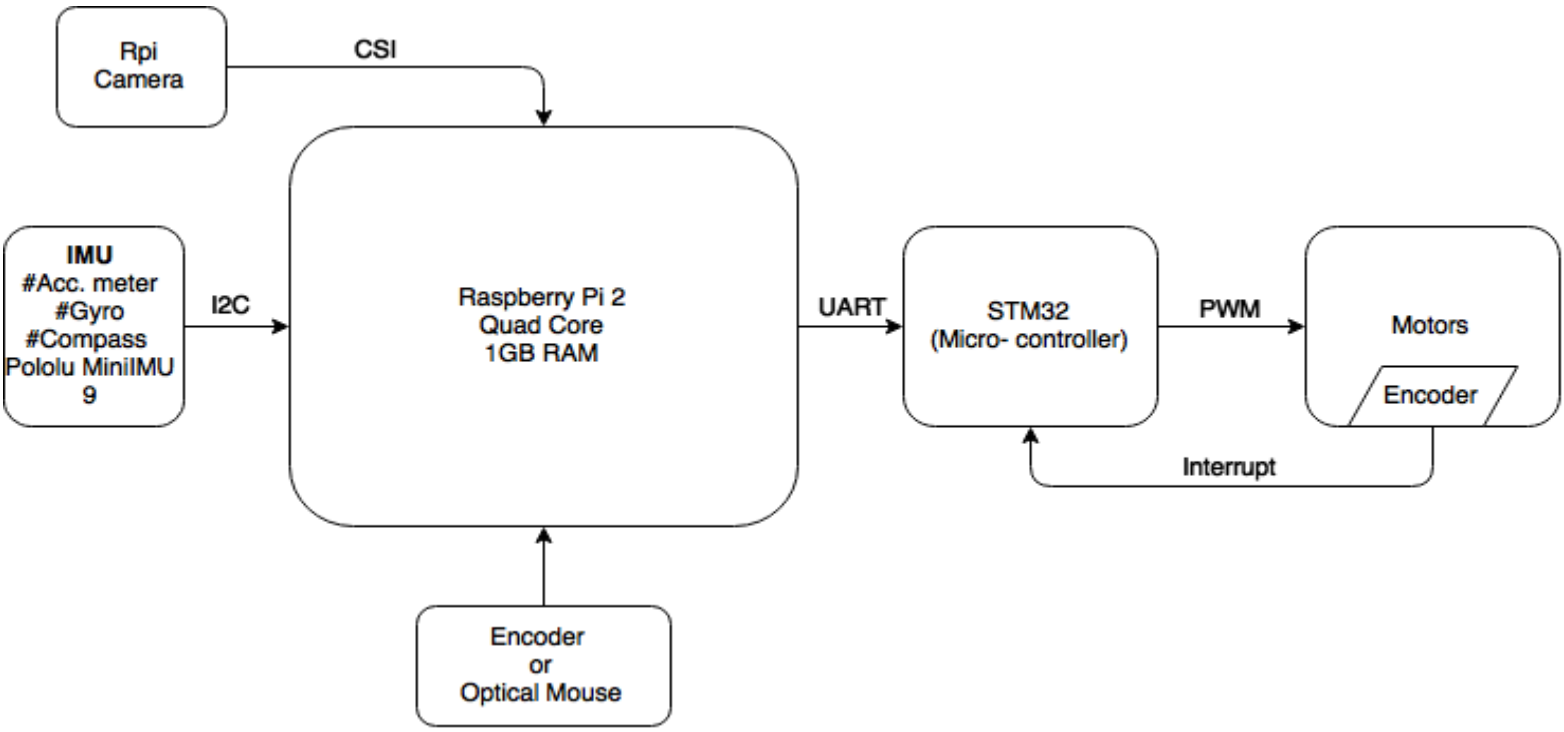
Control of Omni-directional Robot

Tasks:

- **Close loop control of PMDC motor**
  - STM32 – ARM Cortex M4 – 32-bit Microcontroller
  - PID and PI control algorithms
  - Voltage control using PWM pulses
  - Feedback using rotory encoders
- **State estimation of Omnidirectional Robot**
  - Estimation block implemented on RaspberryPi 2
    - 900MHz quad-core ARM Cortex-A7 CPU
    - 1GB RAM
    - Linux Kernel 3.18
  - [x , y , Θ] and [V_x , V_y , Θ'] estimation using Kalman Filters
  - Pololu MiniIMU v9 for heading angle estimation
  - Rotory encoder or Optical mouse for Position and Velocity estimation
- **Trajectory planning and Position control**
  - PID and Adaptive Control algorithms
  - Omnidrive model implementation
  - Obstacle avoidance
- **Image processing and 2-D Mapping**
  - Obstacle detection
  - 2-D Mapping

Hardware layout:



Control Block (Software Flowchart)