

LUT Digital TWINS & DigiEDUHACK

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Presented to you by: Hackathonzz

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An engineering group in mining and rock excavation, metal-cutting and materials technology.

- Exploration
- Surface drilling
- **DRILLING AND BOLTING (Theme)**
- Loading and hauling
- Mechanical cutting
- Rock tools
- Mobile crushing and screening
- Stationary crushing and screening
- Breakers, booms and demolition tool
- Parts and services
- Automation
- Rock drills





CHALLENGE 1

Develop an algorithm to recognize and classify the collisions from the given data.

- The data includes boom control signals, joint positions, a gyroscope, an accelerometer and a pressure sensor and the collision classification

ALGORITHM

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We have...

- simulation video from real life
- data of the simulation

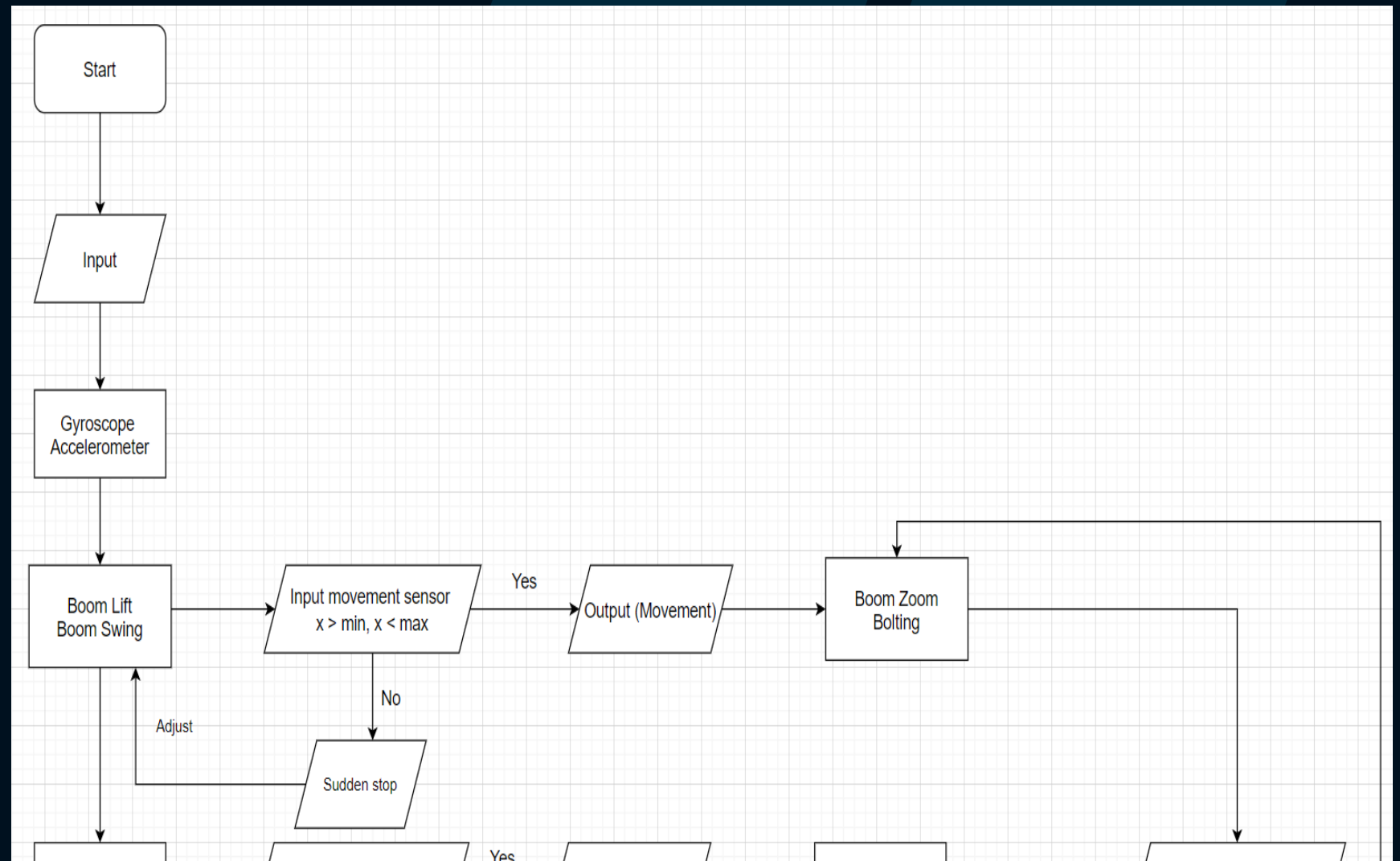
Purpose

- To predict the collision by digital twin
- Analyze and know the part that causes the collision
- Less risky, less costly, safer in real life
- Create a replica of a real-life object in digital and simulate it to predict the outcome

