

# Robotic Gait Simulator



Sheridan

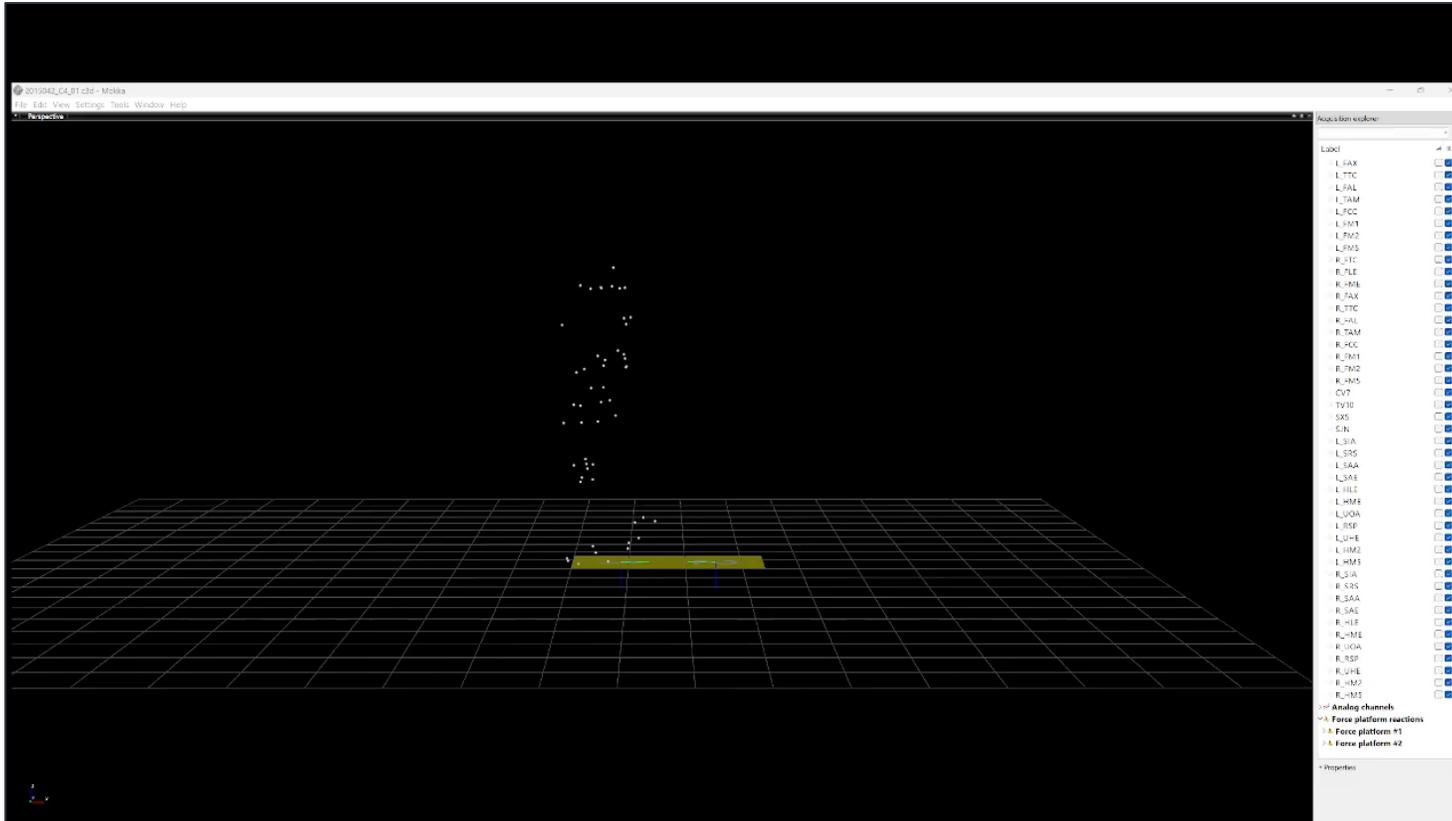
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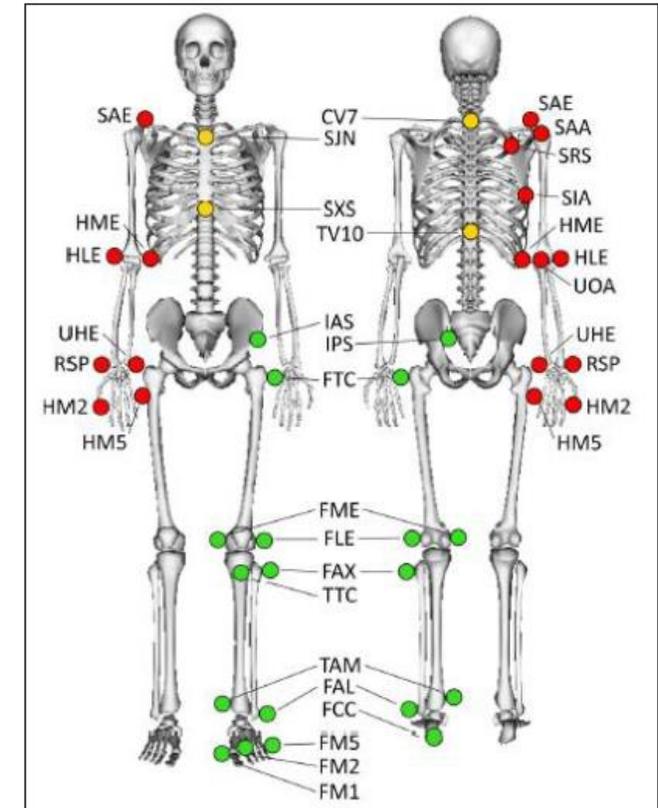
# Project Objective

