HRW ROS Assignment 1 Week 1 Part 1

When there is no box, the sensor publishes the maximum range value which is the distance to the conveyor belt and it reports the distance to the top surface of the box when it does detect one. However, there is also an indication in the data sheet that, although the advertised maximum range is 2.0m, the usable range is only 1.9m and any value above that is sensor noise, which means, there can be false positives in the sensor data.

So, in this part, you will MODIFY `week1_assignment1.py` to achieve the following goals:

1. Subscribe to the `/sensor_info` topic.
2. Compute the height of the box from the sensor reading.
3. Filter out the false positives from the sensor due to sensor noise.

Please upload a screenshot of the code you have implemented for this part.

HRW ROS Assignment 1 Week 1 Part 2

Now that you have the valid height information only, you will create a new message type called `BoxHeightInformation.msg`, which contains a place holder called "`box_height`" which is a floating point number. This way you can share detected box height information with other ROS nodes in your application. You can complete this part WITHOUT MODIFYING `week1_assignment1.py` as follows:

1. Create a new message type `BoxHeightInformation.msg` in the same folder where `SensorInformation.msg` file is located.
2. Add a place holder `box_height` of floating point number type in this message file.
3. Generate the new message type as instructed in the lecture

Upload a screenshot of the command:

```
> rosmsg show hrwros_msgs/BoxHeightInformation
```

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HRW ROS Assignment 1 Week 1 Part 3

Now, you are ready to publish a new ROS topic "`/box_height_info`" ONLY when a valid box is detected. You are not supposed to publish anything when the detected box height was invalidated due to sensor noise.

You can complete this part by finishing doing the next changes on the `week1_assignment1.py` script:

1. Create an object of the new `BoxHeightInformation` message type ONLY when you need it, that is only when the detected box height is valid.
2. Create a publisher for the new message type in the main python module.
3. Publish the box height information on the `/box_height_info` topic ONLY when the detected box has a valid height.

Once you have finished this, and the previous two parts of the assignment, you can run the system.

To run it follow this steps:

Step 1: Start up a terminal, source your setup files, and launch the `rosmaster`:

```
$ roscore
```

Note: ALWAYS SOURCE YOUR SETUP files whenever you start a new terminal. It is assumed you will do this all the time and this instruction will not be repeated in the future when you are asked to start a new terminal.

Step 2: In a new terminal, start the sensor info publisher

```
$ rosrun hrwros_week1 sensor_info_publisher.py
```

Step 3: In a new terminal, run the `week1_assignment1.py` script with

```
$ rosrun hrwros_week1 week1_assignment1.py
```

Step 4: In a new terminal, run the command

```
$ rostopic list
```

Step 5: If you see the topic `/box_height_info` listed, verify that it has a publisher with the command

```
$ rostopic info /box_height_info
```

Step 6: Finally, use the command

```
$ rostopic echo /box_height_info
```

And wait until you see 5 messages of type `BoxHeightInformation`. Terminate this command with `Ctrl+C` and upload a screenshot of the output.

This completes HRW ROS Assignment 1 Week 1