Individual Lab Report

Bikramjot Singh Hanzra
Team B – Auto Pirates
Teammates – Tushar Chugh, Shiyu Dong, Tae-Hyung Kim, William Seto
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1 Individual Progress

In the last week, I worked upon on the following tasks -

- Performing frame transformations using `tf` package provided by ROS.
- Updating the team website for Task 9.2 (Website Graded Check 1).
- Updating the Conceptual Design Review Report.

In the subsections below, I have described in detail the tasks I have completed during the last week.

1.1 Worked on frame transformations using `tf` [1] package provided by ROS.

In our project, we have to transform the coordinate locations of the obstacles from the RADAR frame to the boat frame. We need to perform these coordinate transformations because the RADAR frame and boat frame are not co-located in the world coordinates. So this week, I concentrated on this part of the project.

To perform the coordinate transformations, I used the `tf` package provided by ROS. I implemented the introductory code available on the ROS website. I am currently in the process of writing the code that will be used to perform the coordinate transformations from the RADAR co-ordinate frame to the boat co-ordinate frame.

To provide more insights on my work, I will use a small example. Figure 1 shows a robot with a laser mounted on top of it. The data that the laser captures will be with respect to the laser coordinate frame and we want the data to be with respect to the robot coordinate frame. In order to get the data with respect to the robot coordinate frame, we need to perform the coordinate transformation.

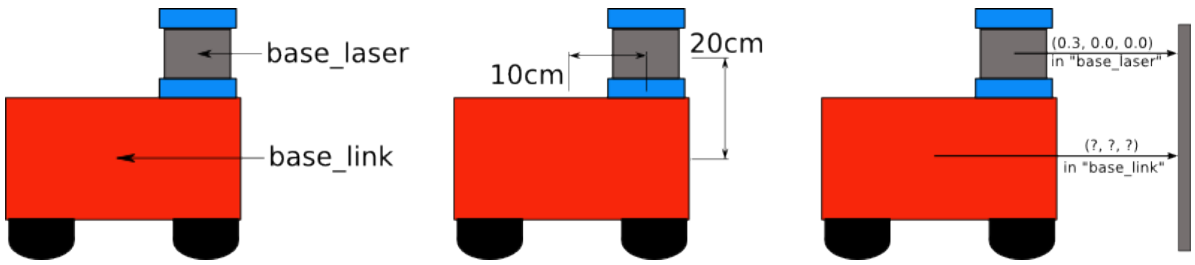

Figure 1: Robot with laser mounted on top of it

1.2 Updating the team website for Task 9.2 (Website Graded Check 1).

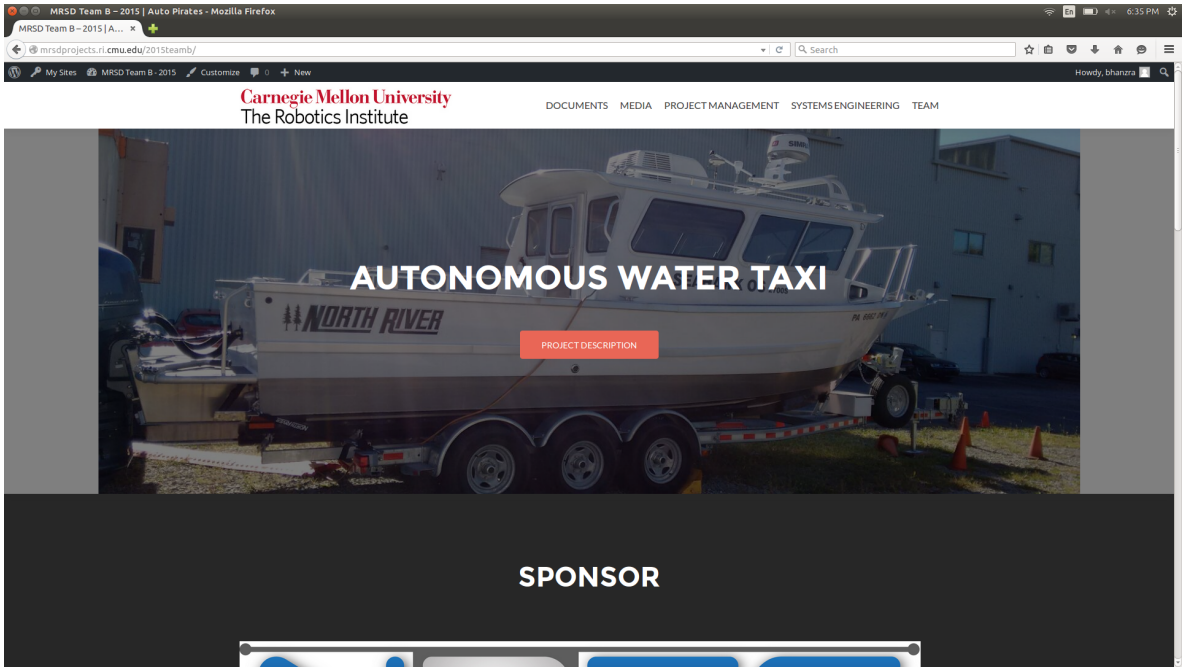

Figure 2: Homepage of Website

Figure 2 shows the homepage of the website. I spend a couple of days on updating the content of the website. This work included –

- Revamping the Homepage of the website.
- Updating the website with the content provided by the rest of the team.
- Uploading all the documents on GitHub and linking them.
- Installing additional plugins.

1.3 Updating the Conceptual Design Review

Based on the feedback given by the Professors and the Teaching Assistants, we needed to make substantial changes in the Conceptual Design Review. Below is a list of tasks that I did in revamping the Conceptual Design Review.

- Incorporated the changes in the Cyber-Physical Architecture as per the reviews given.
- Corrected grammatical errors.
- Compiled the updated Conceptual Design Review.

2 Challenges

Most of my work during this weekend was going through the advanced ROS tutorials. There were some topics, I had not studied earlier. One of which was Quaternions [2] which consumed a substantial amount of time.

Last weekend to prevent damage to the boat due to the extreme weather the NREC team had moved the boat inside the NREC building. Since we are not allowed to work inside the NREC building due to security considerations, we were unable to work on the boat. This disturbed our plan as we had planned to work on the boat.

Another problem I faced while updating the project website was that I do not have administrative privileges to install additional plugins. Stephen (Course TA) helped me in getting the plugins installed.

3 Teamwork

The work done by the rest of team is as under –

- Tushar Chugh – Tushar played major role in updating the Conceptual Design Review and studied state of the art path planning algorithms.
- Shiyu Dong – Shiyu worked on compiling the OpenCPN library and helped in updating the *Risk Management* and *Spring Validation Experiments* sections of the Conceptual Design Review.
- Tae-Hyung Kim – Kim studied state of the art path planning algorithms and helped in updating the *Trade Studies* in the Conceptual Design Review.
- William Seto – William is working on modifying the code of OpenCPN library to get raw data from the RADAR. He also updated the *Description*, *Requirements*, and *User Case Study* sections in the Conceptual Design Review.

4 Work Overview for Coming Week

In the next week, I will be concentrating on –

- Completing the code for frame transformations from the RADAR coordinate frame to the boat coordinate frame.
- William and Shiyu are currently working on getting raw data from the RADAR. Once they finish, I will start writing a ROS node that publishes the data on a ROS topic.

References

[1] `tf` Package Summary
`wiki.ros.org/tf`

[2] Quaternion Wikipedia Page
`https://en.wikipedia.org/wiki/Quaternion`