MACHINE VISION BASED VERTICAL POSITIONING AND CUTTING OF A HARVESTING TOOL

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

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Automation of the asparagus harvesting process is encouraged by the substantial rise in demand in Europe and the shortage of seasonal labor. The automation is supposed to be achieved by building a mobile robot that consists of a drive system, 3-Axis SCARA, and a Harvester tool. The Harvester, as the focus of the research, makes use of the analysis conducted on the images taken by a depth camera to obtain information on the surrounding of the targeted asparagus. The tool consists of three stepper motors to drive the z-axis, cutter, and magazine. The integrated and sequential movement of the three axis enables the tool to harvest asparagus. Evaluation on the surrounding is crucial due to the uneven height of the ground, the presence of obstacles, and delicate nature of the asparagus spears. The analysis results are the inputs for the Harvester to decide on the appropriate approach to harvest the targeted asparagus. The performance assessment yields a highly satisfactory results, though further improvement is needed to achieve an industrial standard suitable for customer usage.

Keywords: Agricultural Robotics, Selective Green Asparagus Harvesting, Motion Control, Cascade Control, Image Recognition

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DEDICATION

I dedicate this work to the further development of this project.

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