

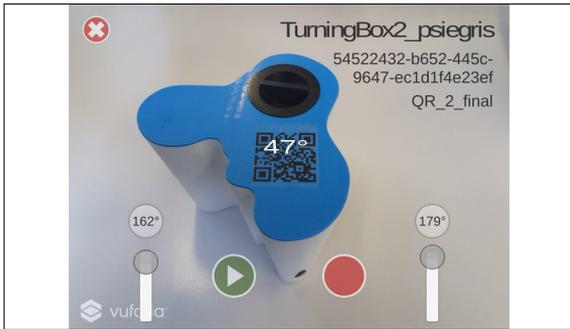


Patric André Siegrist

Student	Patric André Siegrist
Examiner	Prof. Dr. Felix Nyffenegger
Subject Area	Product Development

# Showcase of a Full-Stack IoT Implementation

## Development of a showcase to demonstrate the flow of data through all levels of technology



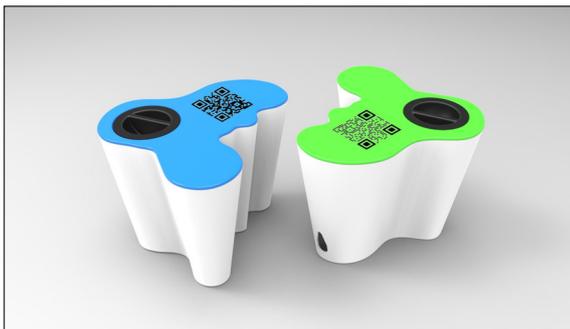
GUI of the the application to identify and control a specific instance

**Introduction:** The crosslinking of products, clouds and mobile devices is significant for the next industrial revolution, called the industry 4.0. Problems which users may have while implementing this technology could be:

- The correct detection of the object instance via an identification tag
- To transmit data through all levels of the system architecture from the sensor to the mobile device

To discuss solutions to those and further issues, the Lifecycle Lab at the University of Applied Sciences Rapperswil realises different concepts in the field of product development and digitalization.

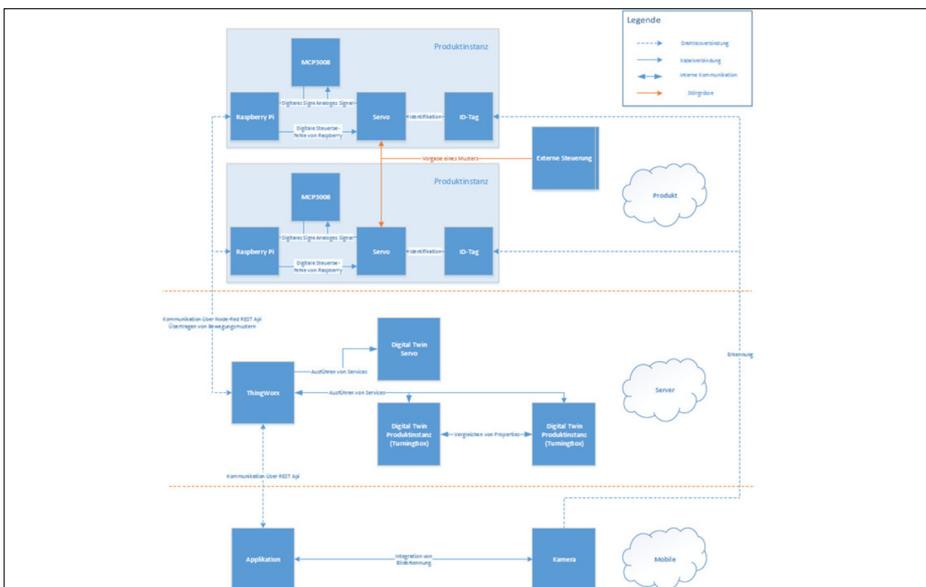
**Objective:** The aim of this paper is to show, how data can be consistently transmitted from a physical product via a cloud server to a mobile device so that a user can interact with a specific instance of that product. The implementation of this functionality should demonstrate in a comprehensible way the flow of data through the entire structure. To realise this showcase, the IoT-Plattform ThingWorx from PTC as well as a Raspberry Pi with a feedback servo is given.



Two instances of the same product varying in the identification tag

### Procedure / Result:

- In a first step, basic functions such as controlling the servo and reading the current position will be implemented. This makes it necessary to have a digital representation of the physical product in the cloud.
- In a second step, data of the potentiometer of two different product instances will be collected and analysed directly on ThingWorx.
- As a last step, the processed data will be sent to the products to learn and infer from each other.
- It is possible to create a simple showcase with ThingWorx to demonstrate the continuous flow of data through a full structure. Since ThingWorx was only available in an Academic Edition, not all of the functions needed could be used for the development.



Overview of the system architecture