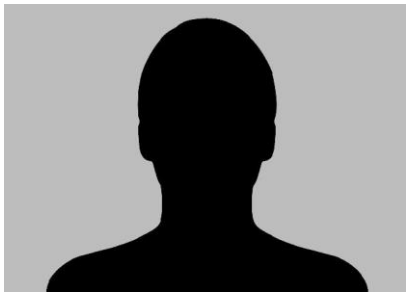
Zurich University
of Applied Sciences

School of Engineering

InES Institute of
Embedded Systems

Ansteuerung einer Zug-Druck Prüfmaschine



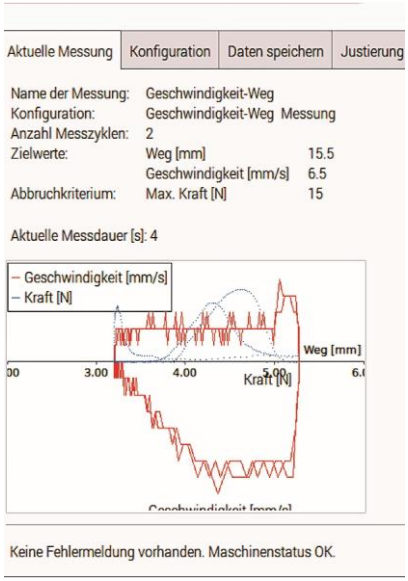
Diplomierende
Silvan Ledergerber
Marianne Schmucki

Dozent
Juan-Mario Gruber

This bachelor thesis describes the further development and improvement of the pressure and ten-sion testing machine, that was built in the previous project [1]. The existing prototype has been controlled manually by two switches and it has measured the current position and the applied force. This machine's mechanical structure was taken from a standard material testing stand. It has a vertical column with a moveable crosshead, which has the force measurement cell attached to it. This machine will serve as a testing stand for Energy Harvester at the Institute for Embedded Sys-tems (InES). The functionality of the prototype will be extended, so that it is able to perform auto-matic measurement cycles and can visualize and export the measured data.

First, the previous project's hard- and software have been analyzed and necessary improvements have been localized. An evaluation of additional functions has shown the necessary work steps to achieve the best fit for this use case. Three concepts were developed to evaluate different aspects of the user-interface. The evaluation covered the type of operation, the type of data processing and the required hardware components. The best fitting concept was realized.

After the realization of the concept, the machine can be interfaced with a touchscreen or the inter-face-PCB. Different automated testing procedures can be configured and executed. Currently im-plemented measurements are using a predefined position-time-graph or a velocity-position-graph. During an automatic measurement the current position, velocity and force are recorded and dis-played permanently in the user interface. These datasets can be accessed can be stored on a USB-device for further analysis. To measure the generated energy, a measurement principle was evalu-ated during the conception phase. The software is developed completely to support the energy measurement. Only the interfacing hardware to measure the energy is not realized yet. There was implemented an adjustment function to correct possible nonlinearities of the force and energy sensors. The developed hard- and software were tested and logged permanently. In a further pro-ject, the energy measurement shall be implemented completely and additional measurement modes shall be added. The documented optimization potentials shall be implemented, too.



Screenshot of the graphical user interface