

SenseInDecision

A tool to detect hesitation to
reduce call center cost

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Data Science fellow



Call centers are frequently in non-native English speaking countries



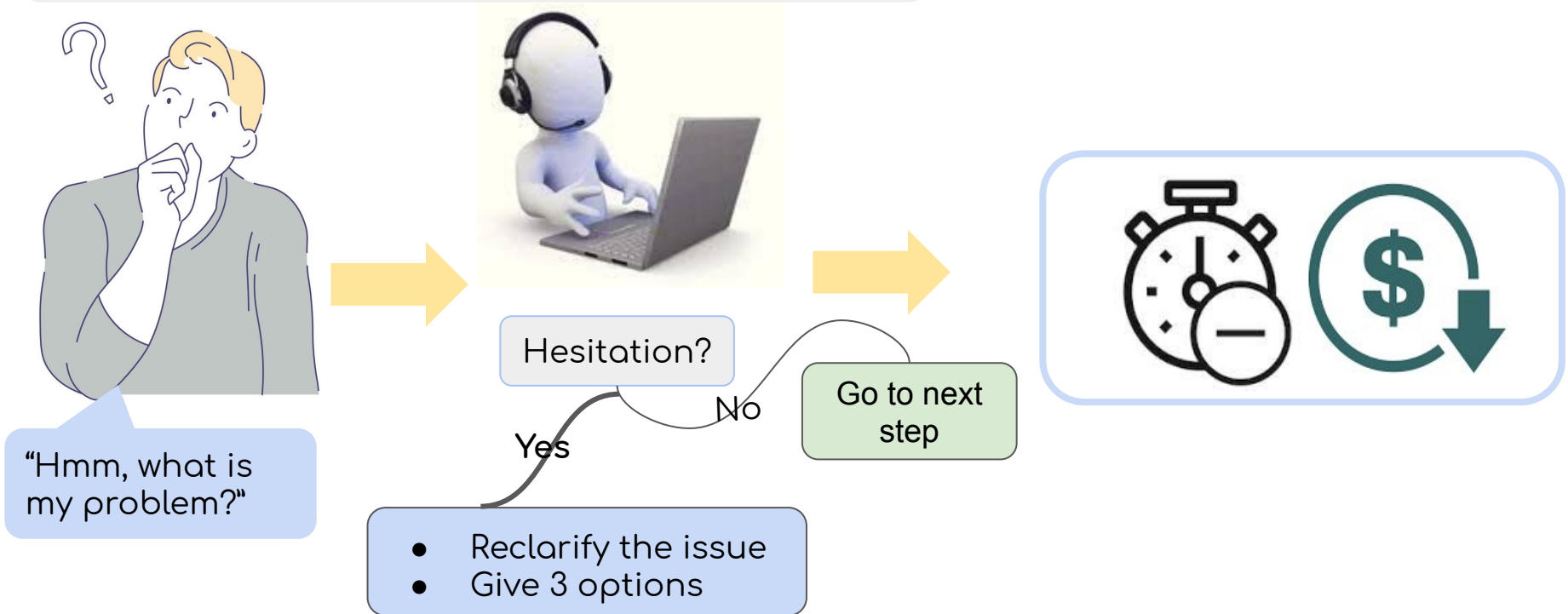
- Largest offshore voice-related call center market.
- 70~80% of call centers are located in the Philippines.

Problem: different interpretation of non lexical features, such as hesitation

Why is it important?

Right result faster

Cost reduction



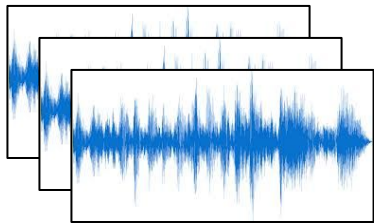
How do we detect hesitant vs. non-hesitant

- Hesitation speech
 - Component 1: silent or filled pauses
 - E.g., “I don’t...know... I am not...sure”
 - E.g., “**hmm**”, “**um**”
 - Component 2: repeated words
 - E.g., “**I don’t...I don’t** know...”



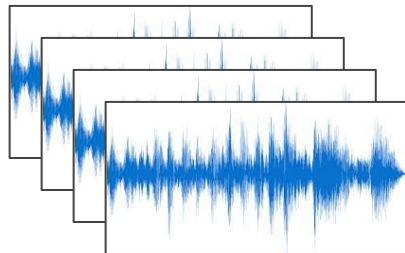
Data generation & validation

- Data Generation
 - One-sentence audio files (10 speakers)



