2022 RoboCup@Home Education (Standard Platform) Team Description Paper - Team SeaSky

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Abstract. Team SeaSky has developed a receptionist robot based on the Pepper robot and Choregraphe Suit programming. One of the tasks in 2022 RoboCup@Home Education, the receptionist, is simplified to test the workflow in the Choregraphe Pepper simulation. However, additional robot capabilities such as people and face detections can be added on if the real robot is available.
The testing results show that the virtual Pepper robot can complete the simplified receptionist task, remember the guest's name, gender, drink, tell the order information to the shop owner and take care another customer when the first-round task is completed. This paper presents the technical information, and proposed solution to be implemented on the Pepper robot.

Keywords: RoboCup@Home Education, Standard Platform, Team SeaSky, TDP.

1 Introduction

Pepper robot (SoftBank Robotics) is one of robot platforms that support various levels of developers from low coding to multi-language coding. Pepper robot outlook is suitable for social interaction with people. The robot is equipped with many sensors as shown in Fig. 1 [1]. That is enough to be used for educational, research or commercial purposes [2].

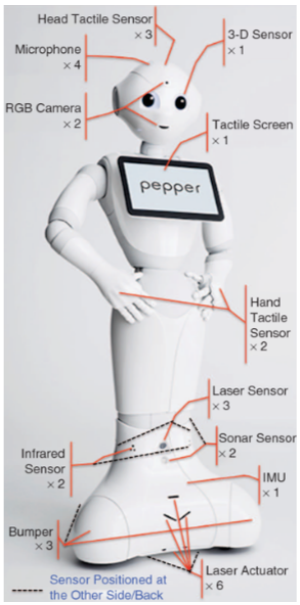

Figure 1. The Pepper robot and sensors [1].

Team SeaSky is a group of two high school students and a mentor who have learned Choregraphe Suit [3] and practiced the Choregraphe box coding style. It was found that they can program the robot to do such complex tasks, e.g., dialog conversation, trajectory control, and robot posture control. The Choregraphe program is tested by simulation with a virtual Pepper robot. One of the tasks in 2022 RoboCup@Home Education, the party receptionist, is simplified to test the workflow with the dialog, move along, say and animation boxes in the Choregraphe simulation, yet additional functions such as people and face detections can be later added on if the real robot is available.

2 Technical Information

2.1 Task: Receptionist

According to the third task in 2022 RoboCup@Home Education Rules [4], the robot acts as a party receptionist to take the guest drink order and bring the guest to an available seat. Then, the robot informs the party owner about the guest and order information. In this development, the task is simplified to a storefront receptionist to test the Choregraphe program workflow by maintaining similar task to the party receptionist. The workflow of the storefront receptionist is shown in Fig. 2.

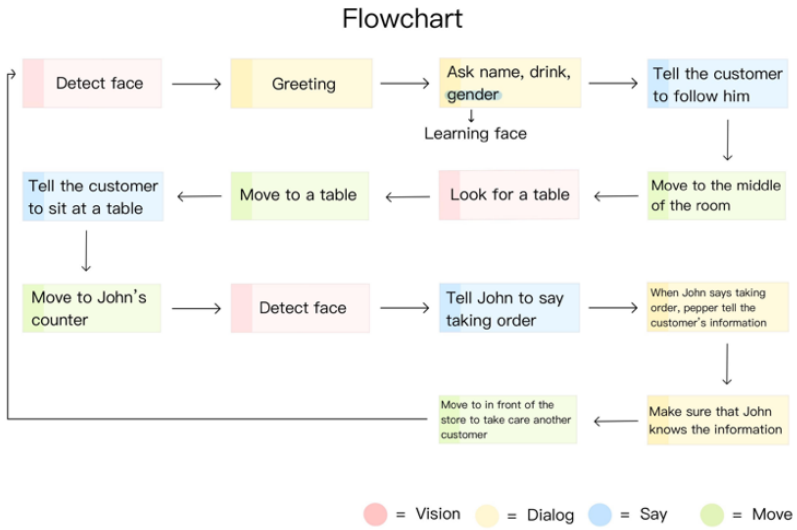

Figure 2. Flowchart diagram of the storefront receptionist task.

After the workflow design is completed, the Choregraphe program is developed by using the dialog box as a main workflow control. The developed Choregraphe program for the storefront receptionist task is shown in Fig. 3. There are four boxes used in the program that works with the virtual robot testing: dialog box, move along box, say box and animation box. The dialog box makes conversations with guests, takes the guest's name, gender, and drink order, answers yes/no questions, and later tells the shop owner the order information. The dialog box is described with a given .top file as shown in Fig. 4. The robot uses the dialog to execute other activities or do something when people say the keywords. The dialog box also activates the move along box when the leading-to-table task begins. The dialog box can keep the order information and tell the recorded information to the store owner.

