Lawarence Tech Summer Science Institute

Building Laptop Robots with a Camera using Java

Dates: Monday, June 28 – Friday, July 2
Time: 10am-3pm, 4 hours per day (total 20 hours)
Class Size: Max. 12

Instructors and Assistants:

- Instructor: Dr. Chan-Jin Chung (chung@ltu.edu)
- Teaching Assistant: Maurice Tedder, Graduate Student, Robotics Lab Assistant

Objectives

- To learn basic concepts in autonomous robotics, control theories, image processing and computer vision
- To learn object-oriented Java programming language using Eclipse or NetBeans IDE

Program Contents (Number of hours) – 50% hands-on

1. Introduction to robotics and robot control theories (1 hour)
2. Introduction to image processing and computer vision (2 hours)
3. Introduction to object-oriented Java programming language (8 hours)
4. Introduction to JMF and how to use USB Webcams with Java (2 hour)
5. Introduction to javax.comm API and how to control motors with Java through parallel port (2 hour)
6. Constructing (assembling) your own laptop robot (3 hours)
7. Class Competitions (2 hours)

Pre-requisites (Eligibility)

- 9^{th} –12^{th} grade students
- Knowledge and practical experience with Windows Operating Systems and DOS
- Some knowledge and practical experience with any programming language such as C, NQC, IC, PBasic, C++, VB, Python, JavaScript, or Java
- Knowledge of high school Computer Science 1 and/or 2 (not required, but recommended)

Benefits

- Students will take the laptop robot platform home (note: laptop computer is not included)
- Students will be able to study for Computer Science AP exam in Java
- Students will be able to participate in Robot Competitions such as Robofest Laptop robot division
- Students will be able to develop various computer vision applications

Major components to build one laptop robot (estimated total cost per a robot: $200)

- Two DC motors
- Parallel port motor control board
- 12V rechargeable battery
- Chassis
- Axels
- USB webcam
- Start/Stop switch
- Parallel port connector
- Two lawn mower wheels
- One caster wheel
- Bolts and nuts
- Boards
- Etc.

Registration Fee: $125 ($50+$75). A few scholarships to disadvantaged students are available.
Registration: please go to www.ltu.edu/community_k12/ssi.asp