

Project work form –

Build a mobile robot with image recognition for sorting recyclable waste using RaspberryPi

Title of the project work: Build a mobile robot with image recognition for sorting recyclable waste using RaspberryPi		Institute ID: MEI 075
Aim of the project: Develop a way to intelligently sort recyclable waste by introducing a robot with camera attached to it, and capable of recognizing certain types of waste. Apply concepts of Machine Learning and Artificial Intelligence in robotics.		
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Name of supervisor(s):	Dr. Nagy István;	
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Team size (min./max.):	4-6 person <i>Under the minimal nr. of participants the project will not be started.</i>	
Material requirements available:	RaspberryPi + PiCamera	
Material requirements pending purchase:	Arduino Uno (maybe it will be necessary later), electric/mechanic parts for the mobile robot	
Usable financial frame (max.):	-	
Required prerequisites:	<i>Machine Design II. (BBXGGE2BNE)</i> <i>Programming Languages (BMXPNE4BNE)</i> <i>Microcontroller software technics (KAVMKBABNE)</i> good to have – <i>Interest in Machine Learning/AI applied to robotics</i>	
Expected schedule:	week 1-2.	Project team founding, defining the tasks in the project group. Time and work scheduling for the semester. Getting in touch with the RaspberryPi and PiCamera. Choosing libraries and Python modules that will be used for the object recognition. Checking ML/AI materials in order to check the best approach for solving the problem. Check necessary materials for building a simple mobile robot controlled via remote or Bluetooth. Starting the Work Log(s) . Making the handover and responsibility reports.
	week 3-4.	Setting up the RaspberryPi and define training data for the Network by using CNN - Convolutional Neural Network and the chosen best suited python library – “OpenCV” for example

	week 5-6.	Start training the Network for detecting images of specific types of recyclable waste – Plastic, paper, glass etc... through the PiCamera.
	week 7-9.	Test and evaluate the training set. In case it still not reliable enough, go back to previous steps and train network with more data. During this week make sure the network can detect various types of waste.
	week 10-13.	In case the object recognition is working well, start building a simple mobile robot where the Picamera and RaspberryPi will be attached . Examination of operation: <ul style="list-style-type: none"> - if working, final tuning. - if not working, debugging, then final tuning. - making the necessary documentation
	week 14 -15.	Presentation and evaluation, work logs and documentation submitting.

REMARK:

- The project can apply only **students of Mechatronics**
- The „project work” is using the studied knowledge and not teaching the required subjects.

<i>Date of application / number of applicants</i>	<i>Date of finishing the project / result</i>