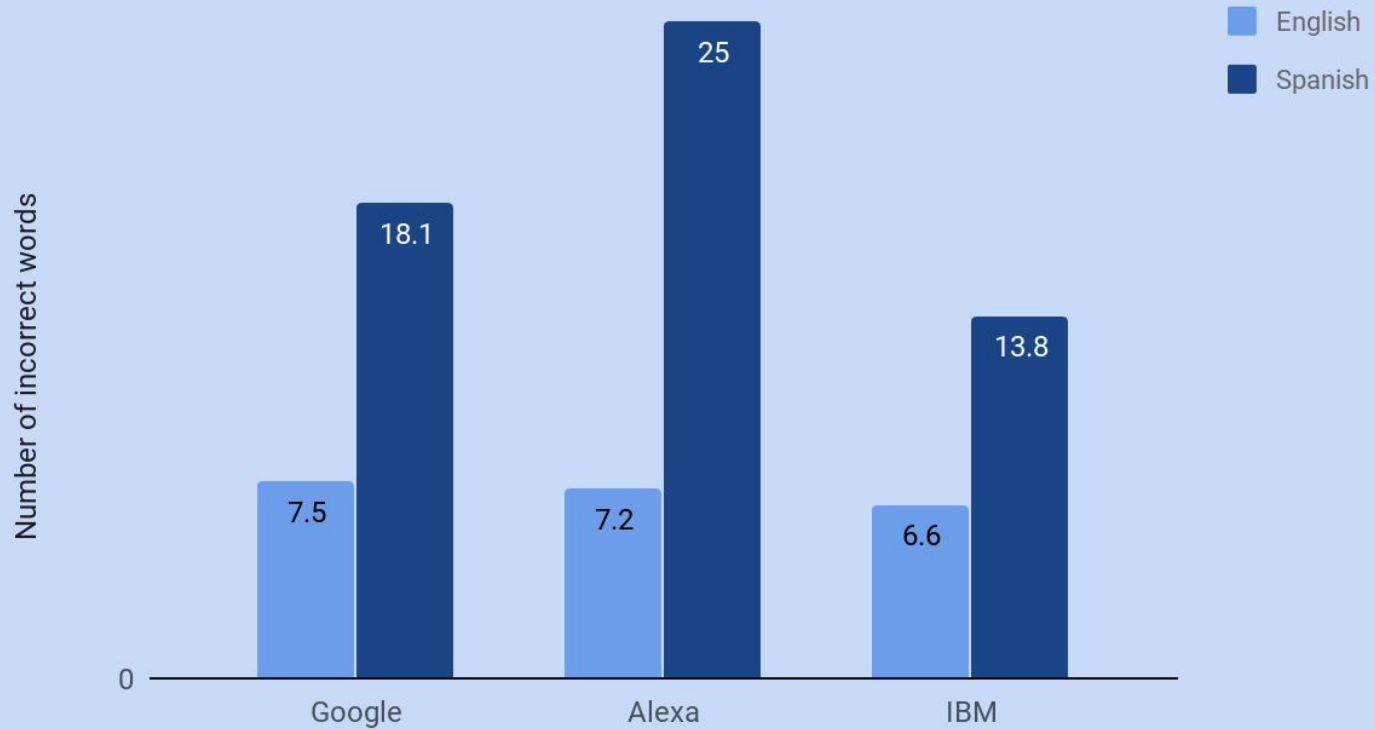


Edit Distance

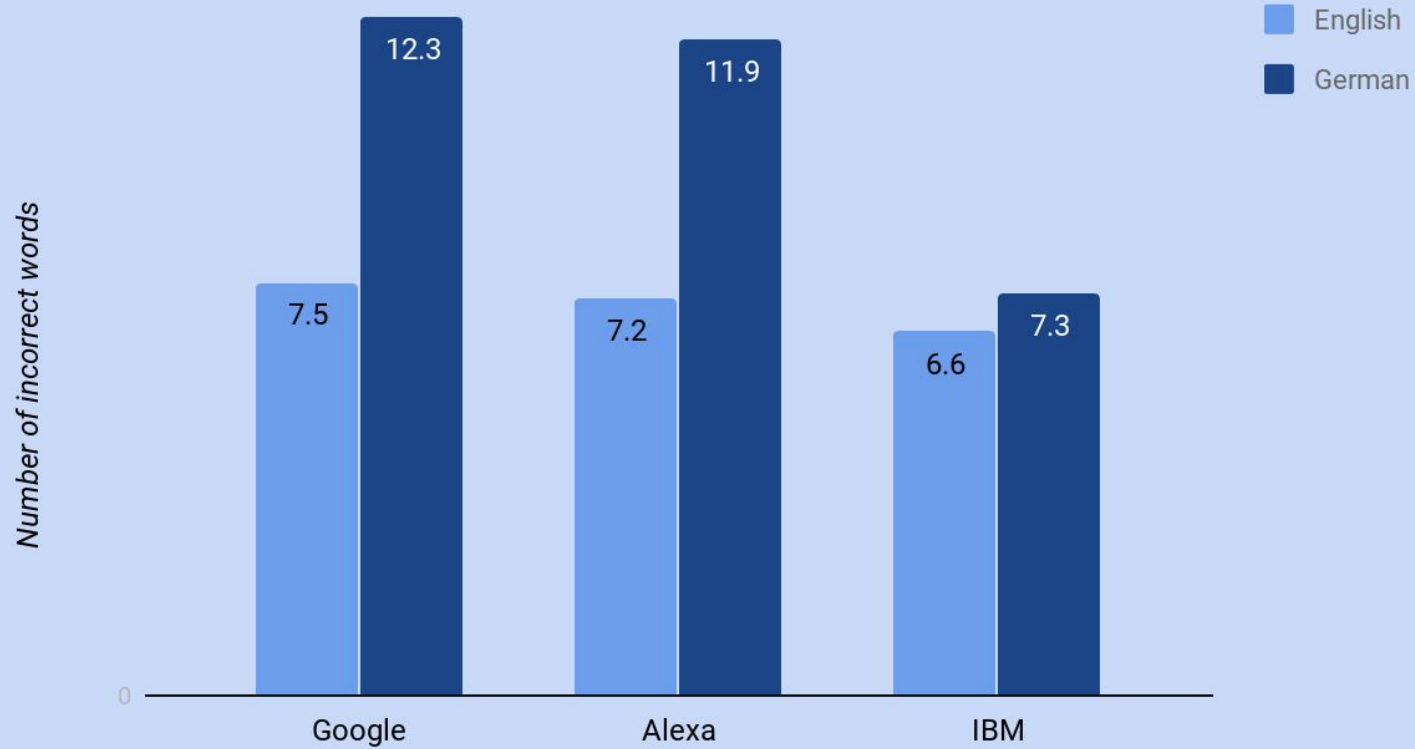
18 30 42 54 66 78 90 102



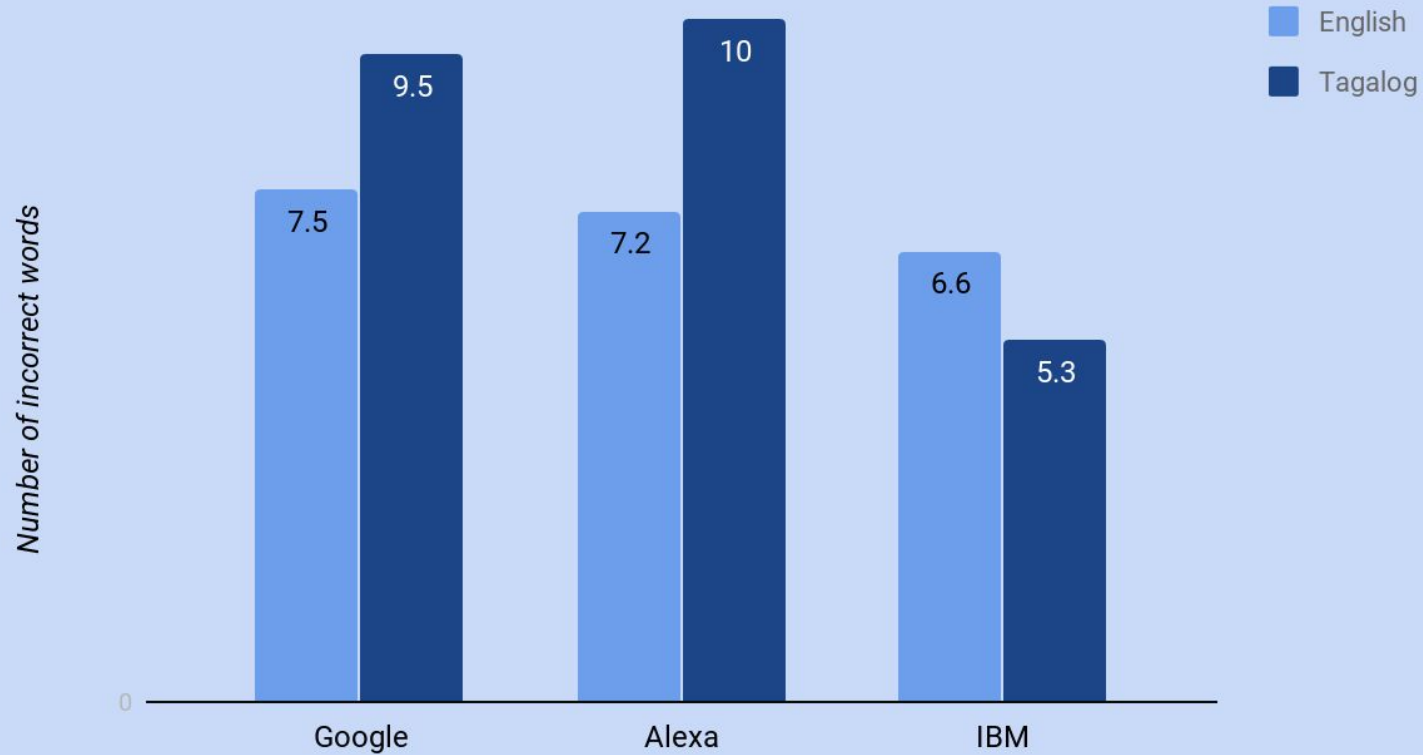
