Communication Model for Cooperative Robotics Simulator

Assessment Evaluation

Version 1.0

1. Introduction

This document will provide the test result of the Communication Model for Cooperative Robotics Simulator based on Test Plan 1.0

2. Testing Result Summary

Feature Identifier	Test Case	Result
T-001	Register robot.	Passed
T-002	Sending broadcast message	Passed
T-003	Sending point-to-point message	Passed
T-004	Receiving broadcast message	Passed
T-005	Receiving point-to-point message	Passed
T-006	Start up all links	Passed
T-007	Shutdown all links	Passed
T-008	Set system range	Passed
T-009	Set system delay	Passed
T-010	Set system delivery probability	Passed
T-011	Start up robot's send link	Passed
T-012	Shutdown robot's send link	Passed
T-013	Start up robot's receive link	Passed
T-014	Shutdown robot's receive link	Passed
T-015	Enable broadcast capability	Passed
T-016	Disable broadcast capability	Passed
T-017	Enable point-to-point capability	Passed
T-018	Disable point-to-point capability	Passed
T-019	Set robot range	Passed
T-020	Set robot delay	Passed
T-021	Set robot deliver probability	Passed

Table 1 Testing Result Summary

3. Testing Result Details

3.1 T-001 Register robot

This test case was successfully passed. The new RobotCommRecord was created and was assigned to have communication capability as stated in communication type.

3.2 T-002 Sending broadcast message

This test case was successfully passed. Only the robots with broadcast capability can send out messages.

3.3 T-003 Sending point-to-point message

This test case was passed. Only the robots with point-to-point capability can send point-to-point message

3.4 T-004 Receiving broadcast message

This test was failed but finally passed. When sending broadcast message, a message needs to be distributed to the other robots to save in their queue. Due to the distribution process, received time attribute will be modified to be an actual received time. Each robot's received time will be varied. It depends on robot's parameters, which are system delay and robot delay. Since Message object implements serialization, if we put a message in a robot's queue without recreation, modifying an attribute will affect a message, which is already inserted into a queue. As a result, the problem has been solved by replicating the message before adding to a queue.

In addition, receivers get messages based on their parameters, which are delay, range and delivery probability. The results of each scenario are as followed.

- **System delay was set**
  Receivers got message from sender after the time of sender sent message plus system delay. (Received time = sent time + system delay)

- **Robot delay was set**
  Receivers got message from sender after sender sent message plus robot delay time. (Received time = sent time + robot delay)

- **System delay and Robot delay were set**
  Receivers got message from sender after sender sent message plus system delay plus robot delay time. (Received time = sent time + system delay + robot delay)

- **System range was set**
  Only robots within system range limit of sender got the message.

- **Robot range was set**
  Only robots within robot range of sender got the message.

- **System range and robot range were set**

Only robots within *this range* of sender got the message. In this case, *this range* is system range plus robot range.

- **System delivery Probability was set**
  Only randomly selected message within the system delivery probability range was delivered to the receivers.

- **Robot delivery Probability was set**
  Only randomly selected message within the robot delivery probability range was delivered to the receivers.

- **System delivery Probability and robot delivery probability were set**
  Only randomly selected message within the delivery probability range was delivered to the receivers. In this case, the delivery probability is the average of system delivery probability and robot delivery probability.

3.5   T-005   Receiving point-to-point message

This test was passed. The robot with point-to-point capability and enabled incoming link received all point-to-point messages. Robots received messages correctly based on their parameters, which are delay, range, delivery probability and link status. The results of each scenario are as followed.

- **System delay was set**
  Receivers got message from sender after the time of sender sent message plus system delay. (Received time = sent time + system delay)

- **Robot delay was set**
  Receivers got message from sender after sender sent message plus robot delay time. (Received time = sent time + robot delay)

- **System delay and Robot delay were set**
  Receivers got message from sender after sender sent message plus system delay plus robot delay time. (Received time = sent time + system delay + robot delay)

- **System range was set**
  Only robots within system range limit of sender got the message.

- **Robot range was set**
  Only robots within robot range of sender got the message.

- **System range and robot range were set**
  Only robots within *this range* of sender got the message. In this case, *this range* is system range plus robot range.

- **System delivery Probability was set**

Only randomly selected message within the system delivery probability range was delivered to the receivers.

- **<u>Robot delivery Probability was set</u>**
Only randomly selected message within the robot delivery probability range was delivered to the receivers.

- **<u>System delivery Probability and robot delivery probability were set</u>**
Only randomly selected message within the delivery probability range was delivered to the receivers. In this case, the delivery probability is the average of system delivery probability and robot delivery probability.

3.6   T-006   Start up all links

This test was passed. When StartupAllLink was called, the system link variable was set to true.

3.7   T-007   Shutdown all links

This test was passed. When ShutdownAllLink was called the system link variable was set to false.

3.8   T-008   Set system range

This test was passed. The system range variable was correctly set.

3.9   T-009   Set system delay

This test was passed. The system delay variable was correctly set.

3.10   T-010   Set system delivery probability

This test was passed. The system delivery probability variable was correctly set.

3.11   T-011   Start up robot's send link

This test was passed. The outgoing link of a particular robot was set to true.

3.12   T-012   Shutdown robot's send link

This test was passed. The outgoing link of a specified robot was set to false.

3.13   T-013   Start up robot's receive link

This test was passed. The incoming link of a particular robot was set to true.

3.14   T-014   Shutdown robot's receive link

This test was passed. The incoming link of a particular robot was set to false;

3.15   T-015   Enable broadcast capability

This test was passed. The variable for broadcast status was set to true.

3.16 T-016 Disable broadcast capability

This test was passed. The variable for broadcast status was set to false.

3.17 T-017 Enable point-to-point capability

This test was passed. The variable for point-to-point status was set to true.

3.18 T-018 Disable point-to-point capability

This test was passed. The variable for point-to-point status was set to false.

3.19 T-019 Set robot range

This test was passed. The range of a particular robot was correctly set.

3.20 T-020 Set robot delay

This test was passed. The delay of a particular robot was correctly set.

3.21 T-021 Set robot deliver probability

This test was passed. The delivery probability of a particular robot was correctly set.

3.22 Integration Testing

The integration testing was passed. I have done this successful testing by integrating it with the Environment. This test was done by testing in two main functions: robot functions and control panel functions. The robot functions include message passing between the robots and the communication model. The control panel functions consist of get and set system and robot parameters. Both tests were passed, although there were some modules in the Environment Control Panel that invoked incorrect methods. There were also some problems with the graphical user interface that displayed incorrectly and accepted wrong value.