

The Pet Car
A Project Proposal by Khalid Mihlar and Jesus Oviedo
Website: <https://sites.google.com/view/the-pet-car/home>

Overview:

Have you ever wanted to have a dog that you can pet, but you don't have to feed or take care of? Well thanks to the pet car, you can make your ultimate pet experience come true. We will be creating a car that will act like a pet, with the ability to move it and also give it a pet with the click of a button!

Goals:

We propose to create a small robot that the user can interact with as if it were a pet. The pet will have a happiness meter that the user must keep up if they wish to control the pet and take it for walks.

1. The robot will be leashed(movement controlled and initiated/stopped) by a Wii Nunchuck communicating to the microcontroller using I2C.
2. In order to provide movement for our car we aim to drive 4 motors using motor controllers communicating via I2C.
3. To provide feedback to the user an LED display communicated with by SPI or UART will give the current status either by direct happiness meter or a friendly pet with changing states based on happiness.
4. The Pet Car does not like to be in close proximity to walls and therefore will have to make use of Ultrasonic Distance Sensor to reduce happiness based on proximity.
5. Even when not available for walks the user should be able to make their pet happy and this will be done by using a simple button to “pet” the robot pet.

Peripherals:

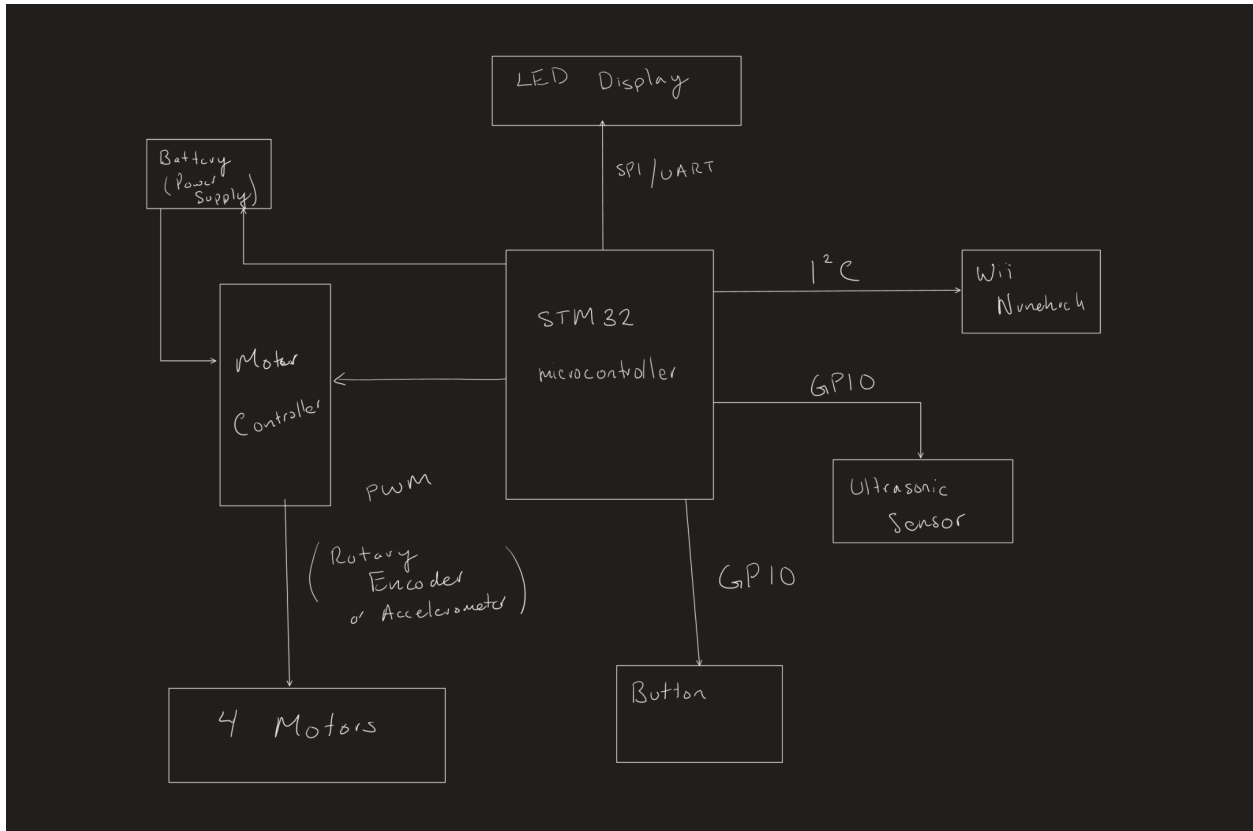
1. OLED/LED Display (with SPI/UART)
2. Nintendo Wii Nunchuck (with I2C)
3. 4 L298N Motor Controllers or 1 Motor Controller (with I2C)
 - a. Four Motors (servo/step)
 - b. Accelerometer or Rotary encoder for control/feedback for motors
4. External Power Source
5. Ultrasonic Distance sensor
6. External button for pet mechanic

Serial Interface Protocols:

1. USART/SPI for interfacing an OLED/LED Display
2. I2C for communication with:

- a. Wii Nunchuck to control movement direction of the pet car and provide stop/start functionality
- b. Motor Controllers to drive motors for movement(forward,backward, turning)

Block Diagram



Responsibility List:

1. Understand how the motor works to use and build the car: Khalid and Jesus
2. Review and understand how to apply I2C and UART to our product: Khalid and Jesus
3. Review and understand how to properly use and map our Nintendo Wii Nunchuck: Khalid and Jesus
4. Review and understand to make sure our interrupts for a peripheral LED system works properly to allow output for our car when based on button presses.
5. Coding the project and making sure every part is working as intended: Khalid and Jesus
6. Make sure to have weekly updates to showcase roadblocks and new changes/initiatives to our project: Khalid and Jesus.

Software Structure:

1. Start and Stop Command via button presses on Wii Nunchuck
2. LED Display status, pet face based on status
3. Global status for happiness dependent on amount of movement, being “pet” (hitting the button), and proximity to walls
4. If too close to an object or happiness is too low, user can no longer control movement
 - a. Spin indefinitely or simply prevent movement
5. Potential software control:
 - a. control/correlate speed to happiness and change display based off of speed/proximity to wall
 - b. Heartbeat LED
 - c. Haptic or auditory pet responsive mechanic
 - d. Autonomous(Wander) mode with collision prevention