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Project work: designing LM-Bot (Lead machine)

Actually, project work is not a new methodology in English language teaching and learning. It has been used and favoured by a majority of teachers and students during learning process. Project work focuses not only on language accuracy, fluency, but also on students' creativity, knowledge of professional disciplines, communication and motivation. The latter is of great significance since "positive motivation is the key to successful language learning, and project work is particularly useful as a means of generating this" [1].

There have been several projects carried out by the students of the Institute of Non-Destructive Testing mastering English language for general and specific purposes [2]. This paper deals with the description of one of the projects devoted to the design of a robot to help elderly people. This project work was done within the topic "Robots and Robotics". So the aim of this work is to focus on project main stages representing practical guidelines on design and application of LM-Bot, a robot to help elderly people.

There is a significant problem connected with elderly, especially blind people crossing the road. So our project aimed at creating a robot to eliminate this problem. This is certainly to be Lead Machine or LM-Bot for short. The idea for the project was born in our mind; therefore this robot does not have an analogue in the world. Our robot is designed for modern big cities with large crossing areas.

To begin with, this robotic device can perform several functions which are very important for elderly people's everyday life. Its main function is to help elderly and blind people cross the road. Its secondary functions include – helping elderly people carry their heavy bags across the road, and making a night shooting. That is when the robot gets charged, it can be used as a night camera by policemen. This will help police reduce the level of crime in the local area.

For the robot to perform these functions efficiently, the main thing for the designers of this project was to create an overall image, including the structure of LM-Bot. So now let us focus your attention on its size, dimensions, materials and general structure.

The robot's height is just 1 meter, whereas its dimensions are 60 to 60 centimeters. This robot look likes an ordinary rubbish-bin, but it performs quite different functions. It has also got two baskets for bags on both sides of its body. The volume of each basket is about 18 liters. These baskets can open and close. So, this is very comfortable for elderly people to put things in and out of them before and after crossing the road. Calculating the weight of LM-Bot, we took into consideration the weight of an average elderly person, and thus, we came to a conclusion that the Robot's weight mustn't exceed 55 kilos.

After creating the robot's basic components, we brainstormed ideas about materials which components could be made of. So we came to a decision that the housing of the robot has to be made of light materials, for example, plastic or cellular

polycarbonate, etc.

To keep LM-Bot's balance, there is a gyroscope installed inside its body which is responsible for the robot's weight distribution. Also there is a special button installed on the traffic lights pillar which allows a pedestrian to call the robot to come to a required side of road.

The next stage of our project was connected with determining the robot's power source and where power comes from. So the robot is powered with a battery which can run for 18 hours. Also the battery has about 1 hour in reserve.

The location of the robot includes the "start" location and the "finish" location. The "start" location is near the traffic lights pillar which has a charger fixed to it. The "finish" location is the opposite side of road. The robot starts operating automatically at the time when the traffic lights turn on. When the green light turns off, the robot receives a signal and starts to move to the "start" location, which is right on the pavement. Location sensors, which are installed on the charger panel, detect the location of the robot. The charger gets connected with the robot which is charged for 6 hours.

One of the most important stages was to determine how the robot moves. So LM-Bot moves both on wheels and follows electronic track, which the robot can identify no matter what weather conditions are.

As for the robot's sensory system, it has got four sensors: two electronic track sensor, touch sensor, location sensor and pull sensor. Electronic track sensors are located on both sides of the robot: front and back, and identify electronic track on the road. Touch sensor is located on handrail around the robot's body, so when a person touches it, the Bot performs certain actions. For example, if a pedestrian comes to the end of the green light, the robot remains on this side of the road and says: "You should wait until the next green light switches on". Location sensor is installed on the pavement at the start of the electronic road. It helps connect the charger with the robot. Pull sensor is also installed on the handrail, and determines the speed of the robot. When the green light turns on the Bot begins moving with certain speed. If a pedestrian moves slower than the robot, the Bot lowers its speed.

We totally believe that this type of robot will make elderly people's lives easier and safer when they are on road. We realize that our project has some disadvantages, therefore, our work over this project will continue to be developed, for example, the robot's interaction with traffic lights has to be modernized; solutions have to be found how to protect the robot from possible damages caused by influence of "ill-bred" people, etc.

References

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