Medical Hardware GUI

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1 Technical and Budget Planing

1.1 Time

2 monthes for Software and Hardware Development 01.08-01.10.2020

1.2 Hardware

- Microprocessor: Raspberrypi 4 8Gbyte RAM
- Microcontroller: 2 X Arduino Nano
- Interface: 10”Touchdisplay
- Peripheral: 8 channel 32 bit ADC, 7.2 A Stepper Driver
- Sensors: 2 Temperature, 2 absolut Pressure, Humidity
- Actors: WS28XXX Led stripe, Step Motor

1.3 Electronical Planing

Requirements:

- Electrical Supply (12V/60W,5V/10W)
- Electromagnetic Protection of TouchScreen

1.4 Software Planing

Requirements:

- Realtime Communication Hardware Touchdisplay
- Database of Profiles
- Database of Logdata
- Deploy Software to bin file
- Linux run on boot
- GUI

  Company logo
  display sensor values in Realtime
  create intensity Profile and save it to database
  read Profile from Database
  run machine with time sensitive Profile
  run machine with manual control
  send logfiles to a specified email adress

2 Technical Realization

2.1 Software

2.1.1 Frontend

- Angular ⇒ AngularClient, npm, ...
- Style ⇒ Material.IO, GraphJs, W3, SCSS
- Communication ⇒ Socket.IO
- Deployment ⇒ Electron packager
- Integration ⇒ Linux Shell

2.1.2 Screens

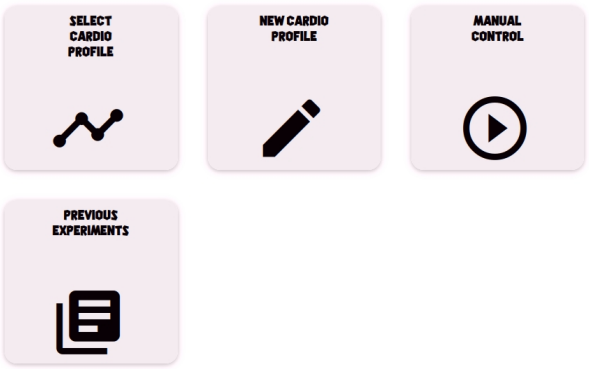

Figure 1: Screenshot of Homescreen ⇒ touch event on every button

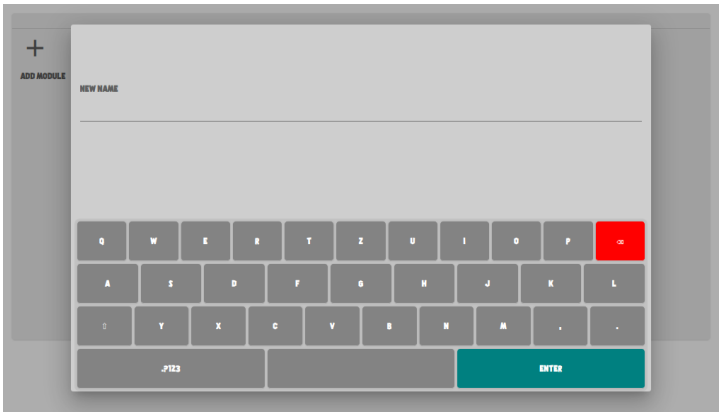

Figure 2: Screenshot of Create Profile(1.Screen)

functionality

- click on select cardio Profile ⇒ navigation to Database of Saved Profiles

Figure 3: Screenshot of Create Profile(2.Screen)

functionality

- click on select cardio Profile ⇒ navigation to Database of Saved Profiles

functionality

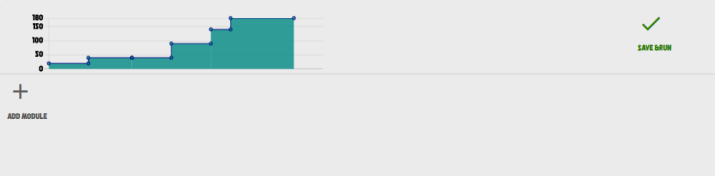

Figure 4: Screenshot of Create Profile

- click on select cardio Profile ⇒ navigation to Database of Saved Profiles

2.1.3 Backend

- Server ⇒ nodeJs
- Communication ⇒ Socket.IO
- DB ⇒ postgresql
- Email ⇒ nodeMailer
- HardwareInterface1 ⇒ Firmata(johny-five)
- HardwareInterface2 ⇒ Serial Communication over USB
- Integration ⇒ Linux Shell

2.2 Electronics

- Raspberry ⇒ Arduino 1 ⇒ Firmata over USB (johnny-five)
- Raspberry ⇒ Arduino 2 ⇒ Serial over USB Baudrate: 51800
- Arduino ⇒ ADC ⇒ SPI (spi.h)

2.2.1 Scheme

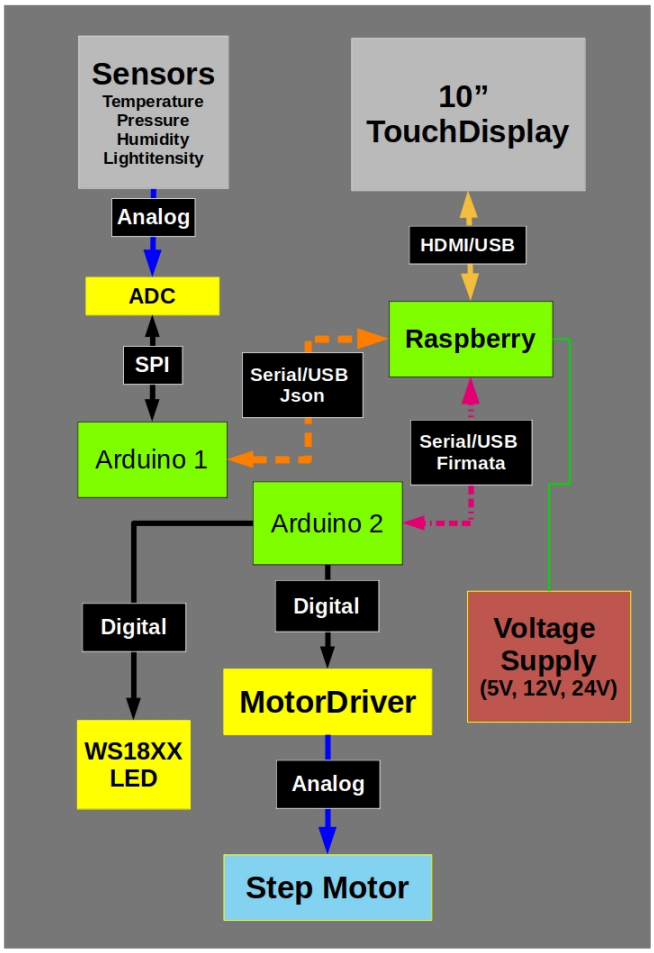

Figure 5: electronical Scheme