**List of features:**

General:

Robot-car will move across the room autonomously or controlled by mobile phone, avoid collision and map the room's floor plan.

UI:

Robot will start when the user pushes a state switch from off state to bluetooth controlled state or autonomous driving state. Red LED will start blinking until the software is ready. Green led will indicate that the robot is ready to receive data from a phone or mapping is done. Mapping data will be saved to a micro-SD card and the user will plug the card into the computer and find the floor map in a txt-file.

Software:

Software will not cause errors. The OS will start when the state switch is turned on. In an autonomous state, software will drive the robot to the nearest wall (100 mm), turn the robot so that the robot's left sensor will be on the right distance from the wall. After that, it will start following the wall so that the left IR-sensor will be on the right distance and the front IR-sensors will not collide with obstacles.

Mapping:

IR-collision and acceleration data will be parsed to map. Acceleration data will give a moving distance. (0.5\*a\*t^2) combined with IR-collision data.

Moving:

The MCU will give an enable signal to DC-motors, and the motors will rotate. Moving data will come from a mobile app through bluetooth or from software (autonomous). When moving DC-motors manually through apps it will have a feature to give data for motors separately. This is how the robot can move towards and control which motor is rotating and this is how it can turn around by giving data to only one motor. When using software both motors are rotating and the robot is moving forward. With sensors, the robot senses when there is a wall or obstacle coming in so it can detect which way it needs to go. Now the robot is using the same method as in manual driving and let the other motor be rotating only and the robot will turn around to another direction where there is no wall or an obstacle detected. After the robot has detected the whole room it will make a map from it and then stop.

Power setup:

The MCU is powered with a 7.4 V battery which is regulated to 5 V using a [regulator IC](https://www.spelektroniikka.fi/p14199-ua7805ckter-5v-15a-pintaliitos-smd-regulaattori-pfm-3-kotelo-fi.html). Battery will be charged through micro-USB. Since USB can output 5 V at maximum, the voltage will be converted to about 8 V using a [boost converter.](https://www.ti.com/lit/ds/symlink/bq25171-q1.pdf?ts=1643529000852&ref_url=https%253A%252F%252Fwww.ti.com%252Fproduct%252FBQ25171-Q1)