Weighted word overlap and word embeddings: A practical ensemble approach to Question Matching in a Dialogue Simulator

Don Tuggener, Manfred Klenner (University of Zurich)
Riccardo Mazza, Salvatore Vanini, Nicola Rizzo, Nadia Catenazzi (SUPSI)
Giulio Tavarnesi, Stefano Fumagalli (LifeLike)

Old system: Mouse interaction

New System: Voice interaction

Overview
- Dialogue simulator for medical interviews (LifeLike)
- Replace mouse interaction with voice input
- Match user input to available questions using machine learning
- Handle non-matching inputs, speech-to-text errors

Approach
- Speech-to-text API (Google)
- SVM classifier ranks every possible answer
- Features: TF IDF word weights, semantic similarity (embeddings)
- Postfilter to identify inputs without a match, foul language, jokes

Evaluation
- Ten-fold cross-validation
- ~87% accuracy in identifying the correct answer
- For ~97% of the matching inputs the correct match is among the top three ranked answers

Data
- Gathered in experiments with medical students in a text-based version of the system
- Captured for every input whether there is a matching answer and which one it is (indicated by the student)
- ~1000 annotated input – answer pairs

Old system: Mouse interaction

New System: Voice interaction

“How high was the fever?”

Scuola universitaria professionale della Svizzera italiana: http://www.supsi.ch
Institute of Computational Linguistics UZH: http://www.cl.uzh.ch
LifeLike: http://www.lifelikeinteraction.com/