# AA 274A Final Project

Group 21
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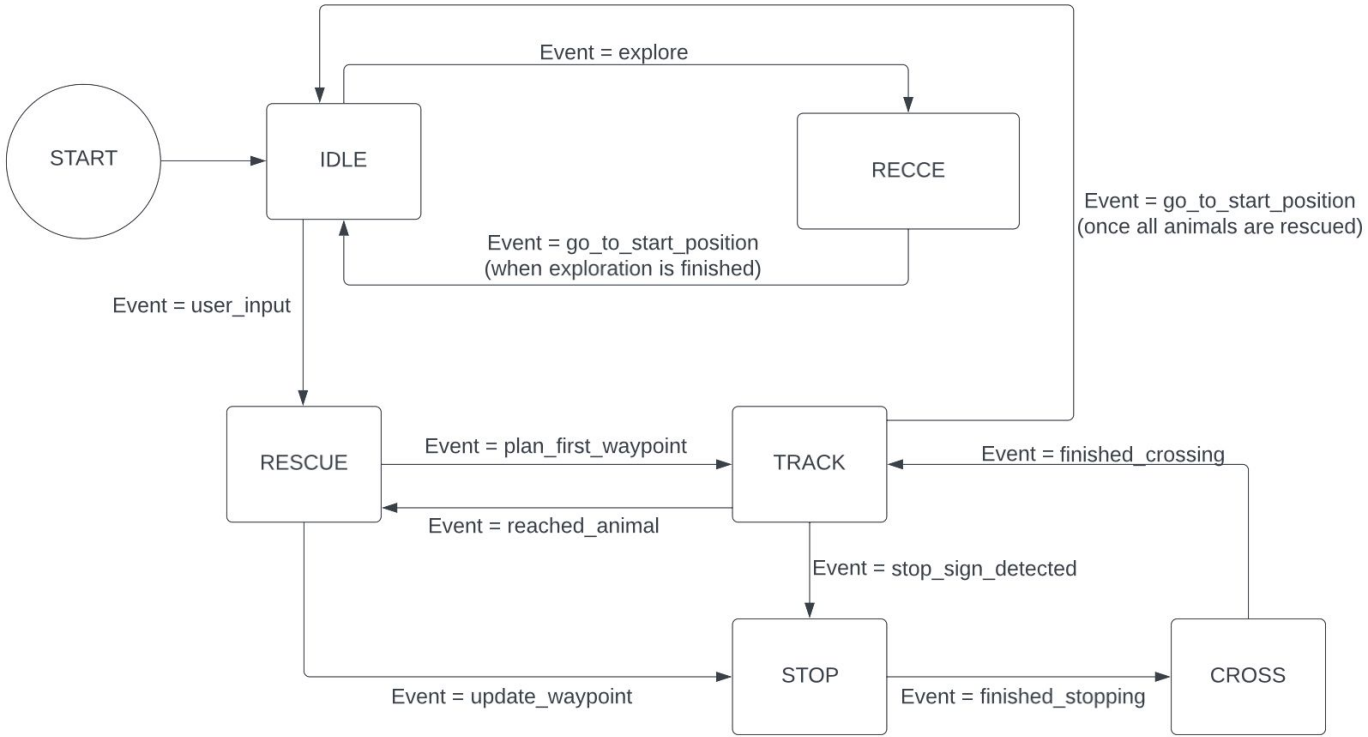
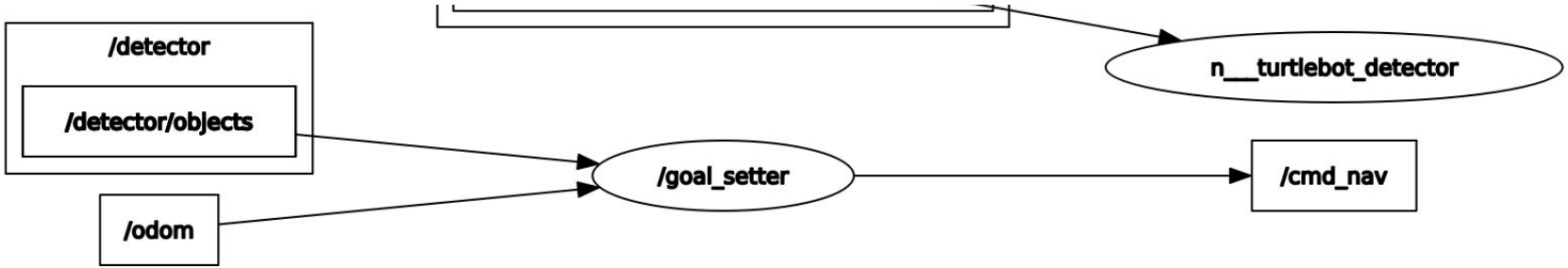
# Finite State Machine



# Goal Setter

- The **/goal_setter** node has two functions- to publish the predefined waypoints in the exploration phase to help the robot map the environment, and to publish the locations of the animals in the rescue phase.
- It publishes these locations to **/cmd_nav** topic. It subscribes to the /odom topic to get the current location of the robot, and to the **/detector/objects** topic to store the get the animal locations.