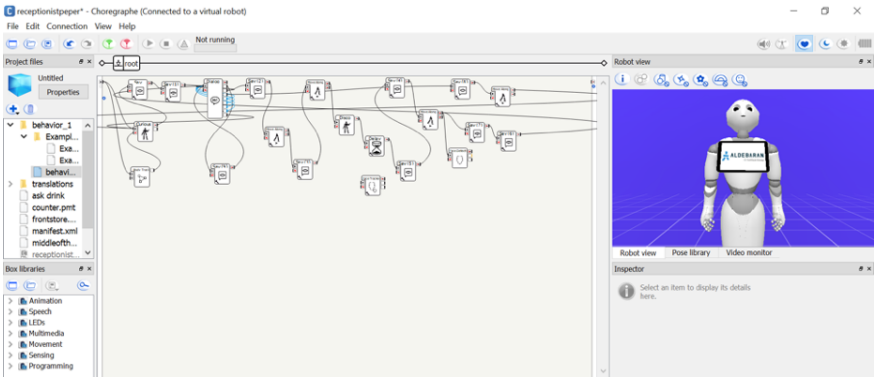

Figure 3. Choregraphe program of the storefront receptionist task.

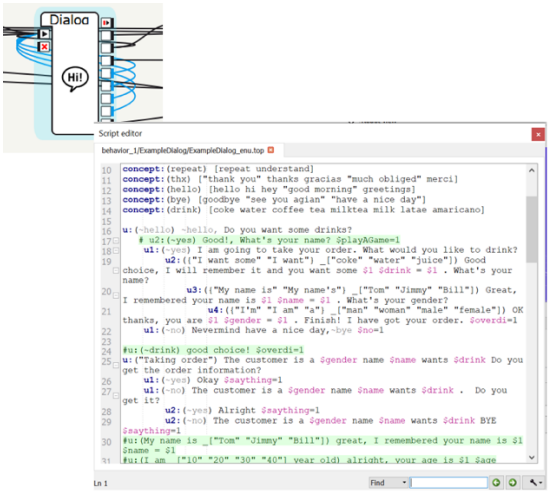

Figure 4. The dialog box and dialog description .top file.

The move along box controls the robot to move on the floor according to a predefined trajectory. In this simulation, the store map is defined according to Fig. 5. The robot moves from in front of the store to the middle of the room and to the owner's counter. The robot corresponding trajectory can be defined by a .pmt file which is written by the planar move editor (Fig. 6).

The say box makes the robot speak according to the text input. The say box is used by the robot to make a short speech telling what the robot is doing. In this situation, the robot uses the say box to tell what Pepper is going to do, for examples
"I'm looking for the table" and "I'm going to take care another customer".

The robot also does a body posture expressing current activities such as looking for someone and pointing to the table by using the animation box. After the robot has completed the first-round task, it will go back to the storefront and ready to take care of other customers by looping the program back to the main dialog box.

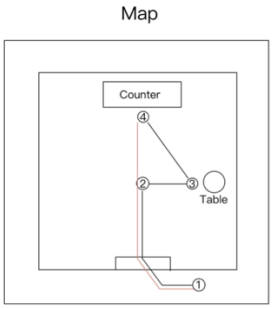

Figure 5. The store map and marking locations.

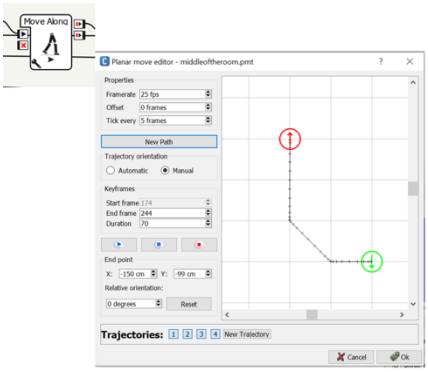

Figure 6. The move along box and planar move .pmt file editor.

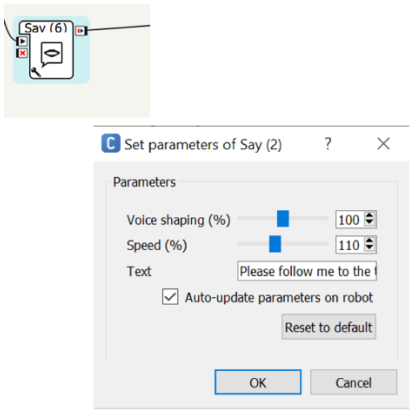

Figure 7. The say box with a brief description text.

The open-source code, TDP and slide presentation of the storefront receptionist task are available on GitHub, https://github.com/fahnapatsakorn/QualifyRoboCup2022.git

The qualifying VDO presents the virtual Pepper robot operation on YouTube, https://youtu.be/Adj4YqEj8QQ

In addition, weekly assignment source codes of 2022 RoboCup@Home Education Online Workshop that tested with the virtual Pepper robot are also available here,
https://github.com/fahnapatsakorn?tab=repositories
https://github.com/smithi2008?tab=repositories

3 Conclusion

The Choregraph program simplifies coding in the connecting block style. This makes the high school team able to program such a complex robot task. The storefront receptionist, a simplified version of the party receptionist task, is successfully tested on the virtual Pepper robot simulation as shown in the qualifying VDO. The open-source code is available on GitHub. The virtual Pepper robot in Choregraphe simulation opens opportunities to check and test the developed program and workflow before testing on the real robot. The team is ready to make further development on the real robot.

References

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