

Analyzing Compulsive Hand Washing

Earliest starting date **August 2022**

Motivation

More than 2% of the world's population are diagnosed with obsessive-compulsive disorder (OCD) once in their lifetime, although the numbers vary from region to region, and that it is associated with significant comorbidity and morbidity [1]. Patients suffer from recurrent or persistent thoughts, images, impulses or actions and they have the desire to resist it [2]. These obsessions and compulsion take more than one hour a day. A typical symptom is fear of contamination and the associated compulsive hand washing. If at all, OCD is often diagnosed very late (up to 17 years after first symptoms [3]). Responsible for this problem is, among other things, lack of knowledge about the illness or shame of the patient [4]. In a retrospective self-report study [5], however, researchers found that patients showed less severe symptoms, higher functioning levels and a less-self stigmatization when the duration between symptom onset and diagnosis was short. This finding already indicates the value of research, for example, on methods for identifying OCD symptoms early.

With the multitude of new connected devices (smartwatch, smartphone, fitness tracker) and other Internet of Things (IoT) gadgets activity recognition in daily life is a very current topic. Literature shows that activities, e.g. climbing stairs or drinking coffee, can already be recognized using a smartphone and wearable sensors, e.g. Inertial Measurement Units (IMUs). We want to use these approaches for analyzing compulsive activities in daily life.

For all analyses one needs data from compulsive activities. Unfortunately, there is currently very little to no available (real) data in this area. Nevertheless, there is a recently published dataset with movement data on simulated compulsive hand washing [6]. In addition, in an upcoming study we plan on collecting hand washing data similar to the study presented by Wahl et. al [6].

Goal

This thesis deals with the very common washing compulsion. We want to extend the dataset and the data analysis presented by Wahl et. al [6].

The final objective of this thesis is not fixed and can be co-determined by the student.

Possible ideas/questions are:

- Can we reproduce the results from [6] or even improve them?
- To what extent do the results improve with an enlarged dataset/ subject group?
- How *personal* is a handwashing activity in a scripted environment?

Your Responsibilities

- Help with collecting the handwashing data in the study
- Bring the data in a reusable data format
- Compare the data with the existing hand washing study data, e.g.
 - By performing statistical analyses
 - By building machine learning models

Your Profile

- You want to work with interdisciplinary topics (computer science and psychological topics)
- You have good programming skills (e.g. Python, R) and you know how to process data
- You are not afraid of statistics and machine learning is fun to you
- You have the desire to familiarize yourself with new topics

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