determine the value of the slope. In case the motor current increases greatly, the maximum speed is set for a short time to get out of slope quickly.

Control software was developed with the help of CodeWarrior IDE and RAppID applications customized for MPC5604 series microcontrollers.

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Designing a robot to advance fruit picking

Many scientists and teachers of English language refer project work to one of the most effective methods of teaching and learning a foreign language carried out through research and communication [1]. According to Olga Supe, “project work is a student-centred teaching approach, it motivates students to use language in real life situation, and it involves a great number of students’ feelings, talents, skills, and knowledge in learning process” [2].

The authors of this paper, the students of Tomsk Polytechnic University, totally share this opinion and aim to describe their experience in doing project work in English language classes. The topic for research was chosen to be as follows: designing a robot to advance fruit picking.

Fruit picking is one of the most delicate agricultural activities. Potato and grain harvesters were invented many years ago. Although we live in the twenty first century, the agricultural labour is still not mechanized or automated in most of the orchards. Previous attempts to create robots for fruit picking failed since they detected only one fruit, picked it up, then continued to look for another one without realizing whether all fruits were collected from one and the same tree. The process was very slow.

The aim of our work is to introduce a project developed by researchers of Vision Robotics Corporation, the USA [3]. The scientists made a lot of efforts to design a robot for increasing the speed, efficiency and quality of fruit picking. So the main points of to be covered within this article include: the robot’s structure, its power source, size and estimated cost of robot.

The invented robot consists of two interconnected robots. For further convenience, the first part of the robot is called Mapper, and the second - Pod. The Mapper usually moves first. Its main functions include making a virtual map of the garden, focusing on location of all fruits and determining the degree of fruit ripeness. As for the Pod, it follows Mapper and collects fruits. The Mapper has a set of stereoscopic cameras which are located on the crossbars, and a pattern recognition system. Cameras are sensitive as they are capable to detect a fruit among the leaves, and determine the degree of its ripeness. Then they send this information to a processor, which makes up a map of the tree and gives commands to the second robot. The Pod receives these data and gathers fruits using eight long manipulators that can flex in several directions, ending up like a human's fingers. Then it puts a fruit in a box which is fixed to the robot's body.

It is of importance to notice that two of the robots move in different ways depending on their functions. The Mapper moves on caterpillars, whereas the Pod – on wheels. The power source for the Robot is electricity. Therefore, it has got an electric motor which powers all electronic components, sensors and actuators.

This robot is quite big: three meters in length, one and a half meter in height, whereas its weight is about one hundred kilograms.

Unfortunately, the Vision Robotics Corporation has not provided the estimated cost of its development. But since the newest and unique development technologies have been used to design this robot we can assume that it will cost about one million rubles.

In conclusion, we would like to say that when this type of the robot has been implemented in practice, it will make an invaluable contribution to development of farming and agriculture in general. In addition, we found the work based on research of the best products for harvesting very exciting and challenging, as it demanded us to apply different skills, such as analytical and creative skills, communicative written and oral skills in English, and many others.

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