Robot Configuration Datasheet

The configuration of the robot contains all the data regarding the robot's location, direction, orientation, arm pose, sensor pose, and objective completion (puck quantity).

Pose (X,Y,θ,Z*)
Pose describes where the robot is in 2d space, and its angle with respect to an axis.

- X : The distance of the robot from the origin along the X axis
- Y : The distance of the robot from the origin along the Y axis
- θ : The angle of the robot's rotation with respect to the X axis
- Z : A psuedo-variable that describes whether the robot is traversing over a log. This variable is expected to be calculated using the IMU data.

IMU (Yaw, Pitch, Roll)
IMU is a listing of orientation of the robot in 3d space.

- Yaw is the value determined by the compass, and gives data on the facing direction of the robot.
- Pitch is a value expressing the forward tilt of the robot. (ex. nodding)
- Roll is the value expressing the lateral rotation of the robot. ("do a barrel roll")

Arm (Φ_1,Φ_2,Φ_3,E)
Arm is a variable describing the entirety of the position of the arm of the robot, and it's end effector via a set of the three angles the comprise it's configuration.

- $\Phi_{1\text{-}3}$: The three angles of the joints of the robot.
- E : The state of the electromagnet that acts as the end effector (grabber)

Wheel ($\theta_{w1},\theta_{w2},\theta_{w3},\theta_{w4},\omega_1,\omega_2$)
Wheel data contains the angular direction of each wheel with respect to the (Robot? X-Axis?) and the rotational velocity of the wheels, as determined by the H-Bridge

- $\theta_{w1\text{-}4}$: The angular direction of each wheel
- $\omega_{1,2}$: The rotational velocity of the wheels, from -255 (full reverse) to 255 (full ahead)

Pucks (P)
Pucks is a single variable stating how many objectives (pucks) have been acquired and stored on the robot.

- P : The number of pucks acquired

IR Servo ($\theta_{IR1},\theta_{IR2},\theta_{IR3},\theta_{IR4}$)
IR Servo is the angular position of each of the servos which control the infrared sensors.

- $\theta_{IR1\text{-}4}$: The angular position of a servo which controls the direction the IR sensor

faces.

Distance (D,V*)

Distance is the accumulated value read from the rotary encoder since last read. Speed of the robot is determined through change in distance traveled over change in time.

- D : The quantity of actions recorded from the rotary encoder.
- V : A psuedo-variable which is equal to $\Delta D/\Delta t$, where t is time.