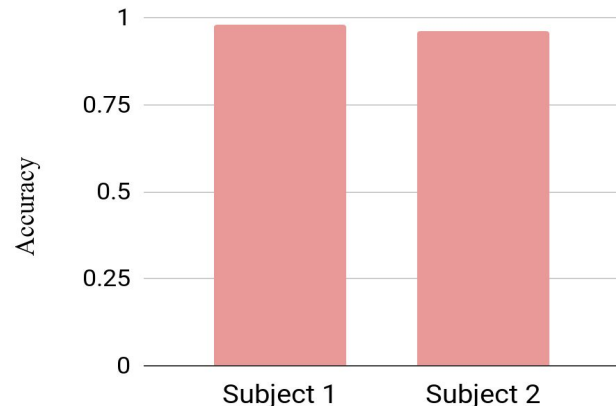
Hesitation labelled
audio (510 files)

- pauses
- repeated words
- example

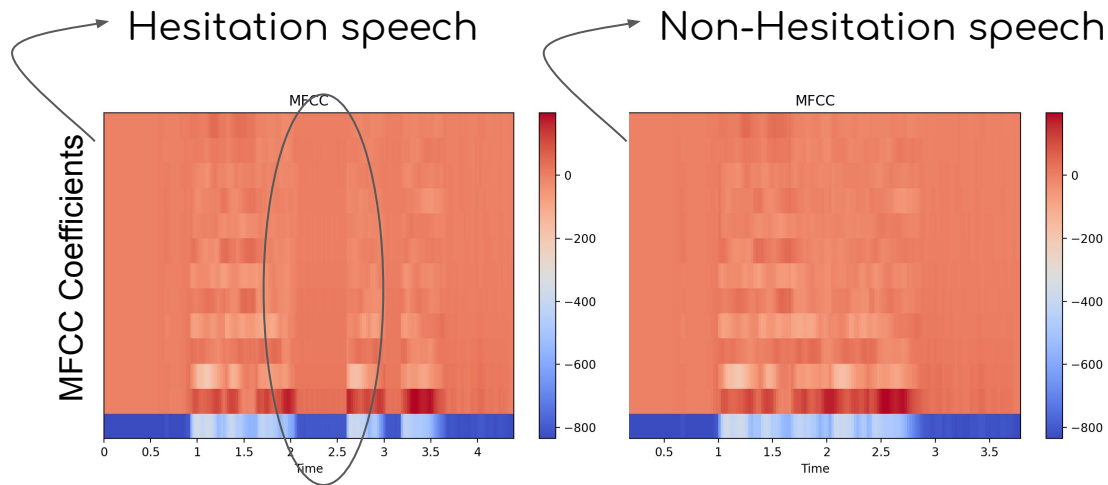


Non-Hesitation
labelled audio (600
files)

- Data validation
 - Short online experiment
 - 2 participants: listened to two speech samples and judge which one is hesitation speech
 - Result



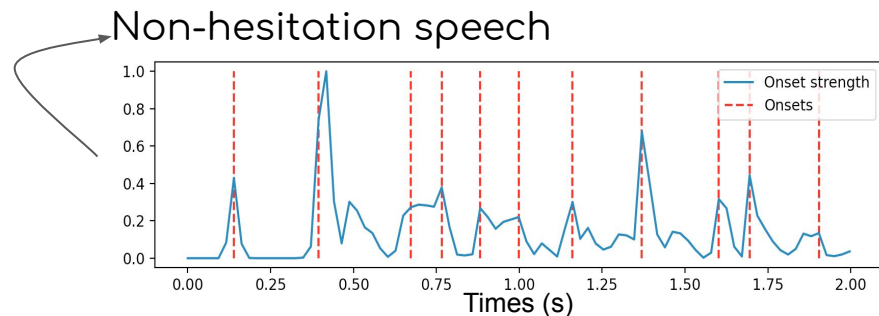
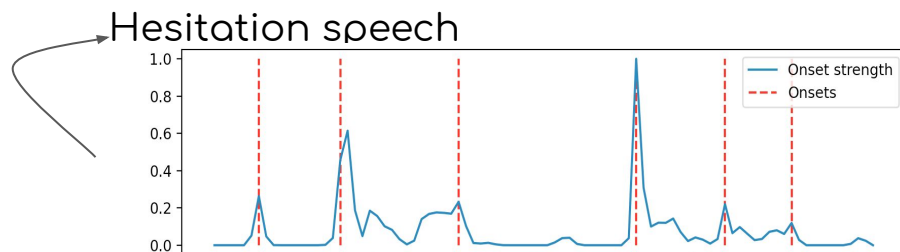
Signal pre-processing