- To Improve prosthesis comfort for persons with one or more lower-limb amputation.
- To Use an “Integrated Digital Twin” approach to improve and optimize design.
- To Incorporate Robotics (physical system) to validate and improve “Digital Twin” model.

# Prosthetic Gait Pattern Modeling

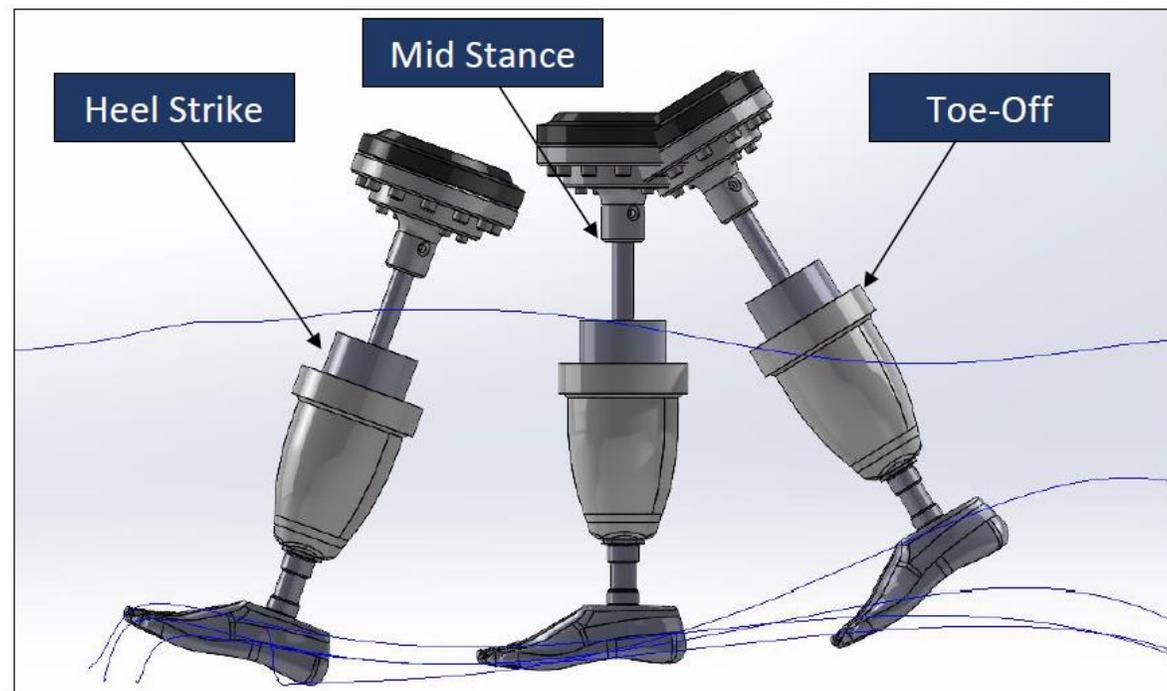


Sensor Data Used to Generate Robot Gait

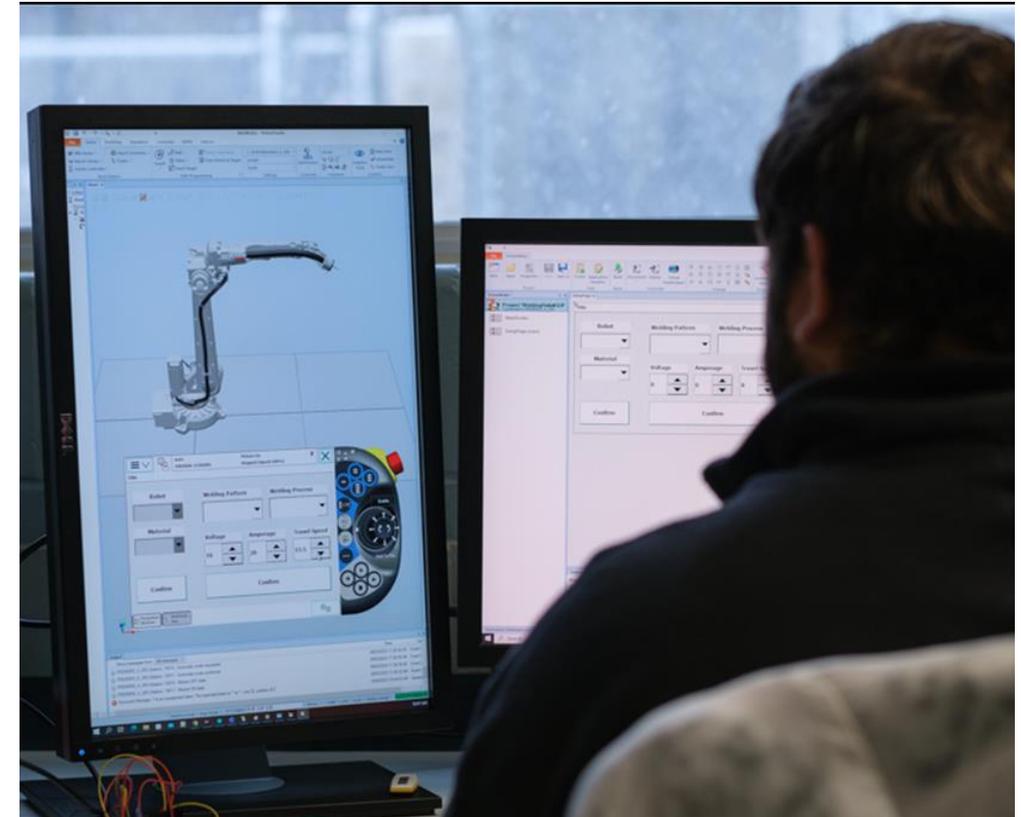
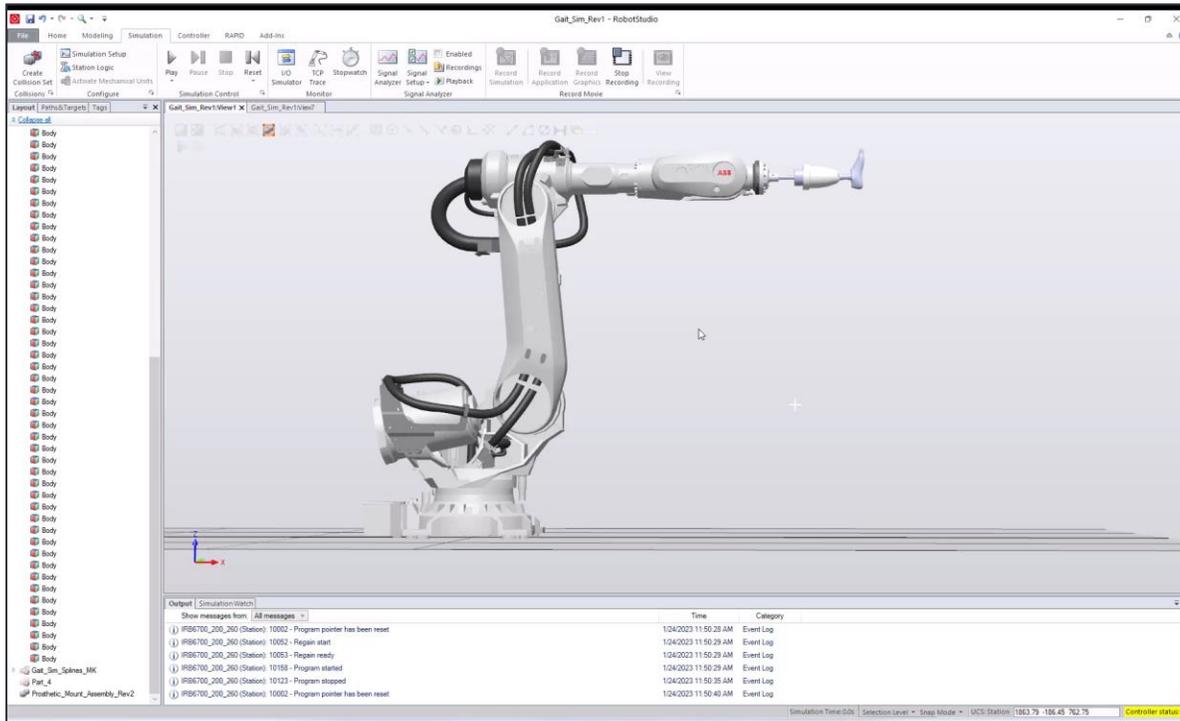


