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Model-based diagnosis framework with web application

Software development project

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Project Members

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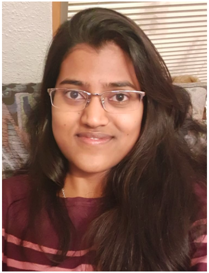


Chandrika

Motivation

- Analyzing robot operation to determine the fault and repair.
- Present work - Launch files, display the published messages in web page for analyzing robot faults.
- Problem - Lack of online tools available for analyzing robot operation for diagnosis and fault detection.

Problem Analysis

- Model-based diagnosis system can be used for long term monitor and diagonize ROS based systems.
- Various diagnosis values stored in database for online fault diagnosis.
- Messages published are diagnosis message and observation message.
- Contents - stamp, sequence number, frame id, observation, observation message, verbose observation message.

Solution approach

- Multiple ROS nodes are launched using "roslaunch" command.
- Launched diagnosis values are stored in database created using SQlite3.
- Displaying the diagnosis values(diagnosis and observation messages) using Flask framework in webpage for fault analysis.

Softwares used

ROS

Framework for writing robot software

Developing webpage

Flask
web development, one drop at a time

HTML

creating documents to be displayed in webpage

Overall framework

python

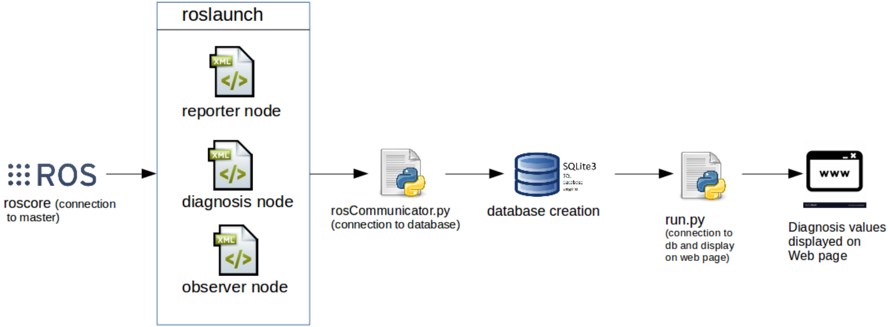
SQLite3
SQL database engine

Database creation

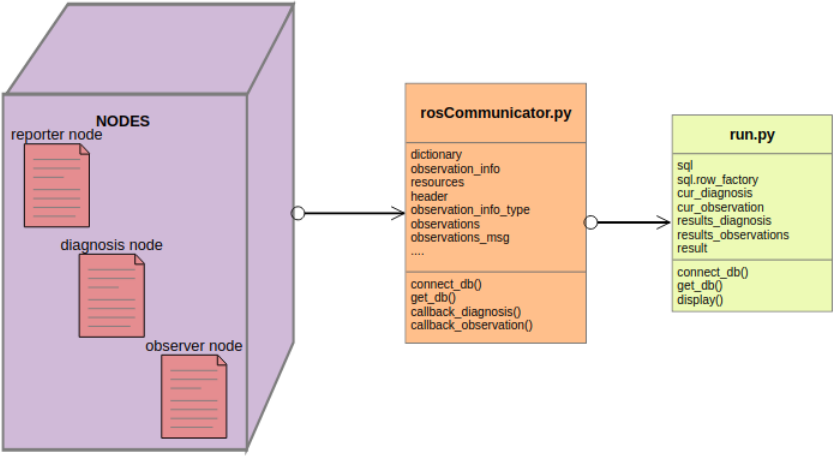
Configure the nodes

YML

Process flow diagram



Technical Details



NODES

reporter node

diagnosis node

observer node

rosCommunicator.py

dictionary
observation_info
resources
header
observation_info_type
observations
observations_msg
....

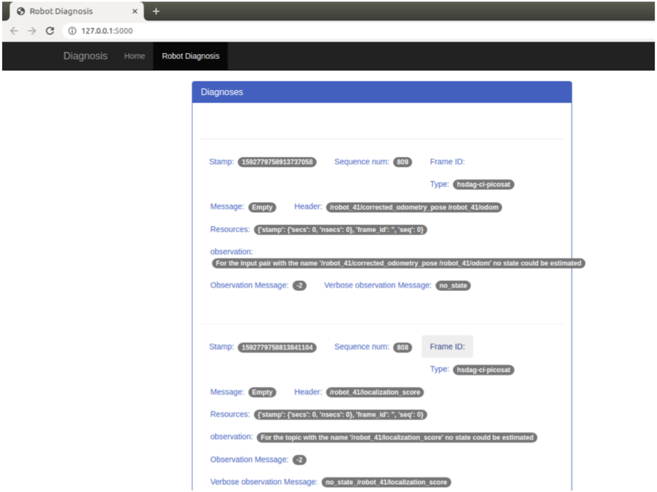
connect_db()
get_db()
callback_diagnosis()
callback_observation()

run.py

sql
sql.row_factory
cur_diagnosis
cur_observation
results_diagnosis
results_observations
result

connect_db()
get_db()
display()

Webpage



Diagnoses

Stamp: 1592779758913737058 Sequence num: 809 Frame ID:

Type: hsdag-ci-picosat

Message: Empty Header: /robot_41/corrected_odometry_pose /robot_41/odom

Resources: {'stamp': {'secs': 0, 'nsecs': 0}, 'frame_id': '', 'seq': 0}

observation: For the input pair with the name '/robot_41/corrected_odometry_pose /robot_41/odom' no state could be estimated

Observation Message: -2 Verbose observation Message: no_state

Stamp: 1592779758813841104 Sequence num: 808 Frame ID:

Type: hsdag-ci-picosat

Message: Empty Header: /robot_41/localization_score

Resources: {'stamp': {'secs': 0, 'nsecs': 0}, 'frame_id': '', 'seq': 0}

observation: For the topic with the name '/robot_41/localization_score' no state could be estimated

Observation Message: -2

Verbose observation Message: no_state_/robot_41/localization_score

Thank you