

Proposal of Class Scenario Design Method for Robot-aided Class

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Abstract. In South Korea, it has been started to deploy robotic systems for teaching aids in model schools. To provide flexible and on-demand services, teachers should edit robot service scenarios that is designed to achieve their class objectives. Since teachers usually are not familiar with computer programming, the robot scenario editor is required that should be easy to use without expertise about programming and robotics. We propose a robot scenario editing method for teachers to edit their class scenario based on simple GUI and multimedia files.

Keywords: robot-aided class; class scenario; teaching assistant robot;

1 Introduction

Since purposes and service scenarios of users vary in wide range of applications, recent service robots should have SW platform to adapt different service scenarios for individual users. In most case, customizing cost for on-demand service scenarios is very high to design or modify service scenarios because only expert can utilize robot scenario tools with expertise such as computer programming and robot science [3].

SW tools and scripting languages for robot service scenario edit have been provided for the development of robot applications and service scenario [1-4]. These tools provide various ways to design robot service scenario. However, the author should have to understand the characteristics of robots and learn knowledge of computer programming. In [3], a robot scenario script language and tool for non-expert is proposed, but it is still difficult to be used by teachers due to lack of explicit scenario design method.

In this paper, we suggest a method to design class scenarios for class assistant robots by using the scenario editor tool in [3]. An artistic class scenario is presented in this paper as an example, but the SW tool can be extended to any subject of the school. In South Korea, it has been started to deploy robotic systems for teaching aids in model schools from 2015. If the robot scenario editing method is provided, robotic systems for teaching aids can spread out without less difficulty of teachers.



Fig. 1. Robotic systems for teaching aids in model schools of South Korea

2 System Overview

Users create robot scenario with scenario editor in PC and it translates the scenario into the scenario script. The robot loads the scenario script and the script engine in robot performs the specific service based on the scenario and user command including STT (sound to text), input through mobile app and so on.

The tool is composed of two modules. One is the robot scenario editor which creates a scenario script, and the other one is the robot scenario interpreter to run the script. This paper focuses on the scenario editor in the robot scenario editor that the non-expert users directly use.

The script editor consists of Import, Package and Scenario in [3]. Scenario interpreter module is responsible for execution by analyzing the scenario script file that you created in the scenario editor. Interpreter can be performed with the analysis of the script, and control multimedia playback.

3 Class Scenario Design Method

An artistic teacher can prepare a class scenario assisted by teaching assistant robot with following steps. First, the teacher plans manually rough schedules and specific events about robot movement and multimedia playbacks to be used in the artistic class in the class. In most case, teachers cannot edit movement directly but modify examples of robot navigation files from the robot motion interface. In our experiment, no teacher in 5 normal art teachers cannot design robot navigation files, but all of them can modify the example files for their scenario. Second, the teacher defines the

commands to control the robot and the decisions that is executed by the command that must correspond to the objective of the class. For example, the subject of the class is to explain abstract art. The command can be ‘Mondrian’ and ‘Kandinsky’. All teacher named the command corresponding to key words of the class. Third, the teacher arrange the schedule to locate the time events planned by rough schedule in the first step. Fourth, he or she generates the script and verify it by simulator.

In most case, the first generated scenario does not work very well. Recursive modification of tuning and simulation might be required. If teachers share well-designed scenario files, a teacher can easily modify and enhance a new scenario from examples.

4 Conclusion

Various areas adopt robot systems to assist people and to achieve better performance of the target applications. The class assistant robot is one of the most promising applications in robot industry. In South Korea, it has been proved that assistant robots increase the interest and focus of students in the class. It has been started to deploy a robotic system for teaching aids in model schools. To provide flexible and on demand services, teachers should edit robot service scenarios that is designed to achieve their class objectives. Since teachers usually are not familiar with computer programming, the robot scenario editing method is required that should be easy to use without expertise about programming and robotics. We proposed a simple and reusable editing method to design robot service scenario for artistic class.

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References

1. Chen, C.-Y., Wang, L.-H.: The motion editor and high precision integration for optimal control of robot manipulators in dynamic structural systems, *Structural Engineering and Mechanics*, Vol. 41, Issue 5, pp.633-644, 2012
2. Kuroki, Y., Blank, B., Mikami, T., Mayeux, P., Miyamoto, A., Playter, R. and Yamaguchi, J. I.: Motion creating system for a small biped entertainment robot. In *Intelligent Robots and Systems, Proceedings. 2003 IEEE/RSJ International Conference on Intelligent Robots and Systems*, Vol. 2, pp. 1394-1399, October, 2003.
3. Choi D., Ha J., Jung M., Park M. and Park H.: Development of Robot Scenario Script Language and Tool for Non-Expert, pp. 498-502, Dec. 2015
4. Peterson, J., Hager, G. D. and Hudak, P.: A language for declarative robotic programming, In *International Conference on Robotics and Automation*, Vol. 2, pp. 1144-1151, 1999
5. OPRoS, <http://www.ropros.org>
6. ROS, <http://www.ros.org> Appendix: Springer-Author Discount