Control/Scan Publisher/Subscriber ROS

In preparation for the following Vector Field Obstacle Avoidance assignment due before the mid-term, we would like to you build upon the simple publisher and subscriber packages that you set up in last week's practical.

In the Stage Simulator from last week's practical, you should have a simple robot with laser scanner within a maze. We would like you to have your own control code to move this robot around, instead of relying on the keyboard_teleop. In addition to this, it is important that you are able to interpret and manipulate range data coming from the laser scanner. Together, you will eventually be able to write a control loop, reading sensors and reacting with drive commands.

1. Create a new ROS package "control" with ROS dependences "rospy", "roscpp" and "geometry_msgs"
2. Create a new ROS node "drive", that will publish velocity commands to the simulated robot. This will rely on "geometry_msgs/Twist". Using last week's "talker" node, you will replace the "std_msgs/String" message type with that of "geometry_msgs/Twist". You are expected to investigate the data structure of "geometry_msgs/Twist" and learn how to assign new values. These messages will be published to the topic "cmd_vel".
3. Create a new ROS node "scan_stats", that will subscribe to the topic "base_scan" from the Stage Simulator. Reuse the majority of the code from the "listener" node from last week's practical, and alter the callback to loop over the individual range values. Using "ROS_INFO", we would like you to print the average and median range collected from "base_scan".
4. In extension of "scan_stats", we would like you to publish the average as well as the median laser can values on their own topics, named "/base_scan/average" and "base_scan/median" respectively.

The following velocity vector is to be used for the assignment:

    '[2.0, 0.0, 0.0]' '[0.0, 0.0, -1.8]'

It is required that a "rqt_graph" of both your "cmd_vel", "base_scan/average" and "base_scan/median" topics. Those are to be submitted in a PDF document along with your workspace in a tarball.

This assignment is to be submitted to the Moodle at 00:00 12.02.2014.