

MRSD Project

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Team G / Robographer

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Individual progress

Update the kernel in laptop

To fix the intraface crashing problem, we took advice from Sasanka, a Ph.D. student from Katia's lab, and upgraded the kernel of Linux. The command `wget` was used to directly get the new version of kernel from 2.XX.X to 3.19.0-generic from <http://kernel.ubuntu.com/>, the official website for Ubuntu kernels. After the upgrading, the processing speed of intraface was significantly improved. Crashing problem happened occasionally on laptop and frequently on chrome book, after the installation of the new version of Linux kernel, it barely happens on laptops and only occasionally on chrome books.

Adjust pan-tilt units

The current x frame range of April Tag is -40 to 40, the resolution is much lower than the original 480 range. So the pan motor angle must be adjusted as well to make the tracking movement observable. There are three different pan-tilt unit, all the frames are different due to the distortion during the data transferring between intraface and Arduino. The slight different between the mechanical part also influenced the range of frame. Nevertheless, one of the three pan motor and another one tilt motor of the all three tilt motors was installed in inversed direction. All the three pan-tilt unit adjustment and collaboration are done as the one shown in last progress review.

Solve the displacement problem in flocking algorithm

The original algorithm of flocking calculate the distance between turtlebot and the master turtlebot one by one. We have two turtlebots, in this case we need to calculate the distance twice in each loop. That would cause extra pipeline issues because the increased usage of memory. Since the number of turtlebots is only two and the operating range is limited in small room, using average distance to displace individual distance wouldn't make much difference in this scenario, and the pipeline issue was solved easily as well. If we are planning to increase the number of turtlebots in the future, then we'll probably use multi-thread function to manage the memory issue.

Challenges

Kernel Panic Issues

At first the kernel on the official website was not used, which was a bad decision. The former kernel was found on the other websites. After the installing the former

kernel, the kernel panic message was shown on screen when rebooting. We learned that having a backup plan could be critical in this kind of situation since the malfunction of kernel could shut down the whole Linux operating system. To handle this problem, simply switch back to the old version kernel that can be found in the setting environment of Ubuntu advanced options under the grub menu. And reinstall kernel from the official website should help.

Say cheese error

The kick-in say cheese sub-function caused the error "System program problem detected", which comes up when a certain application crashes. In our case, remove crash report files in the /var/crash directory and use the command rosclean to clean the accumulated log files fixed this problem.

Delay issues of the pan-tilt units

Since the Arduino board now subscribe topic from multi-source, the delay of time became more serious. I'm planning to use the nodehandle class in ROS to handle the multi call problems.

Two different version of pan-tilt and intraface system

The one that built by Sida and I is working on laptop, the system was shown on last progress review. On the other hand, Gauri and Rohit is working multi frame Intraface combined with pan-tilt unit which could set the initial position but working without April Tag on chrome books. The combining of these two system could take some time, especially the multi frame and single frame system of the intraface.

Teamwork

Gauri and Jimit finished the flocking behavior on three turtlebots, they teleoperate the master turtlebot to the desired point, and the other two turtlebots will follow.

Rohit set up the initial condition of the pan-tilt unit, so the camera will face the center instead of other position at the beginning.

Rohit and Gauri tried to combine Intraface and the pan-tilt unit code with initial condition.

Sida is working on adjusting single frame issue, she also changed the voice command.

Future Plan

1. Gauri and Jimit finished the flocking function without the elevation part, which is the part that holds the camera. Since the blind spot issue remains, we need to figure out how to solve this problem. The blind spot issue was mentioned in the last ILR, stemmed from the height of the April Tag, we have two blind spot. For now there are two solution: lower the position of April Tag or use visual odometry in the blind spot.
2. Rohit will replace two tilt servo motor which is out of function.
3. I will work on the arrangement of three turtlebot use the feedback angle from April Tag.
4. I will merge Rohit's initial position code to the current Arduino code.
5. Everyone will work on the integration of subsystems.