

Monkey Deterrent System

Dynamics, Control & Instrumentation

GOEE4002

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Problem & Aim

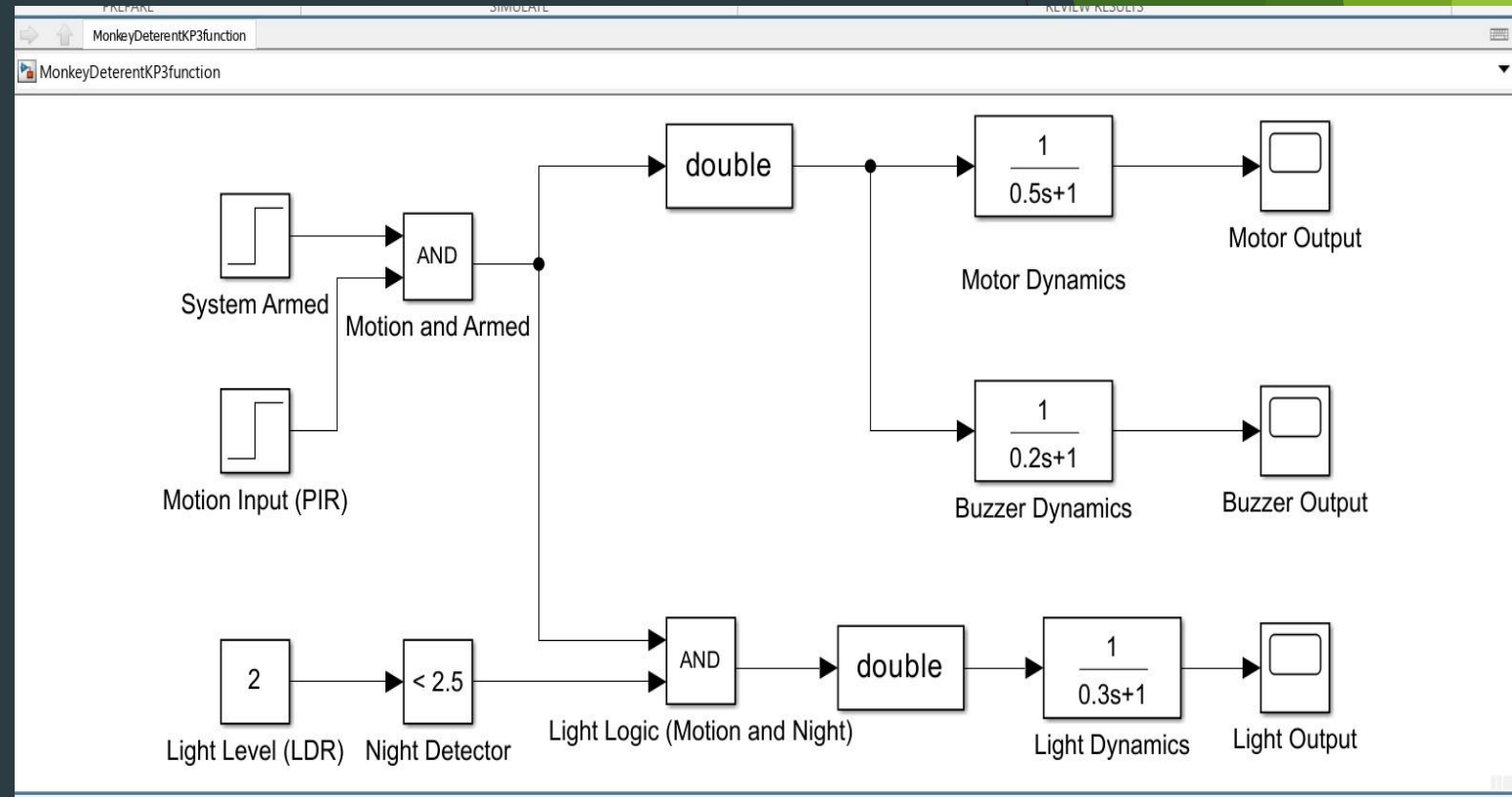
- ▶ Monkeys damaging crops in rural Zimbabwe
- ▶ Scarecrows ineffective
- ▶ Human guarding unsustainable
- ▶ Need a low-cost, solar-powered deterrent
- ▶ Simulated using MATLAB/Simulink