## Spanish vs. English Accuracy



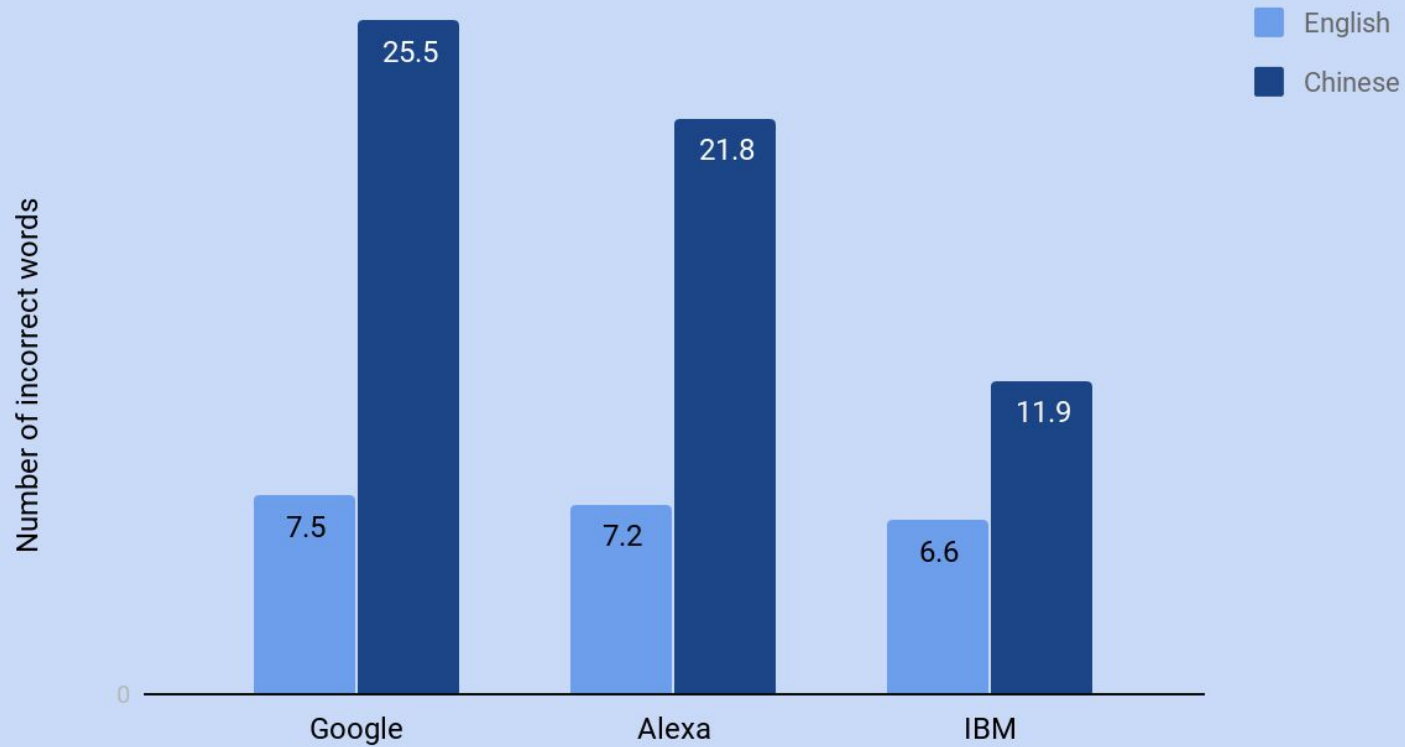
## German vs. English Accuracy



## Tagalog vs. English Accuracy



## Chinese vs. English Accuracy