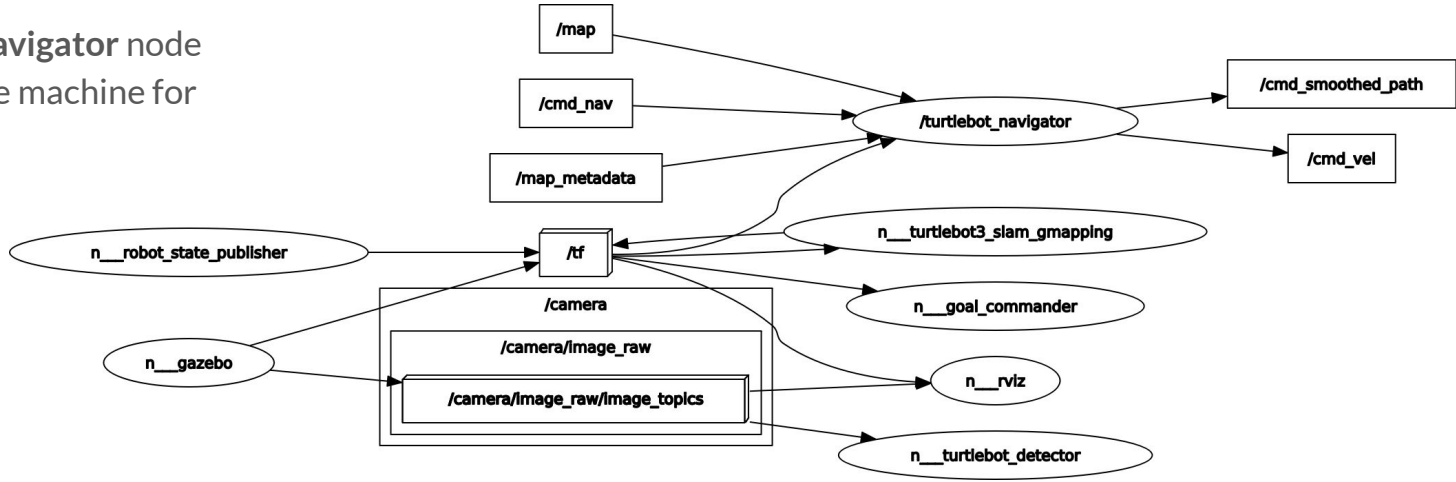


# Animal Location Marker

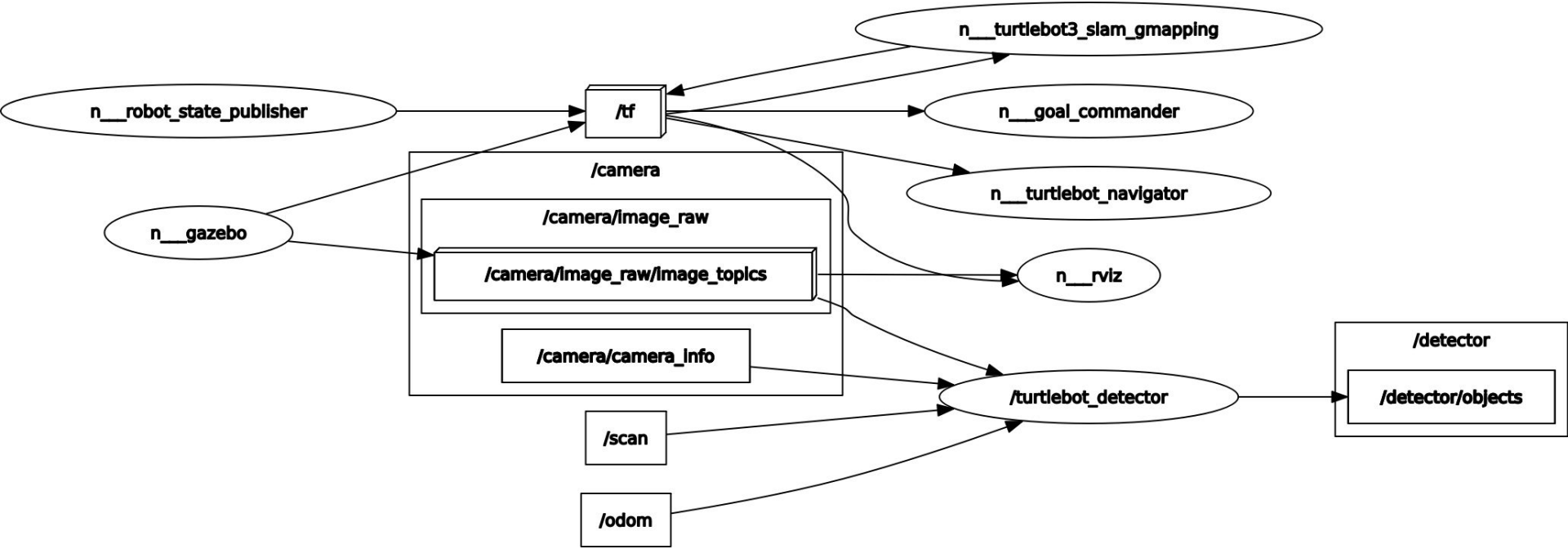
- **/animal_location_marker** node publishes a marker in RVIZ at the location where an animal is detected. It subscribes to **/detector/objects** topic and publishes to **/animal_location**.

