PROJECT PROPOSAL

SELF-BALANCING ROBOT

**COEN 6711 MICROPROCESSOR & THEIR APPLICATIONS | DEPT-ECE
CONCORDIA UNIVERSITY, MONTREAL, QUEBEC, CANADA**

OWNERSHIP

Proposed to:
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KEY-COMPONENTS

• FRDM-KL25Z board
• Ultrasonic sensor hc-sr04
• Motor driver
• Self-Balancing robot kit
• Battery
• Wires for Connections

BACKGROUND

In partial fulfillment of the requirements for the completion of course "COEN-6711 Microprocessor & their Application", we have been assigned to propose and implement one project based on MCU - ARM CORTEX M0+ family.

We know that a MCU is particularly used for single task purpose so that the design complexity can be reduced and the efficiency can be escalated. Incorporating a microcontroller unit in a design has made an evolutionary change in the electronics field. Complicated designs now can be remodeled in terms of design simplicity and application. Hence, we considered all the parameters while selecting our project topic and after appropriate research on our project topic we selected "Self-balancing Robot" controlled by MCU-FRDM-KL25Z.

OBJECTIVE & SIGNIFICANCE

This project is focused on designing and implementing a self-balancing robot (vertical balance) with an ARM Cortex M0+ microcontroller that will move at a constant speed in a given direction until it encounters an obstacle.

BLOCK DIAGRAM

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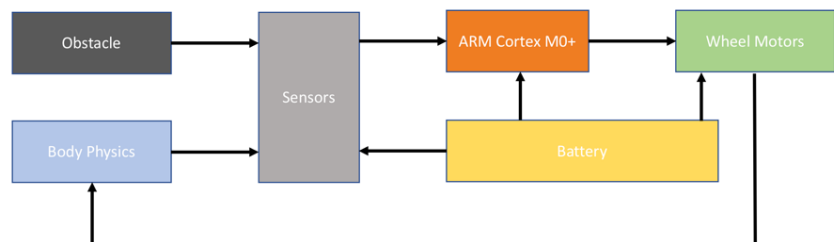
CONTROL METHOD

The ARM microcontroller will execute this control logic to stabilize the vertical angle of the robot.
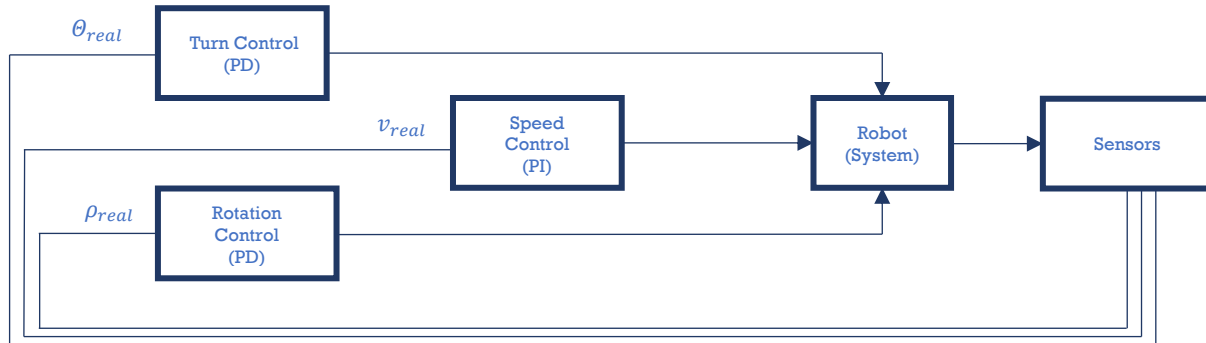
PROJECT TIMELINE

TASK	September				October				November			
	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Motor Control *(Speed and Direction)*	▓	▓	▓									
Simulink testing por Balance Control				▓								
Gyroscope Implementation *(Angle and Angular Velocity Calculation)*					▓	▓						
Ultrasonic Sensor *(Obstacle Detection and Movement Interruption)*							▓	▓				
Physical Robot Build									▓			
Balance Control Implementation										▓	▓	
Testing												

REFERENCE:

1. https://github.com/hpetre/COEN-6711
2. https://www.researchgate.net/publication/236030928_Autonomous_Dual_Wheel_Self_Balancing_Robot_Based_on_Microcontroller
3. https://www.semanticscholar.org/paper/Design-and-control-of-a-two-wheel-self-balancing-Juang-Lum/2dad074eed5019eb2b1e3056bbd9b82442ec596a
4. https://www.idosi.org/mejsr/mejsr25(4)17/19.pdf
5. M. Hasan, C. Saha, M. Rahman, R. I. Sarker, S. K. Aditya. Balancing of an Inverted Pendulum Using PD Controller. Dhaka Univ. J. Sci. 60(1): 115-120, 2012

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