

# Discovery of Personal Processes from Labeled Sensor Data – An Application of Process Mining to Personalized Health Care

Timo Sztyler<sup>1</sup>, Johanna Völker<sup>1</sup>, Josep Carmona<sup>2</sup>,  
Oliver Meier<sup>1</sup>, Heiner Stuckenschmidt<sup>1</sup>

<sup>1</sup>University of Mannheim, Germany  
{timo,johanna,heiner}@informatik.uni-mannheim.de

<sup>2</sup>Universitat Politècnica de Catalunya, Spain  
jcarmona@cs.upc.edu

**Abstract.** Currently, there is a trend to promote personalized health care in order to prevent diseases or to have a healthier life. Using current devices such as smart-phones and smart-watches, an individual can easily record detailed data from her daily life. Yet, this data has been mainly used for *self-tracking* in order to enable personalized health care. In this paper, we provide ideas on how process mining can be used as a fine-grained evolution of traditional self-tracking. We have applied the ideas of the paper on recorded data from a set of individuals, and present interesting conclusions and challenges.

## 1 Introduction

Physical inactivity is a major risk factor for certain types of diseases. Indeed, physical activity does not only prevent or relieve diseases, but also improves public health and well being [2]. In this context, personalized health solutions and lifestyle monitoring can help to ensure that people doing the right activity at the right time. However, the regular use of such methods is critical to achieve the desired result. Hence, barriers for the adoption must be low, and using both software and devices should be as comfortable as possible.

Thanks to the technological progress in the development of wearable devices, sensor technology, and communication, we are nowadays able to setup a body sensor network based on smart-phones, smart-watches, and wristbands which does not affect people during their daily routine. In contrast, most of the available software requires substantial user input to specify, e.g., the current activity or even vital parameters like the heart rate or blood pressure.

We want to develop an application which monitors the personal lifestyle of the users and provides appropriate visualizations. However, this still needs a sufficient acceptance because the user has to view and interpret the visualizations. Therefore, we also want to provide automatically generated recommendations resulting from the monitoring data and, e.g., references (practical guidance). In the long term, we also have to automatically recognize a person's daily activities





























