Barelang FC – Global System Description

Figure 1 describes an overview of the Barelang FC system, including hardware and software. The hardware consists of sub-controller OpenCR, which handles the connection to sensors and actuators. The OpenCR is connected to the main controller (Jetson Xavier NX) using Dynamixel U2D2. The communication between the main controller and sub-controller used Dynamixel 2.0 protocol. On the software side, our system consists of ROS2 and UPennalizers Frameworks. The UPennalizers Framework handles robot motion (gait, kick, standing-up motion, etc.) and interfaces to the robot hardware. The UPennalizers framework communicates with ROS2 through local UDP communication. Therefore, we create a ROS2 node as a motion bridge to pass data from ROS2 messages to UPennalizers.
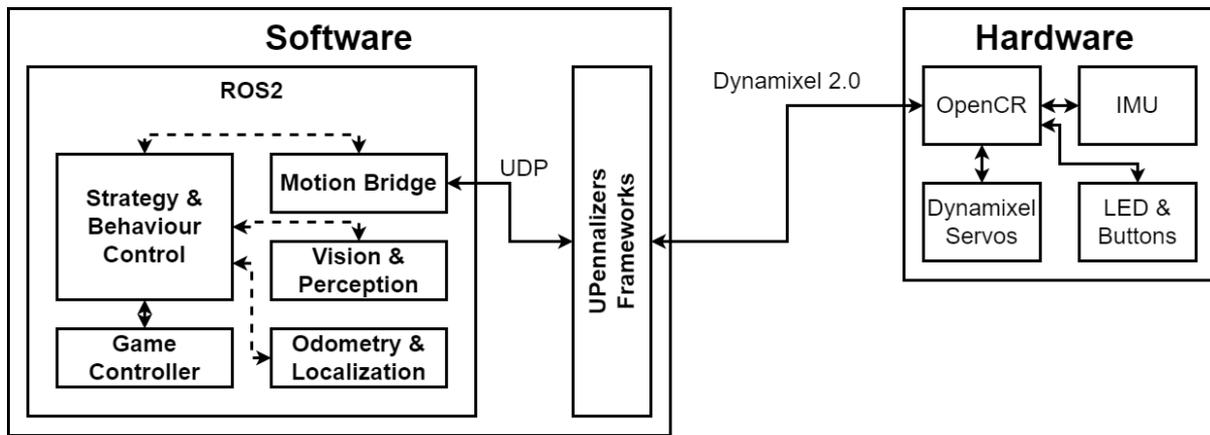

Figure 1. Barelang FC Hardware & Software Overview

Figure 2 describes the ROS2 computation graph of the Barelang FC robot. Some nodes are cloned from open-source ROS packages, for example, usb_cam and darknet_ros nodes. The main_strategy node handles overall robot behavior control by communicating with other nodes through ROS messages. In addition, we create a game_controller node, which parses data from the game controller for listening instructions from software. However, for team coordination, we use the ROS message with multiple machine setups.
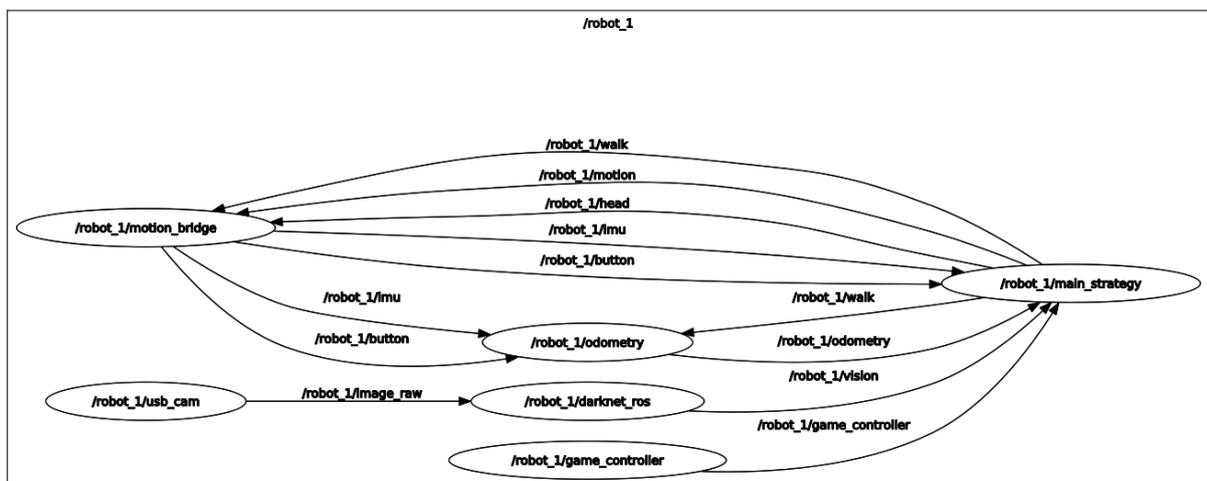

Figure 2. Barelang FC - ROS2 Computation Graph