System Summary

- ▶ Low-cost, solar-powered monkey deterrent system
- ▶ Uses **PIR sensor** to detect motion
- ▶ Uses **LDR** to detect day/night
- ▶ Microcontroller processes sensor inputs
- ▶ Activates **motor, buzzer, and light** when conditions are met
- ▶ Designed to be simple, reliable, and easy to maintain

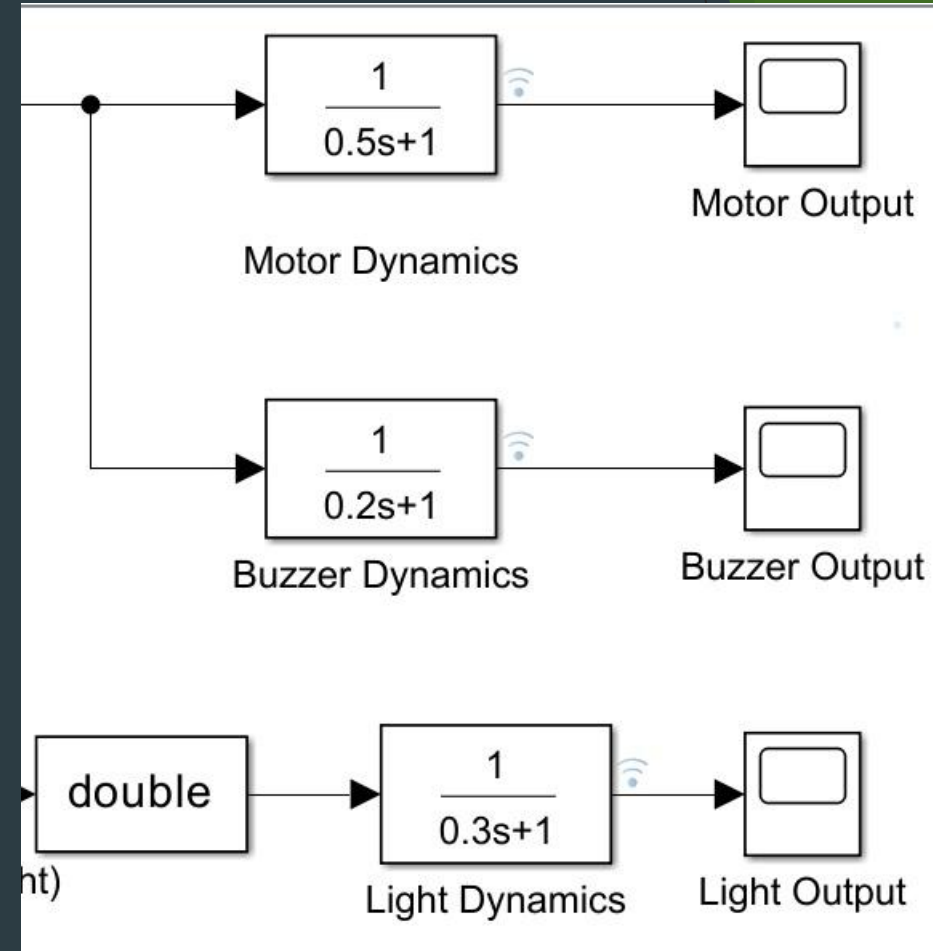
System Design Overview

- Inputs:
- PIR Sensor (Motion) / LDR (Light Level)
- Logic:
- 20 Second Arming Delay / AND Logic / Day vs Night Behaviour
- Outputs:
- Motor / Buzzer / Light (Night only Activation)



