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Promotion on Science and Technology for Children using Human Following Robot

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Abstract: The authors perform promotion activity on science and technology for primary school children with human following robot. This robot can follow a particular person as target. In our activity, the children enjoy interaction with robot by being followed as the target. Enjoying with the robot, they are interested in the science and technology. In this paper, we present framework about the human following robot. Also we demonstrate the interaction with the robot in our promotion activity.

Keywords: Human-Robot Interaction, Open-RTM, Mobile Robot

1. Introduction

As a leader of society in the future, it is important to be interested in society and technology to children. To satisfy children's interest, the authors have an inspiration to take a chance with robotics. Thus, we performed promotion activity on science and technology. In our activity, the children can enjoy interaction with a human following robot. This robot can follow a particular person as a target. By following robot, the children are interested in the science and technology. In this paper, we present interaction between the children and the robot in our activity. To present the interaction, we introduce about the human following robot at first.

2. Human Following Robot

The authors are developing human following robot as shown in Figure 1 (Masahito et al, 2012). The robot can follow a particular person as a target. To discriminate the target, the robot has two sensors. The first is stereo camera "Bumblebee2" made by Point Gray. The camera can determine the target by color image. The second is laser range finder "UTM-30LX" made by HOKUYO AUTOMATIC CO.LTD. The laser can get target position by distance data.

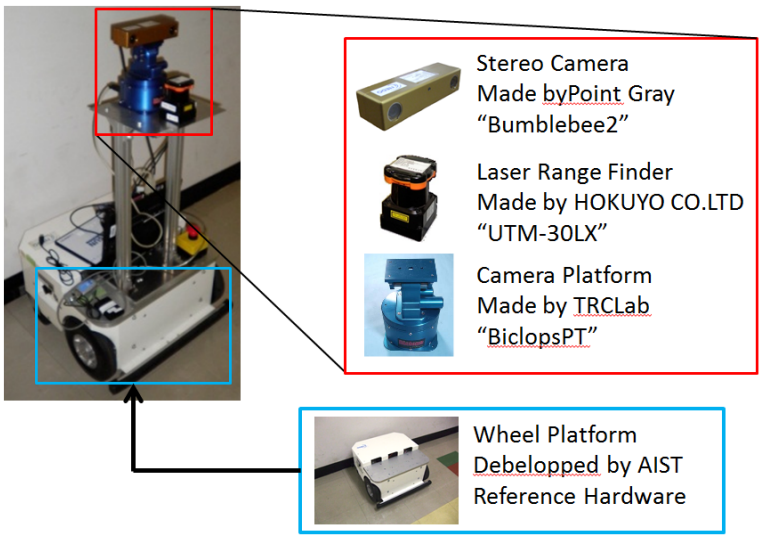

Figure 1. Framework of Human Following Robot

Block diagram how to follow the target is shown in Figure 2. The robot detects the target position using two sensors. Next, the robot orders camera platform and wheeled platform through velocity control. Looping these processes, the robot follows the target (Takemura et al, 2009). We use the camera platform "BiclopsPT" made by TRCLab, and the wheeled platform "Reference Hardware" made by AIST (Advanced Industrial Science and Technology).

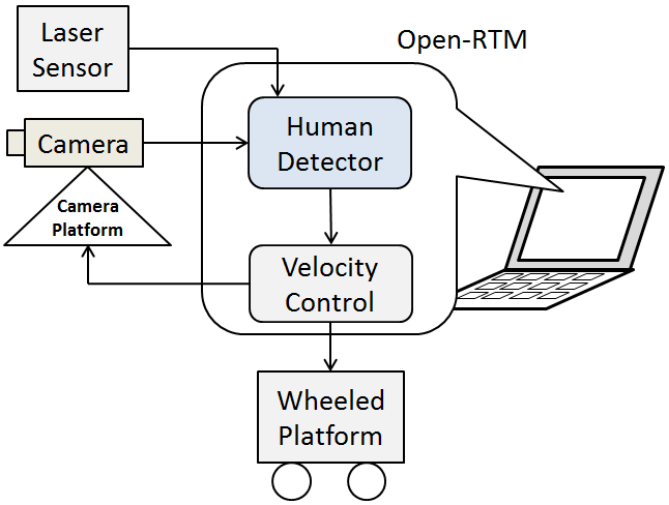

Figure 2. Block Diagram how to Follow Target

Flow chart how to detect the target is shown in Figure 3. If two sensors detect the target, the robot detects the target position in velocity control. Next, tilt of camera platform and velocity of wheeled platform are calculated. Finally, the robot orders these calculation results to each system. If two sensors do not detect the target, the robot detects the target position with previous position. As these systems' platform, we use "OpenRTM-aist" developed by AIST (Ando et al, 2005).

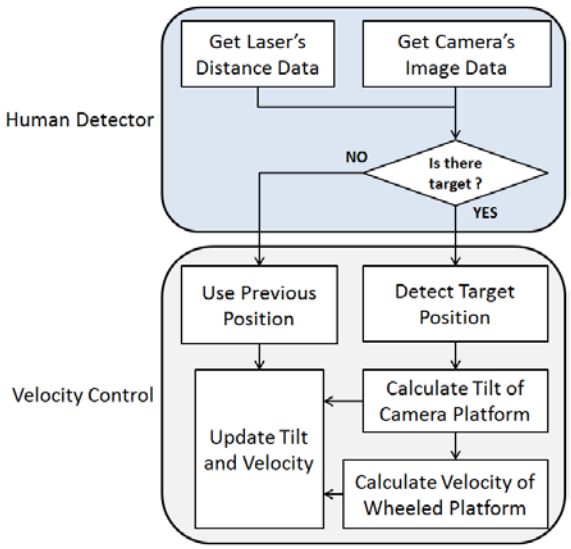

Figure 3. Flow Chart how to Detect Target

3. Promotion Activity

The authors perform promotion activity on science and technology a few times a year. In the activity, we invite primary school children into our laboratory. The children take a chance to come into contact with robot and some mechanics. Enjoying interaction with human following robot is one part of contents. Following as target, the robot is enjoyed interaction. Figure 4 is shown images in our activity. In Figure 4, the children enjoy interaction with the robot and are interested in the robot. After the activity, we heard comments to the children.

The comments showed that most of the children are interested in the robot. Thus, these comments were confirmed that our activity is effectiveness as interaction with the robot in promotion activity on science and technology.

4. Conclusion

This paper presented framework about human following robot and a report about interaction to primary school children with the robot in our promotion activity on science and technology. In our activity, the robot followed child as a target. The children enjoyed interaction with robot. Children's comments after the activity showed that most of the children are interested in the robot. Thus, we confirm the effectiveness of our activity with human following robot in the science and technology.

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(a) (b)

(c) (d)

Figure 4. Images in Promotion Activity of Science and Technology