Lil Runner

A walking bipedal robot

A project in IN5590 by Lazo Omar E-mail: lazoo@ifi.uio.no

1 Intro

The project is a culmination of my efforts in the IN5590 course. The objective was to create a bipedal walking robot utilizing servos. This endeavor challenged my skills in CAD design, manufacturing, and programming. Ultimately, I was able to finalize the robot's design and bring it to life.

The primary goals for this project were:

- Ensure that Lil Runner lives up to its name by achieving high-speed locomotion.
- Design Lil Runner to have an appealing and intriguing appearance.

Early design concepts and the final iteration of Lil Runner are featured in the **Extra figures** section.

Tools

Key components used in this project include:

- 6 Dynamixel AX12 servos

The software tools that were essential for this project are:

- SolidWorks (for CAD design)
- Cura (for 3D printing)
- Python (as the programming language)
- dynamixel_sdk (a package for controlling the Dynamixel servos)

Conclusion

Lil Runner successfully achieved a notable and interesting design while being capable of a quick walking motion, described as more of a march rather than a jog. Given the time constraints, I was unable to achieve actual running movement.

Throughout this project, I tuned a sine controller for the servos to maximize Lil Runner's walking speed. Future enhancements could include employing AI algorithms, such as evolutionary algorithms or reinforcement learning, to optimize movement patterns further. Additionally, aesthetic improvements like adding lenses to Lil Runner's eyes, integrating lights, or applying a paint job could enhance its overall appearance, making it even more striking and engaging.
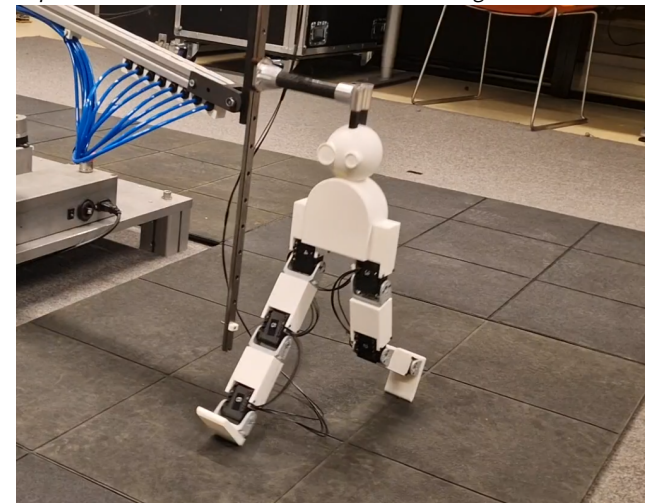
Extra figures

Concept art of Lil Runner
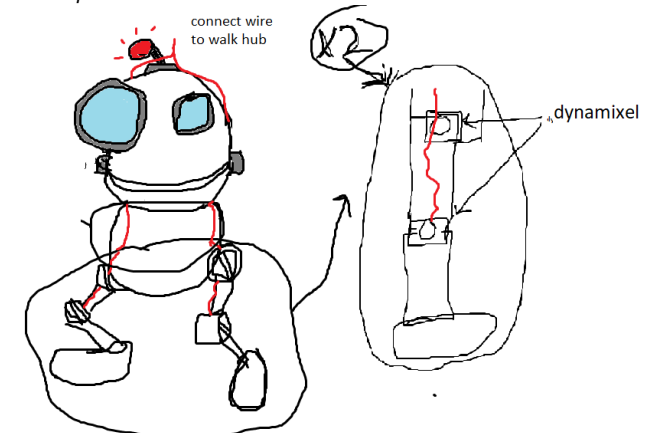
CAD design of Lil Runner
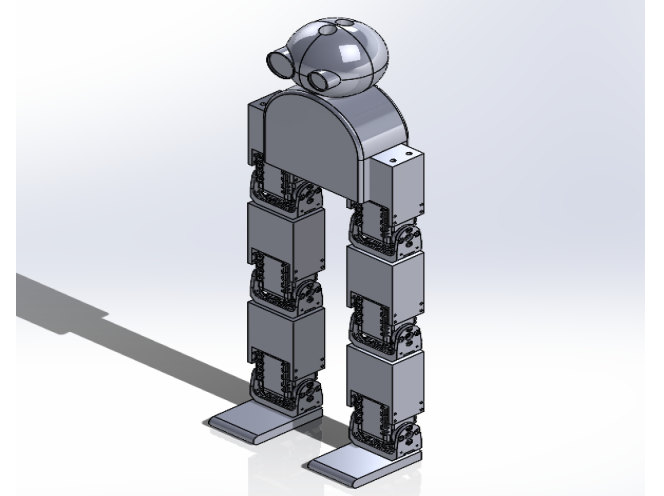
A picture of Lil Runner in the middle of marching

UNIVERSITY OF OSLO

GitHub repo →