JAX Manipulator

An Inverse and Forward Kinematic Challenge

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Robótica e Sistemas Autônomos, Senai Cimatec

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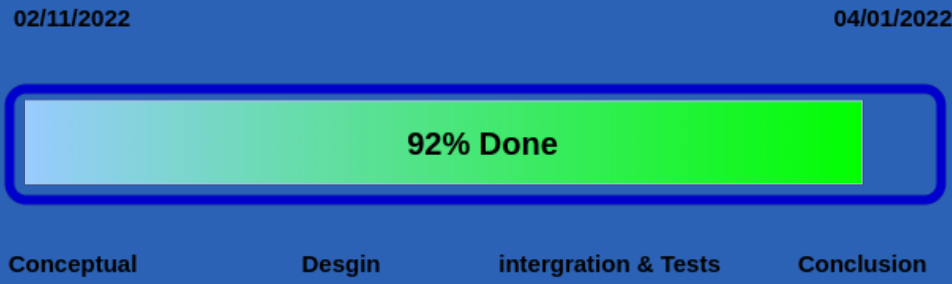
Sistema FIEB | SENAI CIMATEC

PELO FUTURO DA INOVAÇÃO

Cronogram

The project had the start in**02/11/2022** and has its end aimed to **04/01/2022**.

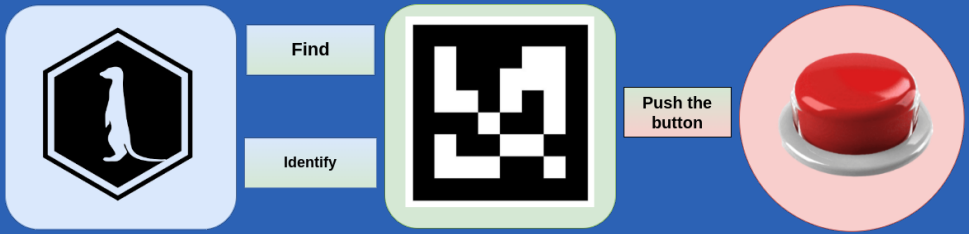


Introduction

The **manipulators are autonomous** tools that have a lot of functions. Their use is increasing a lot and in **many fields**. The **Jax Manipulator** challenge has a goal to use the **JeRo Timon** to an autonomous task.

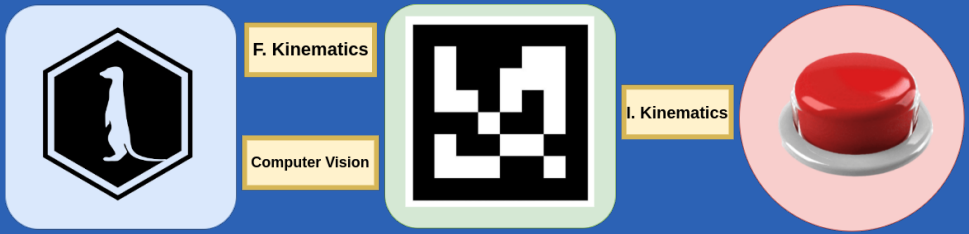
The Task

The tasks require that Jero Timon manipulators **find a tag that** is placed in a specific position. after the tag is found, the manipulator should **push a button** that is located at an box.

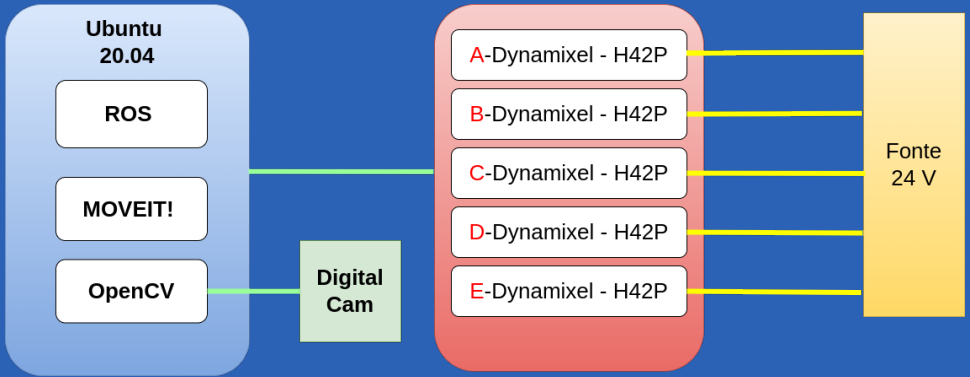


Functionalities

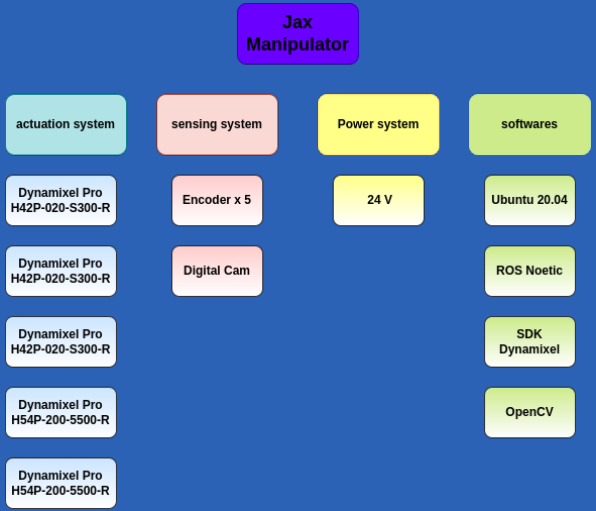
The robot is able to identify the tag with applications of computer vision tools. The moves in the space are acquired by the trajectory control that uses both forward kinematics and inverse kinematics.



Intergration



System


Jax Manipulator
actuation system
sensing system
Power system
softwares
Dynamixel Pro H42P-020-S300-R
Dynamixel Pro H42P-020-S300-R
Dynamixel Pro H42P-020-S300-R
Dynamixel Pro H54P-200-5500-R
Dynamixel Pro H54P-200-5500-R
Encoder x 5
Digital Cam
24 V
Ubuntu 20.04
ROS Noetic
SDK Dynamixel
OpenCV

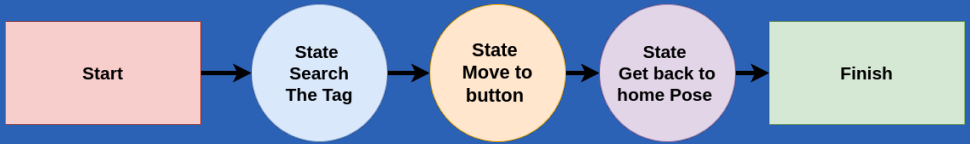
Tests

Many Tests were performed to verify the functionality of the manipulator. Some tests were:

1. Verify the URDF of the robot;
2. Verify the behaivor of the joints;
3. observe the movement of the manipulator;
4. Observe how the forward and inverse kinematics perform.
5. Detect the tag in the enviorment.
6. Visualze the state of robot.

State Machine

To perform the challenge, the robot must follow a state machine.



Demostration

Questions?

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