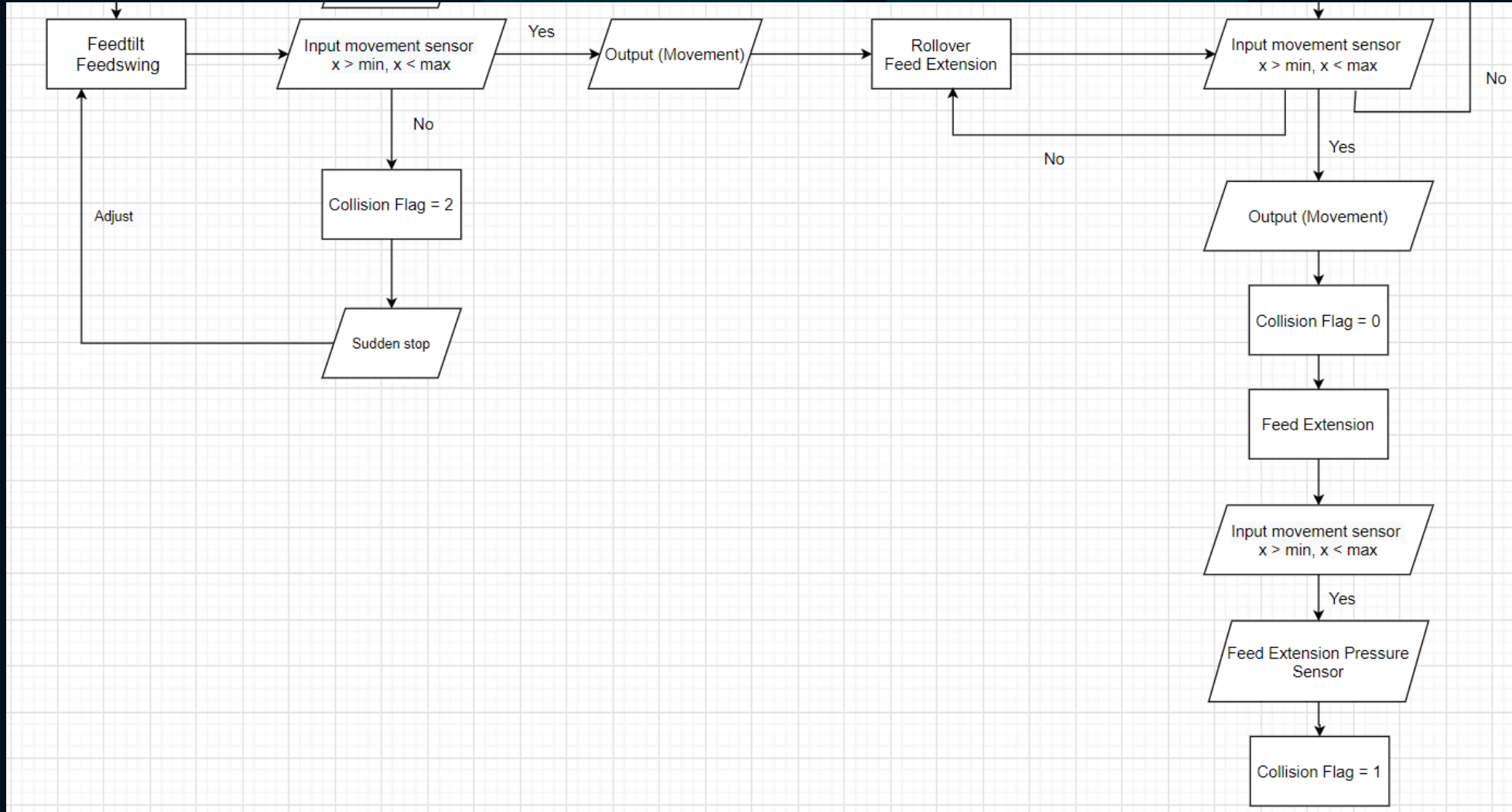
What do we do?

- Analyze the data
- Find the correlation between the given signals
- Check the collision signal with time
- Few collisions happened throughout the simulation
- Indicated with collision flag 0= no collision, 1= normal collision , 2= misuse collision
- Using the correlation between the signals (boom swing signal, boom lift signal)
- Find the algorithm of the machine that matches the data given

PART 1



PART 2



CHALLENGE 2

Present a concept for modeling the collisions to the digital twin.

- How do you know what part of the machine did the collision occur?
- How would you model it to the digital part?



We model it with two general concept:

- Vision Sense



- Auditory Sense



What is mean by visual sense?



- During the drilling process and movement of drilling machine, basically it will happen two type of collisions which are normal collision and misuse collision.
- An escalation mark will pop out to inform the user the during the collision happens

Normal Collision

A circle will be shown if normal collision is happening since it is a normal procedure. A pop out window will appear at the left-hand side in the manual bar.



Normal collision
(1) is happening

Misuse Collision

An escalation mark will be shown and keep blinking on the part where misuse collision happens.



What is mean by auditory sense?



- A sound will be alert to the user through speaker when collision happening
- Police car alarm, crashing sound, alarm bell



THANK YOU!

We hope to hear your feedback too!