Self-Learning Digital Health Interventions: How to Learn from Personal Data with an Application to Cough Monitoring

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Self-Learning Digital Health Interventions: How to Learn from Personal Data with an Application to Cough Monitoring

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1. Problem

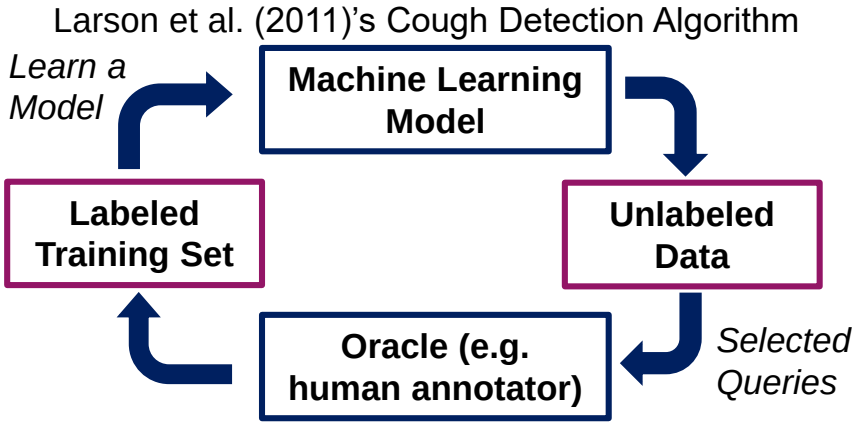
Sensing applications, such as smartphone-based **cough monitor** systems, can objectively monitor disease symptoms. However, the general applicability of those systems lack the capability to tailor to the **personal** disease symptom fingerprint.

2. Research Question

Can we **improve** the individual specific **accuracy** of a general coughing detection model by continuously including **personal data** and employing **active learning**?

3. Research Framework

Larson et al. (2011)'s Cough Detection Algorithm



4. Method

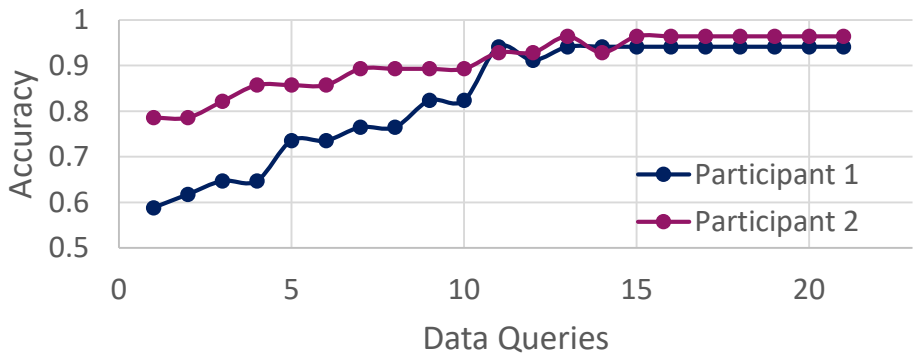
Data acquisition included a population of 47 subjects (33 female, 14 male).
Audio signals were **recorded** by means of five different devices and their built-in microphones:

- 2 Android phones and 1 iPhone
- Android tablet
- Studio microphone

The participant were instructed to **intentionally cough** and perform various **control sounds** (i.e. throat clearing, induced laughter and speech) while being recorded.

5. Results

Preliminary results include data from 8 participants. Evaluation of the initial coughing model yielded an accuracy of 84.2%. Active learning, however, further increased accuracy beyond 94 %.



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