39. Run, talk and don't get injured

We have developed a smartphone app that provides a novel, automated and unobtrusive way of assessing a runner's physical state based on speech. Beginning runners often have difficulty determining whether they are exercising at the right intensity. They often start with running too fast, and this increases the risk of exercise dropout and injuries.

One of the most widely used subjective ways to assess the level of exercise intensity is the 'talk test'. When you can still speak comfortably while running, you are running at the right intensity. Our smartphone app analyzes your voice and indicates whether or not you are exercising too hard.

ICT science question

How does speech production change under influence of various conditions? How can we develop an algorithm that uses this knowledge for reliable automatic voice-based assessment?
To solve these challenges, we train classifiers to gauge two signals while they are being acquired each under individually varying circumstances.

Application

The app measures the speech production during running exercises. Speech and heart rate data are collected from people talking while running at various intensity levels. To the best of our knowledge, we are the first to address these two challenges simultaneously.
Through automatic voice analysis, the 'talk test' can be made more objective but still in an individualized way. It works unobtrusively as a voice-based app on a smartphone that people often carry while running. Although there are many running apps available in the market, none of these have the features as presented in our demo.

Alternative Application

The knowledge we gained about the human speech apparatus can also be applied in other areas, for example speech and language therapy. Some people have difficulty speaking due to breathing problems caused by diseases such as COPD. Having software programs that can help train people in their own time to control their speaking apparatus could be beneficial for these people. In addition, our software can be applied in other smartphone-based speech analysis tasks as well, such as emotion recognition.

Nice to know

"It's very interesting. With the speech data obtained you not only learn a lot about how speech parameters change under physical stress, but you can also develop technology that classifies levels of physical stress. I would be very interested in using the speech data collected for classification challenges." – Anonymous

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Assessing your exercise intensity by talking to your phone while running is a fun and cheap alternative to assessing it by measuring your heart rate through bands or expensive watches

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Our voice app offers a fun and accessible way to assessing exercise intensity to help prevent beginning runners, who often run at a too high intensity, from risking injuries and program dropouts.

We will not only be innovative in our research, studies on speech under physical stress are still limited, but we will also utilize the knowledge to advance voice technology to detect physical states.

Research on changes in people's speech under the influence of physical activity is novel. It can be utilized for an app that detects exercise intensity through voice.

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COMMIT/ project
SENSEI Sensor based Engagement for Improved Health

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