GeiCar - Software Architecture - ROS2 Humble

Nos noeuds

Peu fonctionnel

Raspberry PI 3 - ROS2 Humble

joystick_ros2

/joy
axes [-1;1]
buttons {0,1}

joystick_to_cmd_node

/joystick_order
start {true,false}
mode {0,1,2}
throttle [0;1]
steer [-1;1]
...

/hook
type {"detect","lock","fdc"}
status {true,false}

/consign_speed
float speed [m/s]

/consign_steer
float steer [deg]

car_control_node

/motors_order
right_rear_pwm [0;100]
left_rear_pwm [0;100]
steering_pwm [0;100]

can_tx_node

/motors_feedback
steering_angle [-1;1]
right_rear_speed RPM
left_rear_speed RPM

can_rx_node

/hook
type {"detect","lock","**fdc**"}
status {true,false}

/hook
status {true,false}
x
y
distance

vision

usb_cam_node

/image_raw
height
width
encoding
is_bigendian
step
data

/avoidance_parameters
bool left
bool big

motion_planning

/distance
total [cm]
last [cm]

/motors_feedback
left_rear_odometry *Nb of pulses*
right_rear_odometry *Nb of pulses*
right_rear_speed RPM
left_rear_speed RPM

odometry

/wheel_odometry
nav_msgs/Odometry
pose
twist

/fixed_obstacles
bool fixed_obstacles[ ]
/obstacles
int16 area[ ] : {-1,26,...}

obstacle_detection

/us_data
front_center [cm]
front_left [cm]
...

/imu/data
quaternions
linear acceleration [m/s²]
angular rate [rad/s]

imu_filter_madgwick

/imu/data_raw
angular_velocity [rad/s]
linear_acceleration [m/s²]
/imu/mag
magnetic_field [T]

/scan
angle_min [rad]
angle_max [rad]
angle_increment [rad]
ranges [m]
...

rplidar_ros

side_detection

/obstacle_side
bool left_lidar
bool right_lidar
float32 right_min
float32 left_min

/obstacles_id
bool obstacle_left;
bool obstacle_middle;
bool obstacle_right;
bool big_obstacle;

obstacle_avoidance

/navigation
start
dclatitude
dclongitude
dcaltitude

map_navigation

/gnss_data_dc
latitude [°]
longitude [°]
altitude [m]
...

/orientation
bool same_orientation

car_orientation

/imu/data_dc
quaternions
linear acceleration [m/s²]
angular rate [rad/s]

Jetson Nano - ROS2 Humble (Docker)

Ethernet

NUCLEO F103RB

function 0
Control motors from CAN orders

function 1
Send US data

function 2
Send motors data (odometry, speeds, steering angle)

function 3
Steering calibration

function 4
Send communication ACK (system check)

function 5
Hook locking

CAN Bus

NUCLEO L476RG

function 0
Send IMU data (magnetic, angular rate, linear acceleration)

function 1
Send GNSS data (latitude, longitude, altitude)

function 2
Send communication ACK (system check)

Raspberry Pi 3 - DAMAGED CAR

can_rx_node

/imu/data_raw_dc
angular_velocity [rad/s]
linear_acceleration [m/s²]
/imu/mag_dc
magnetic_field [T]

imu_filter_madgwick

ROS2 network