# Navigator

- **/turtlebot_navigator** node runs the state machine for the robot.



# Detector


n__turtlebot3_slam_gmapping
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/tf
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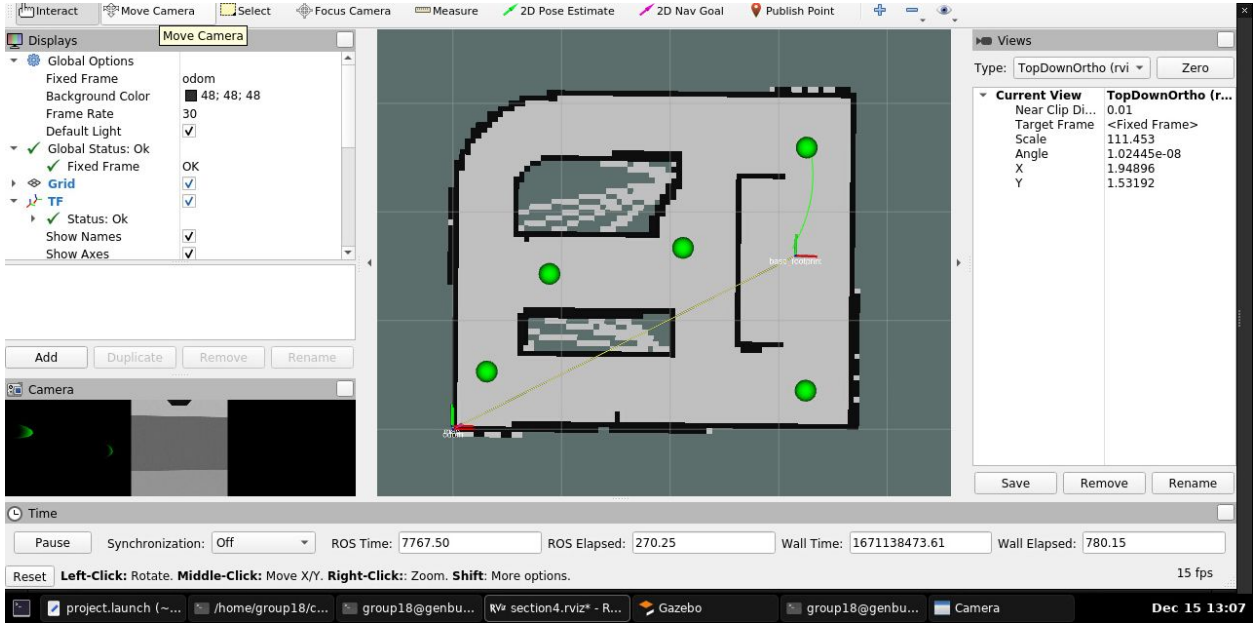
/camera
n__turtlebot_navigator
/camera/image_raw
n__gazebo
/camera/image_raw/image_topics
n__rviz
/camera/camera_info
/detector
/turtlebot_detector
/detector/objects
/scan
/odom

# RVIZ Command Center Visualization

- Robot state
- Planned trajectory
- Current map
- Markers at each animal location



# Extensions Implemented

- **Stop Sign Detection**
  - CNN uses robot's camera input to detect a stop sign -> robot stops for 3 seconds before continuing its path
- **Publish Markers at Animal Locations**
  - CNN uses robot's camera input to detect animals and publishes the location of the object to the rostopic *"/detector/objects"*
  - Marker node subscribes to this topic and publishes a marker at each location
- **Publish Animal Sounds**
  - Publish the appropriate animal sound at the detected animal location
- **Using RRT* instead of A* for Path Planning**
  - RRT* for path planning in both exploration and rescue