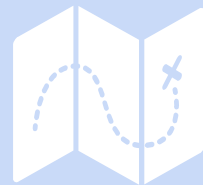




# Next Steps



1. **Analyzing Bing** (Microsoft)
2. Analyzing **speech impediments**
3. Deep dive into **word-by-word** analysis
4. Writing to the companies!!



**Bias by accent does exist** and has numerous implications.



# **Thank you!**

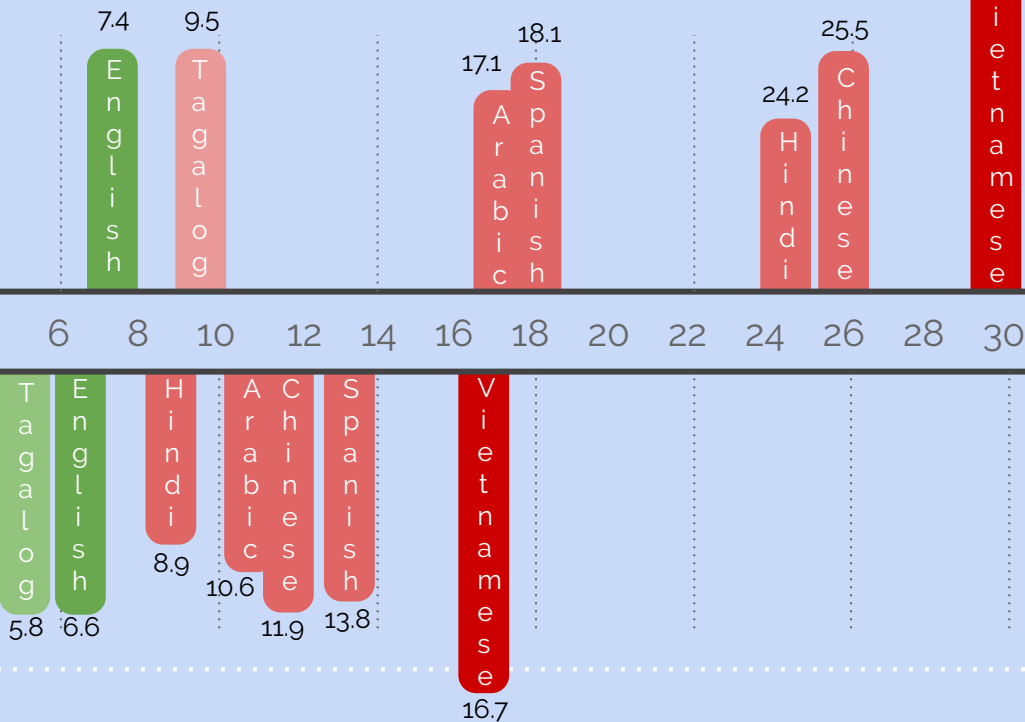
## Questions?