Feature vector

- MFCC

Signal pre-processing

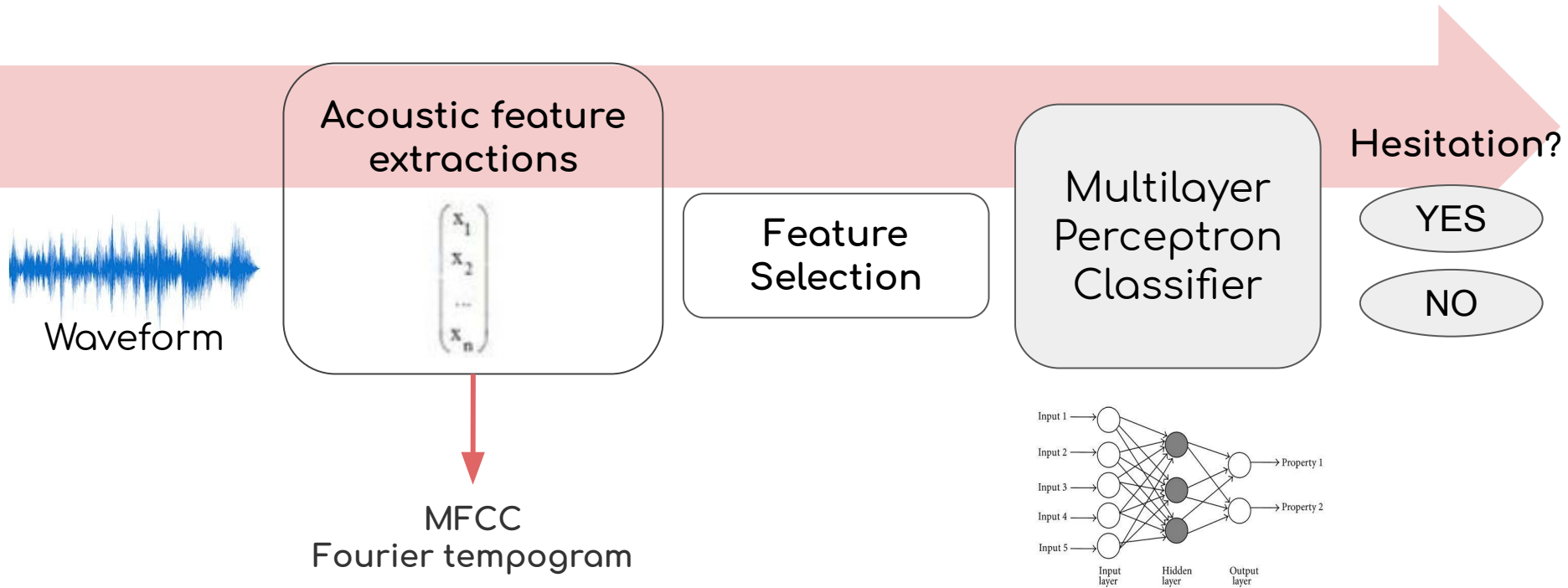


Feature vector

- MFCC
- Fourier tempogram



Model



Accuracy 84%

Demo



hesitationapp.de:8501

Hesitation Detector

Upload your customer file

Select an audio file from your home directory (/Users/MihyeC/Desktop/hesitation_det/dataset) to play

hesitation_example.wav

▶ 0:00 / 0:04



Is this customer hesitating?

Hmm! this customer is hesitating

Outcome: Right results faster

- According to Cisco, call centers reduced cost per call by as much as **35%** by leveraging any technical improvement such as **computer telephony integration**.

Fully loaded cost-per-call
\$2.70 to \$5.60



\$2.50 to \$5.18

Mihye Choi | Data Scientist

My experience



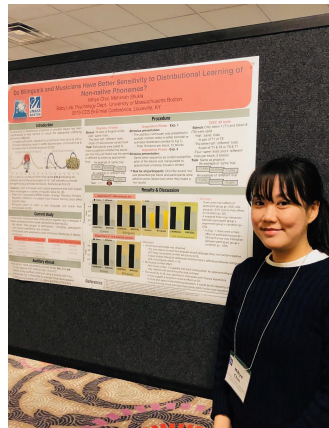
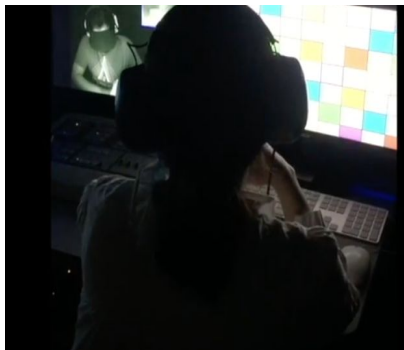
PhD candidate
in cognitive neuroscience



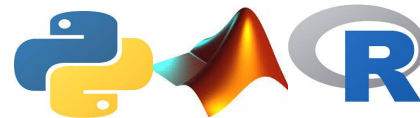
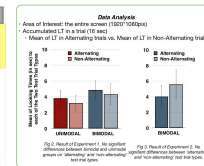
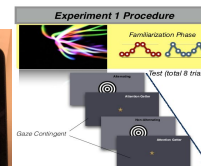
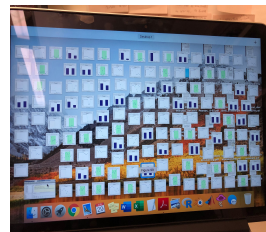
M.A., Psychology



B.A., Psychology



I love...



I want...

