Bachelor thesis

Developing a prototype of a walking robot with a spider structure

Michał Załęcki

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Supervisor: dr hab. Cezary Rzymkowski, prof. PW

1. Introduction

"Developing a prototype of a walking robot with a spider structure" is a thesis, written in the form of a diary. Its keynote is to show the reader, how to build a robot, step by step, completely according to his own concept and sense of style.
The author describes the problems he encountered and how he solved them. Often, it turns out that his original ideas could not be reflected in reality, which is why this thesis describes the entire evolution of the concept, up to the main goal of building a fully functional robot.

2. Mechanical analysis

The choice of drive units turned out to be of key importance for the project. The choice fell on the D-04HV servo motors. The author paid attention to the aesthetic values of the design, often putting them above pure efficiency. Moreover, the distinguishing features of the robot from a large family of similar projects were described, with great emphasis on the description of numerous improvements.

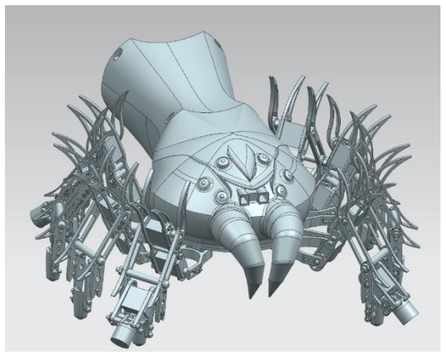

Figure 1 Robot model

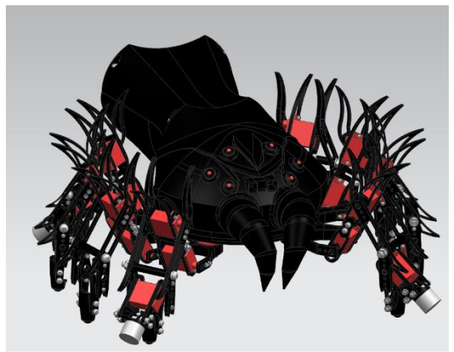

Figure 2 Robot model with predicted colors

3. Electronic analysis

This chapter described the problems related to the strength of electronic components to the effect of electric current. Moreover, the issues of selecting a power package and a microcontroller were discussed. The author describes the problems he encountered and how he solved them.

4. Control concept

Chapter describes how the spider will move. The author focuses on showing the challenges faced by the designer, which the observer could describe as "taking an ordinary step". This process comes to the uninterrupted solution by the microcontroller of the system of quadratic equations of trigonometric functions. In addition to the basic walking module, the robot can be controlled via bluetooth, move over uneven terrain, and has been designed to mechanically meet the challenges of climbing metal walls.

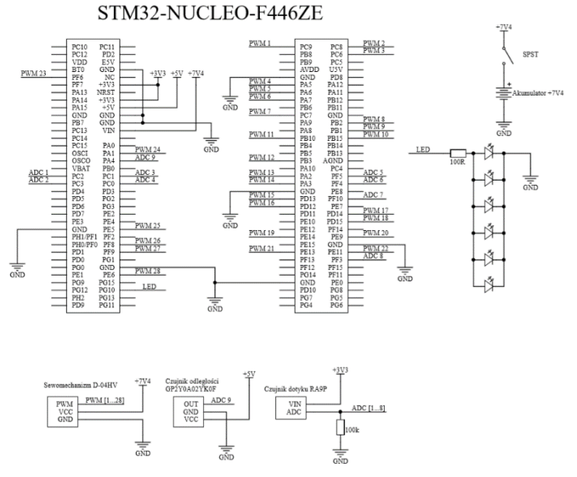

Figure 3 Electronic diagram and assignment of microcontroller PINs

5. Conclusions

The end of the work is a summary of the author, what he managed to achieve and what further challenges he must overcome. He describes what is the heart of the whole project and imagines a future in which, the presence of robots, in every sphere of human life, will be completely common.

Figure 4 The actual appearance of the spider