01 - Outline, Ch1 Preview

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Outline

Course overview

Ch1 Preview

Course objectives

- The primary objective: introduction to the mathematical formulation and practical aspects of robotic manipulators.
- It will present kinematics, dynamics, control, and programming vital to effectively using/designing robotic arms.
- Topics covered:
  - Configuration space;
  - Rigid-body motions;
  - Forward and inverse kinematics;
  - Trajectory generation;
  - Motion planning;
  - Manipulator control.
- A complete yet straightforward robotic manipulator model will be developed to demonstrate these concepts using high-level languages and frameworks.

Course details

- Instructor: Dr. Vinicius Prado da Fonseca
  - E-mail: **vpradodafons@online.mun.ca (Brightspace email) include [COMP3766] in the subject line**;
    - Send email within Brightspace. Does not receive emails from outside brightspace;
    - Use ONLY brightspace email.
  - Office: EN-2012;
  - Office Hours: Friday after class or by appointment.
- Course Prerequisites: COMP2001, COMP2002, MATH2000, MATH2050, STAT2500 or STAT2550
- Lectures (**EN 1054, M-W-F 14:00 - 14:50**) and course notes on Brightspace;
  - Lectures are recorded on Online Rooms (Bongo).

Course details (cont.)

- Labs
  - Lecture room, lecture time, some Fridays;
  - Quiz on Brightspace;
  - Course repository: `https://github.com/vncprado/COMP3766`.
  - More details next slides.
- Textbook
  - Modern Robotics Mechanics, Planning, And Control, Kevin M. Lynch and Frank C. Park, 2019 (Cambridge University Press);
  - Book website: `https://hades.mech.northwestern.edu/index.php/Modern_Robotics`
  - Online notes and slides will also be available.

Evaluation

- The final grade in the course will be determined as follows:
  - Quizzes (2) - 25%;
  - Lab exercises (4) - 20%;
  - Assignments (5 or 6) - 30%;
  - Final Project - 25%.
- Course outline on Brightspace:
  - Evaluation, lecture dates, lab schedule, assignment deadlines and textbook units.

Assignments

- Assignments (5 or 6) may have written and/or programming portions
- Submit written portions by hand in a scanned document or annotated PDF.
- Programming portions will be mostly in Python. Use the provided files as a template for your code.

Labs

- Labs (4) will be **IN PERSON**
  -
  - Lecture room, Lecture time, some Fridays, see schedule on Brightspace;
  - Repository with ROS workspace will be provided;
  - Bring laptop with **Docker** and **VSCode** installed;
  - D2L Quiz will be open until 23:59 on lab day.
- NO EXTENSIONS!
- You must do the **pre-lab section** before arriving at the lab time.
- After completing the lab you must answer the **quiz on brightspace**.
- On Brightspace you will find:
  - Lab schedule;
  - Lab manual;
  - Support files;
  - Lab quiz.

Final Project

- Repository (INCLUDE REPO LINK HERE)
- Final weeks starting after second quiz.
- Deadline last day of classes.

Robotics is a relatively young discipline with highly ambitious goals, the ultimate one being the creation of machines that can behave and think like humans.

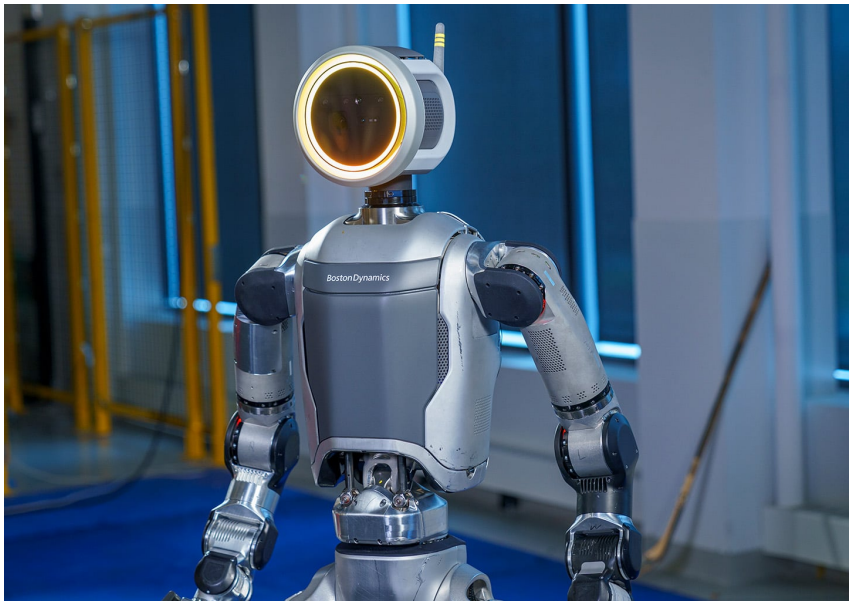

Figure: Boston Dynamics Atlas Robot.