Gait Data Markers

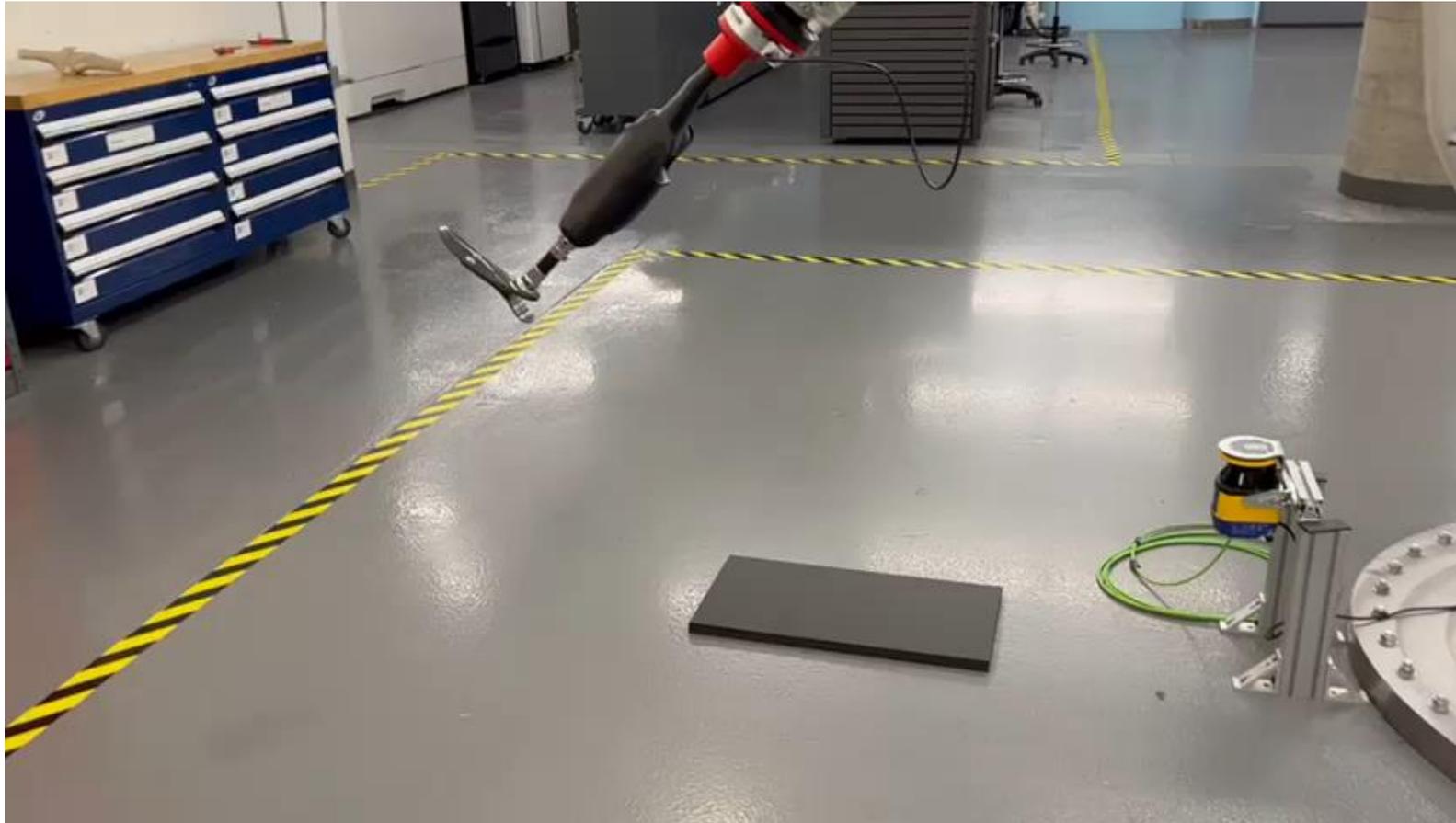
# Prosthetic gait pattern modeling



# Robot