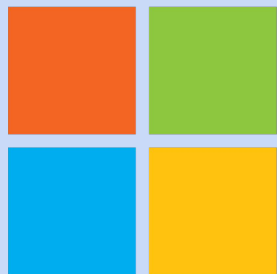
# Our Analysis



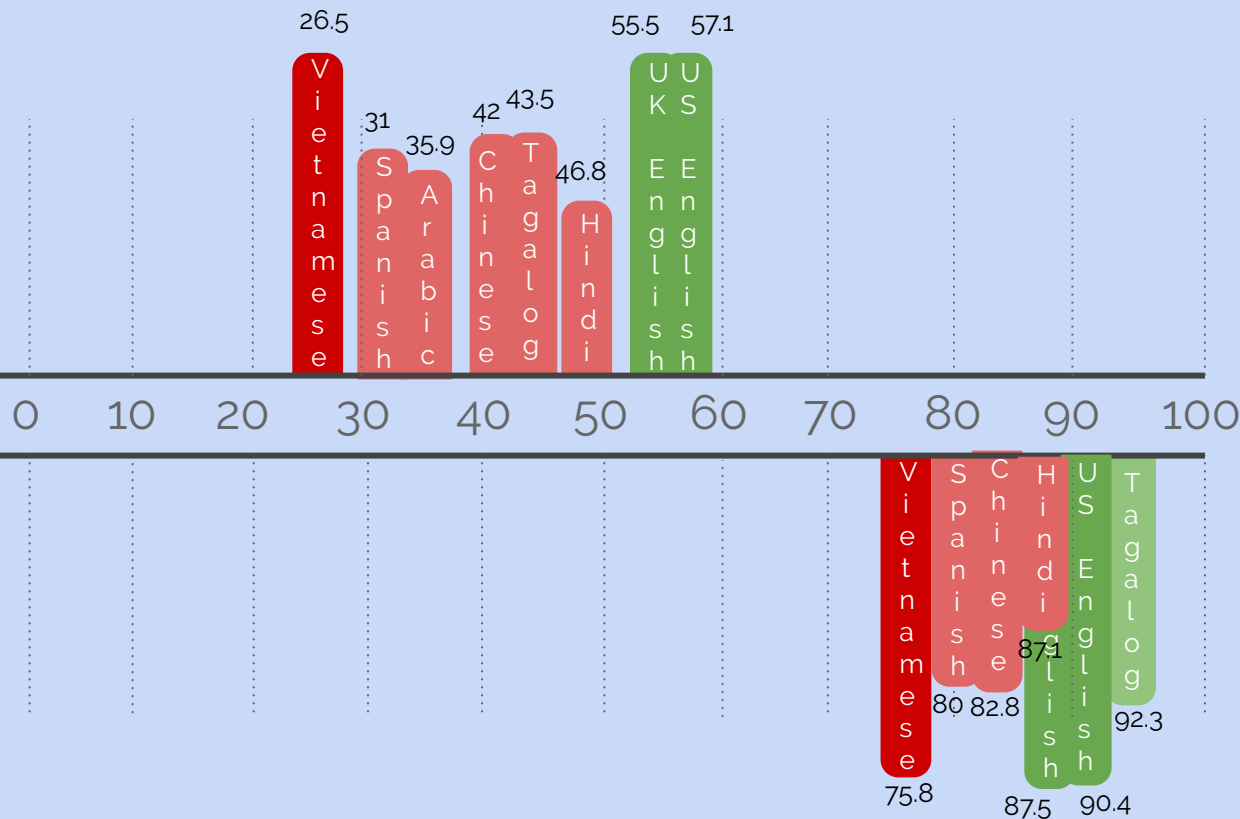
Accuracy

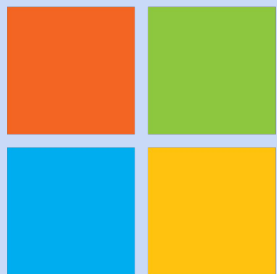
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30





