

Individual Lab Report 07

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16-682 MRSD Project 2

Team B: Space Robot

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Individual Progress

During this week, I was working on April Tags. I learned online tutorials about April Tags and OpenCV. Basically I was trying to use the camera to detect April Tags' location and then using the inverse transformation to get the related location of the camera then to get the localization of our robot.

By searching online together with Dipta, we found that the information and materials about using April Tags for localization were really limited. There was only one April Java version from Umich April lab and also one April C++ version from MIT. We figured out how to use already existed C++ source code from MIT to detect April Tags.

I familiarized with code, and after running we got the position and orientation of the April Tag related to our laptop camera (see figure 1). However we found that because of the limitation from the camera's angle, camera could only detect it with a small range. This might be a key consideration for our next step when we were going to use our wireless camera.

After this, I was more focus on learning ROS tutorial and trying to integrate that C++ source to the ROS node so that we could run it directly in ROS.

Challenges/Issues

One challenge is that when we were following the tutorials online about the C++ source code from MIT to detect April Tags, we failed always in the same step. So Dipta and I emailed Michael Kaess who was the author of that tutorial. We were so lucky that we found him was working in CMU now. He fixed this bug and helped us to understand the tutorial.

Because I haven't touched ROS before, it took a long time for me to go through the basic tutorials and have a better understanding of it. I learned how to create a simple publisher and subscriber by C++ by asking help from Shao-Po. Even though understanding this one, I still found some difficulties in creating the ROS package for existing MIT C++ source. I adjusted the main cpp combining with ROS node features and also the content in CMakefile file. I still haven't figured out to run it successfully yet.

Cross-reference/Teamwork

Brian participated in foot design and partial of whole fabrication. He fixed some Arduino bugs. At the same time, he was helping Nate for lots of 3d printing.

Nate designed and manufactured our new chassis (see figure 2). The new design decreased lot of weight and also more stronger than original one. However of the limitations from 3d printing, still had some problems with the assembly. He helped order our camera and IMUs.

Dipta was together with me working on April Tags. After this, he was working on our Belkin wireless camera that we had ordered last week. He gave the presentation this time.

Plans/Future Work

I will still working on the integration C++ source of April Tags with ROS node. After discussion with Nate, he told me that I do not need to integrate the whole C++ source of April Tags to ROS if that would be too difficult for me. He suggested me that I can integrate the results coming from that C++ source only to ROS node.

After that, I will communicate with Dipta in order to connect our parts of work together.

Figures

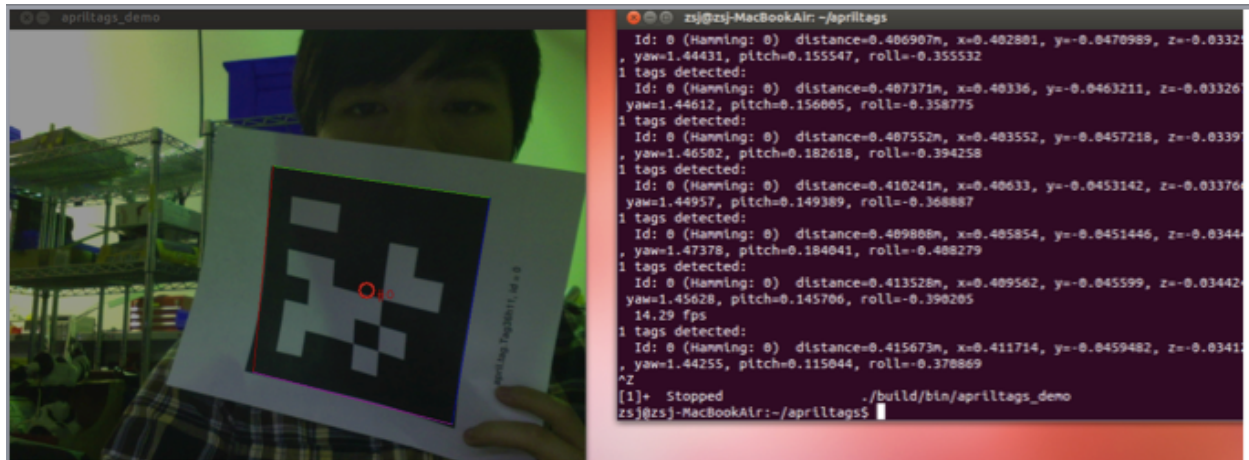


Figure1: MIT C++ source detecting the position and orientation of the April Tag

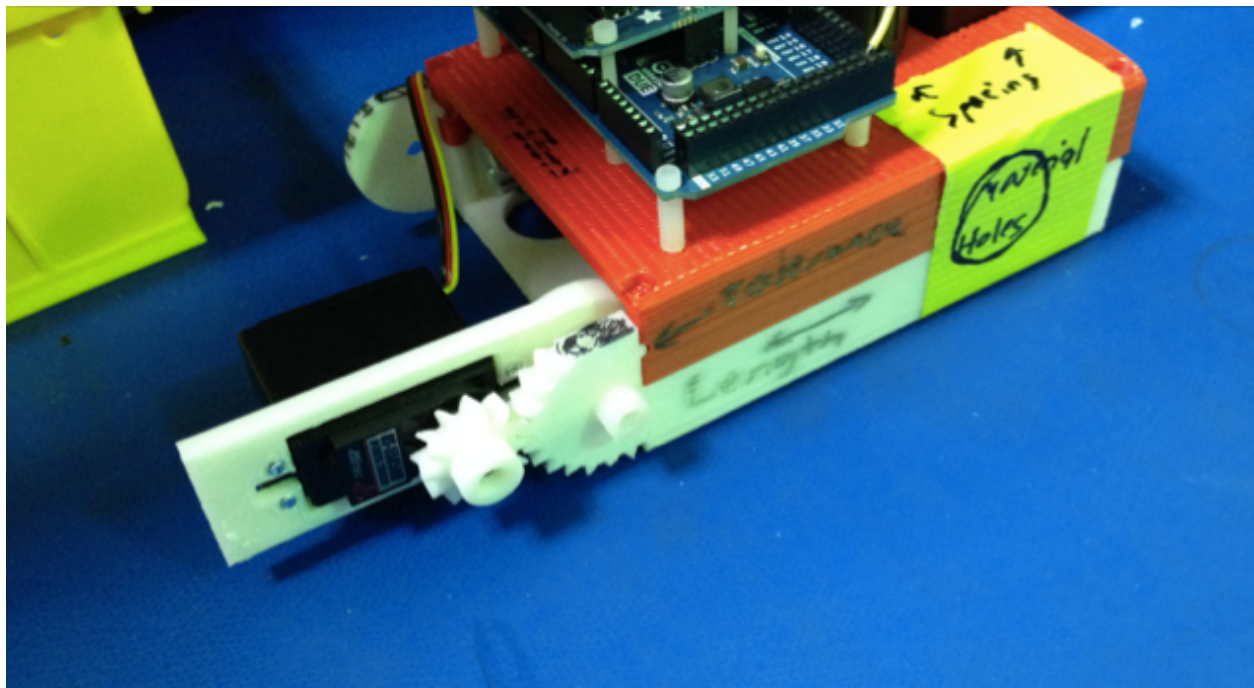


Figure2: New design of the chassis