Studio Simulation

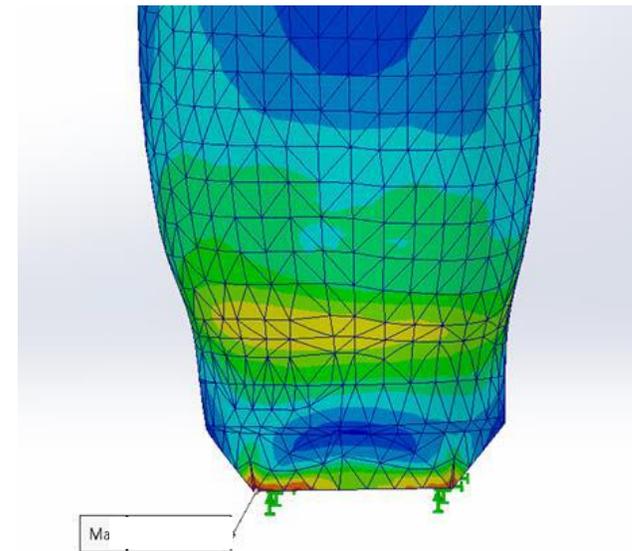
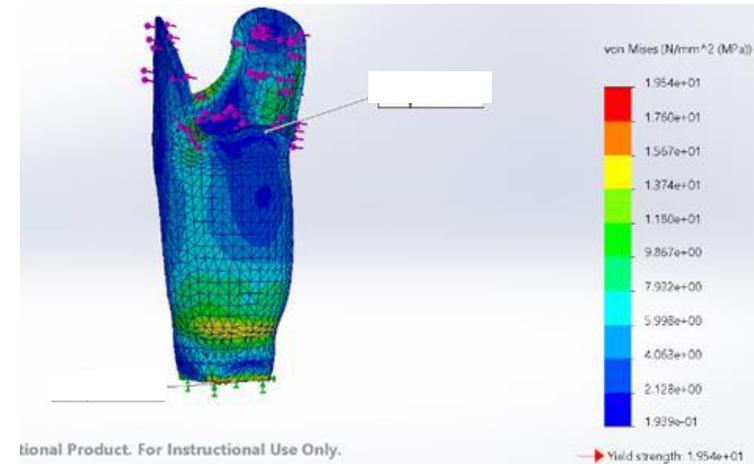