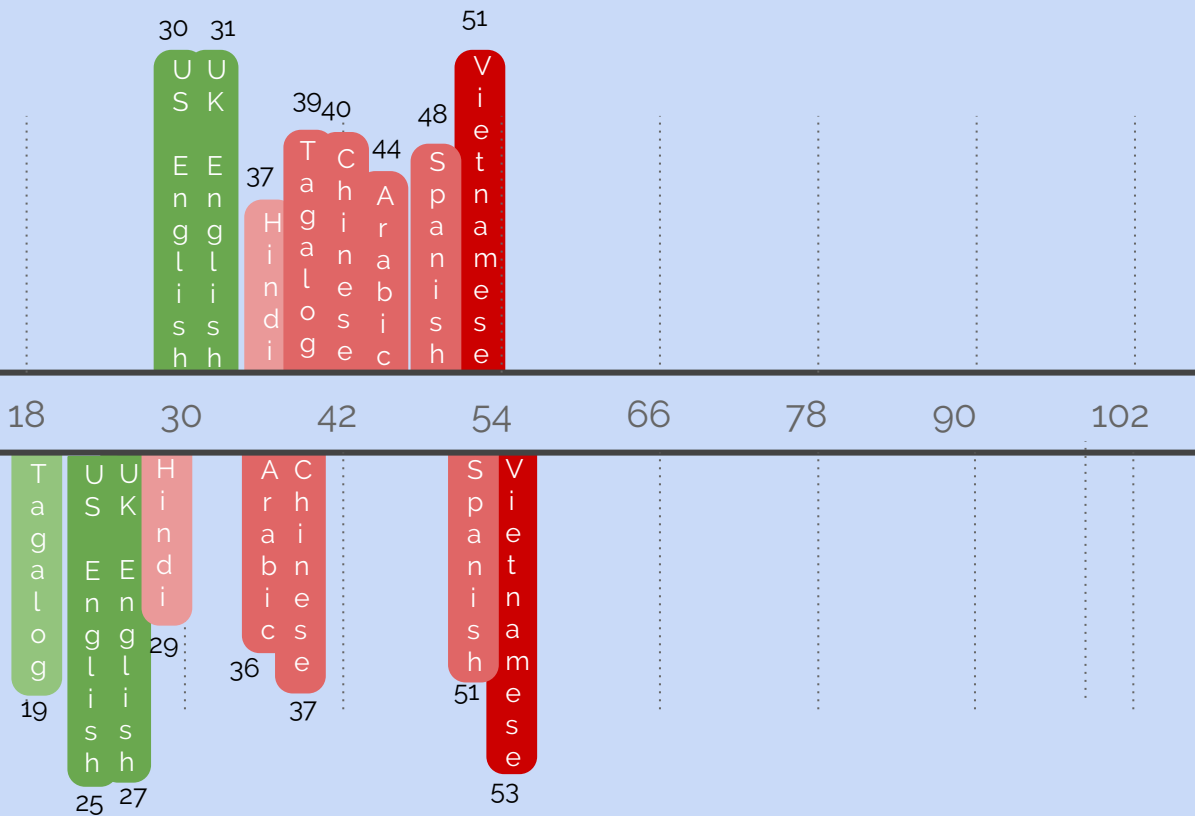
Accuracy





Edit Distance

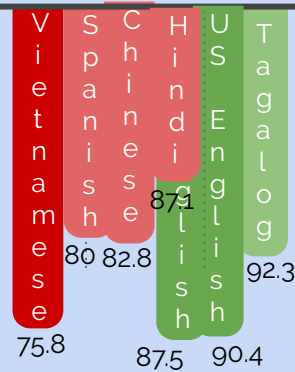
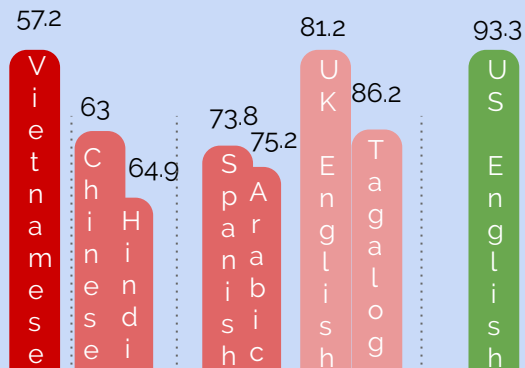
IBM®





Accuracy

0 10 20 30 40 50 60 70 80 90 100



# Our Analysis



31  
English

34  
Tagalog

58  
Spanish

64  
Arabic

95  
Chinese

104  
Hindi

112

Vietnamese

Edit Distance

18

30

42

54

66

78

90

102



19  
Tagalog

23  
English

29  
Hindi

36  
Arabic

37  
Chinese

51  
Spanish

53  
Vietnamese