Improving stress self awareness with physiological markers and external observers

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Why I study this?

Many People Need help

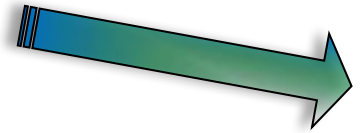
Many People Lack

- Skills for self awareness
- Time and money for therapies
- Stress releasing skills

To understand their stress levels and learn how to cope with it.

Failure to detect stress and manage it in early stages can result in several health related problems:
- digestive disorders
- cardiovascular disease
- sleep deprivation
- obesity
- memory and performance deficit

Fortunately . . .



Most People Have

- Smartphones
- Wearables
- Close friends and relatives

Research Questions

I frame my research in the context of machine learning and human computer interaction

1. Can we improve accuracy of stress assessment by incorporating external observer's (human or computerized) independent assessments?
2. Can we improve the accuracy of stress assessments using physiological markers collected unobtrusively from individuals (heart rate variability and micro changes in walking patterns)
3. Explore the impact of measuring lifestyle choices (e.g. sleep, physical activity, leisure, etc.) on an individual's ability to assess stress (*will come back to this point*)

Proposed Methods

Data Collection

- Automatic logging of smartphone usage (Android)
  - Category of applications used (news, sport, communication, etc.)
  - Screen touches
  - User activity
  - User presence events and light
  - Network connectivity

- Automatic logging of individual's body signals (HRV, Daily walking)
  - HRV: Empatica E4 and LifeTrak Zoom
  - Walking: Google Fit, high precision devices

- Self assessment using experience sampling method (ESM) and "peer-ESM"
  - Built in Android application we developed in the lab

Proposed Methods

Machine Learning

- Classification task
  - Using standard algorithms: DT, kNN, SVM or NN.
- In the past the best performing method was NN and kNN

- Potentially unsupervised methods if shown that biomarkers are reliable.

Human Computer Interaction

- Explore ways to present information that support behavior change

Currently working on

Recruiting participants for 1st experiment

Please talk to me if, by any chance, you know stressed people

PEERceived Stress

1. Understand the value of social links and human-machine collaboration towards stress assessment.
   - Study subjects provide self stress assessments using a mobile application
     - We record smartphone usage data, heart rate variability and walking related data
   - Peers provide their own assessment about the subject

Thank you for your attention

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