# Gait Tests



Preliminary Gait Test

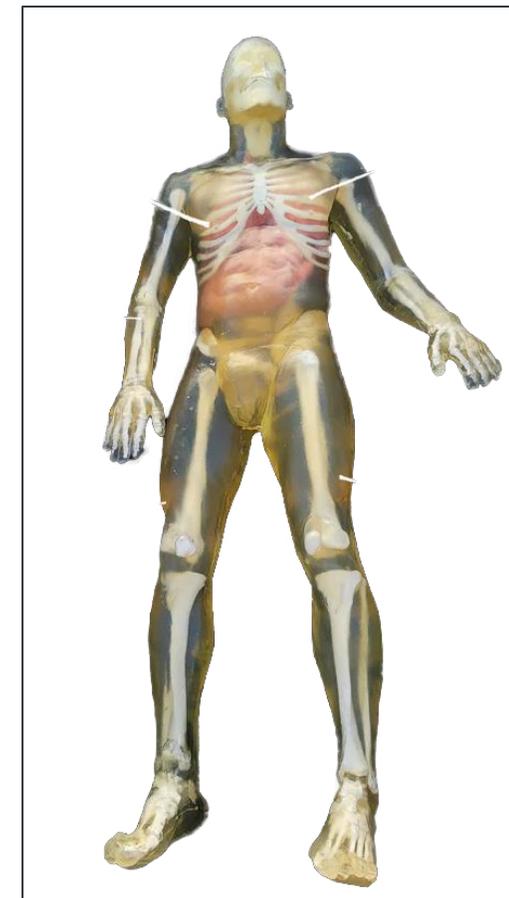
# Finite Element Analysis



# Prosthetic Residuum Prototype



3D Model of Prosthetic



Ballistic Test Dummy. Source: Ballistic Dummy Lab.

