Final Project Report

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Convoy

The convoy model includes RCU,ACU and software,The UML picture though and detailed requirement will be explained below.

Artifacts and properties:

Firstly,I constructed a file called purpose and scope which includes purpose and scope of RoboCon System, both of these two artifacts are heading , because I will use it in SRS, and these two artifacts act as heading in SRS, and these two parts deal with the subtask of No.1

Secondly, I constructed a file called relevant terms and concepts, and I use the artifact type of terms and concepts, terms represent some definition and acronym in this article, concepts represent some plan of action, and concepts includes attribute like difficulties and priority to show the importance and toughness of achieve this concepts.And these terms and concepts will be used to define or explain some requirement or features and construct links and traceability between them.

Thirdly, I constructed a file called stakeholder's goals to include all the stakeholder and their goals.I use the artifact type of goals, and goals include attributes like goal's type and this type is enumerated and include value of achieved etc.

Fourthly, I constructed a file called the requirement which includes all the requirement I extract or suppose from the whole pdf file.When I think some of requirement is incomplete or ambiguous, I will add some particular limitation to avoid ambiguity or add some assumption to make requirement detailed and complete.For example, I add a requirement called system expense and I described it as total expense less than the defined cost initiate and this is better than on-budget in description of file which is ambiguous, in all of detailed requirement, I add some value called initiate defined value and use this value as a base to avoid some ambiguous description, at the same time,I also add some requirement like leader should be able to avoid obstacle use a way or function, and in feature,I defined and make some assumption this way or function is called CS568 avoid obstacle algorithm, by this way, I construct the traceability and testability of requirement, also deal with the problem in description file whose requirement is not evident or ambiguous. And I also construct a folder called feature which include a series of things which I think should be implemented by this system, and some of requirement can be satisfied or traced by this feature when this feature has been fulfilled.For example, I add a feature called system

determine leader which I make some assumption that system have a algorithm called determine leader algorithm and this algorithm could be used to discover the leader.Once this feature be fulfilled, it could prove the requirement of leader determination be satisfied, and most of features and requirement have this kind of satisfaction or trace link, also some of requirements or feature's words have been defined by some terms to have traceability between requirement, feature and terms.There are a lots of related feature and requirement in these two file, and most of thoughts is similar.

Fifthly, for UML diagrams that depicts the structure and relationships of all the key concepts discussed in the RoboCon System Concept. For architecture part,I constructed two UML which depicts software and hardware architecture separately, for hardware part, Hardware includes bumper, Wi-Fi adapter, wheels, motor, camera,I put all of this component of hardware within RCU model, for each part of hardware, I put two links, for example, for camera, first links is from camera and RCU, which means camera tracked RCU, second is mutually link from camera to driver, which means there is data transfer between them, and all another things is function this hardware component fulfilled, such as cameraTrack, cameraReqData,cameraSendData, all of the function be linked to convoy program represents all the function this program hardware part should have.For the software part, I first list relationship between RCU,ACU and eBox, then list all the algorithm each separate part should have, for example,I listed algorithm like cameraTrackingalgorithm are modeled inside eBox, by this way, engineer could know more clearly about which part should have which algorithm.

   Sixthly, for UML diagrams that depicts the domain concepts related to routes, including waypoints, distances, obstacles. I add minicomputer to each RCU and by this way, it can send data to ACU for demonstration, also, the darkness control is important because it can test the accuracy of image processing algorithm.Also, waypoints and obstacle could used to test the effectiveness of obstacle-avoidance algorithm.I also add the sequence attribute which represents that a series of points related to location of waypoints and obstacle.

   Seventhly, for UML diagrams depicts the messages exchanged between RoboCon components, I make a assumption that hardware and software works right for RCU and ACU, and I use formation, movement, and recharging three modes, and each of the modes includes some message exchange, and I also divided each mode to different stepson list all the information exchanged in these steps, for example, for formation step1, we need to exchange information for

setLeaderInformation, CheckLeaderInformation, LeaderSendtoFollowerInformation and FollowerRequestLeaderInformation.

Eighthly, for UML diagrams depicts different operational modes that a RCU may be in and the events or conditions that cause a transition between modes. I divided each of the mode to different substate and also includes a series of actions may be occurred in the system, and every one of action happens, it will be have corresponding state transfer from one to another substate, for example, in formation mode, I divided the substate of waiting and leaderToBeConfirmed, and when action gatherInfoFromRCU happens, the substate have some transition, and I set each three mode (formation, movement, recharging) have substate and action.

Ninthly, I construct a SRS module and use the heading which name is all of the file's name I constructed and form this SRS.

I also add the tags like device-related, design-related,stakeholder-related etc to distinguish artifacts and each of my artifacts have its own tags, and I also add some views for easily looking.