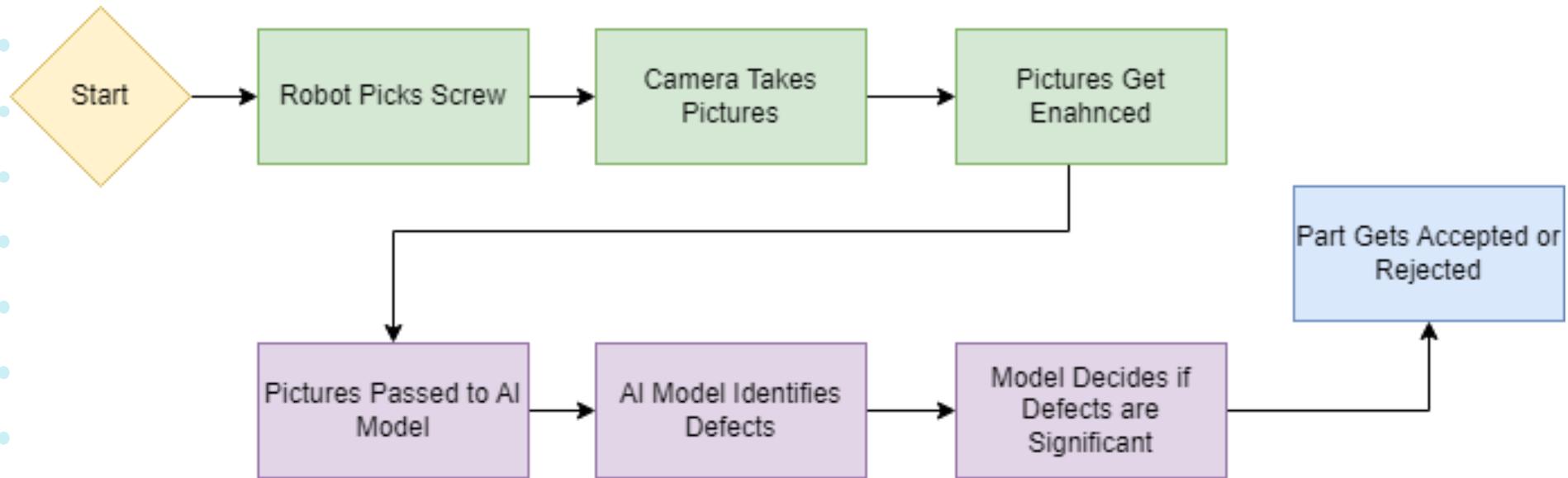
# Ongoing Work

- Mounting and Testing of Updated Residuum model with Embedded Sensors on ABB Robot.
- Testing Residuum model in various configurations (patient weight, walking on a slope etc.)
- Sensor Data Collection.
- Refinement of “Digital Twin” using sensor data from physical system.

# Robotic Imaging System with AI for Defect Inspection

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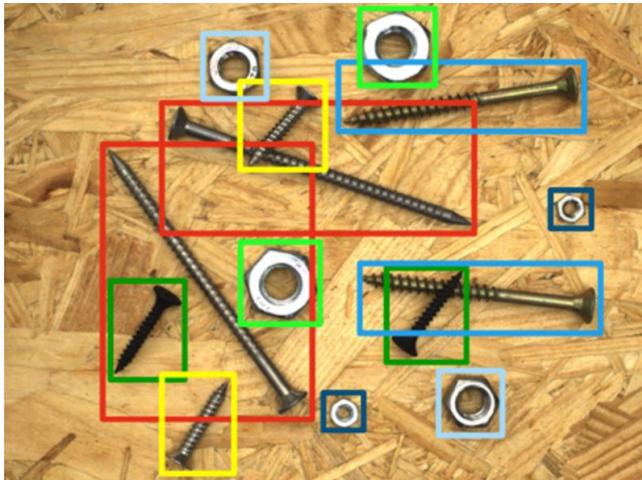
# The Process



# Image Gathering



# AI Model

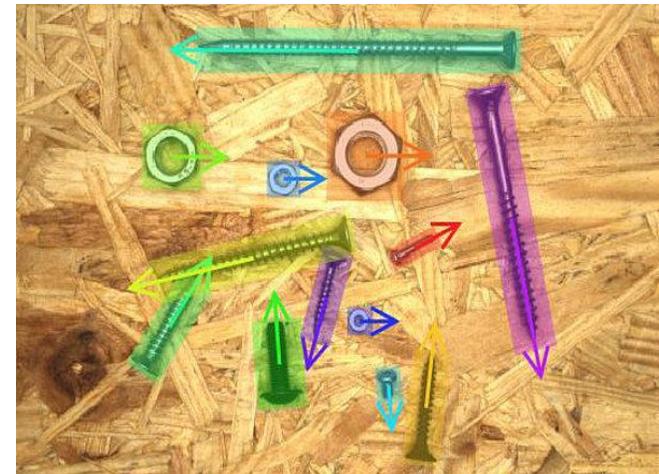


Annotate



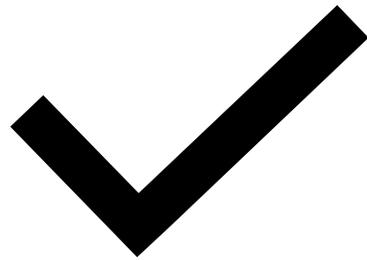
Detectron2

Model

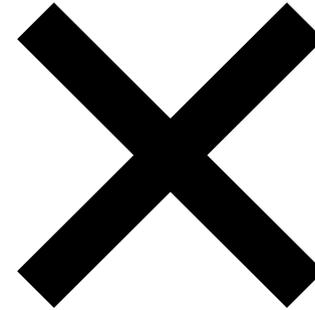


Detection

# Decision



The Part is Accepted



The Part is Rejected