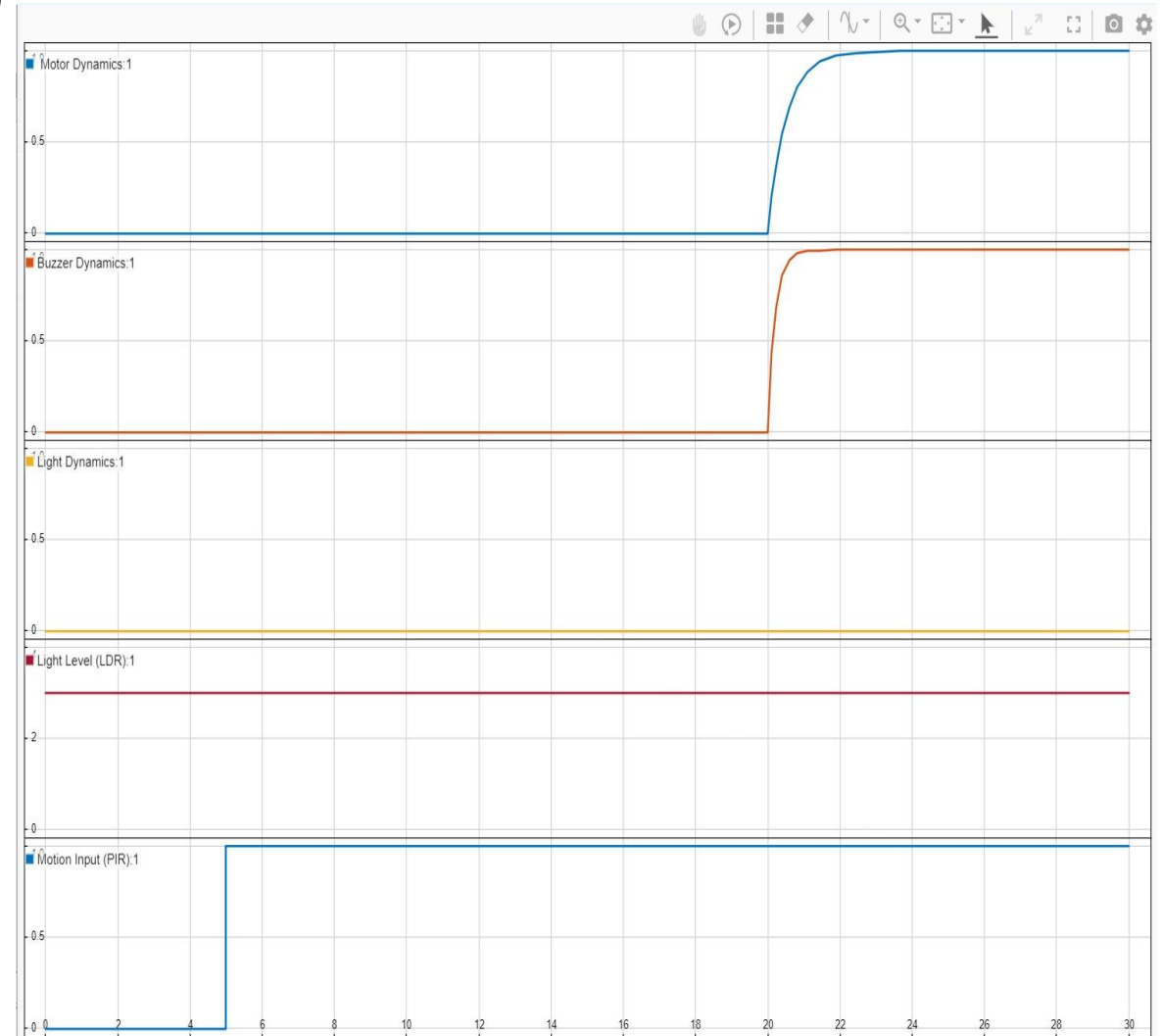
Modelling Approach

- First Order Actuator (Output) Models
- Motor: 0.5s
- Buzzer: 0.2s
- Light: 0.3s
- 30 Second Simulation



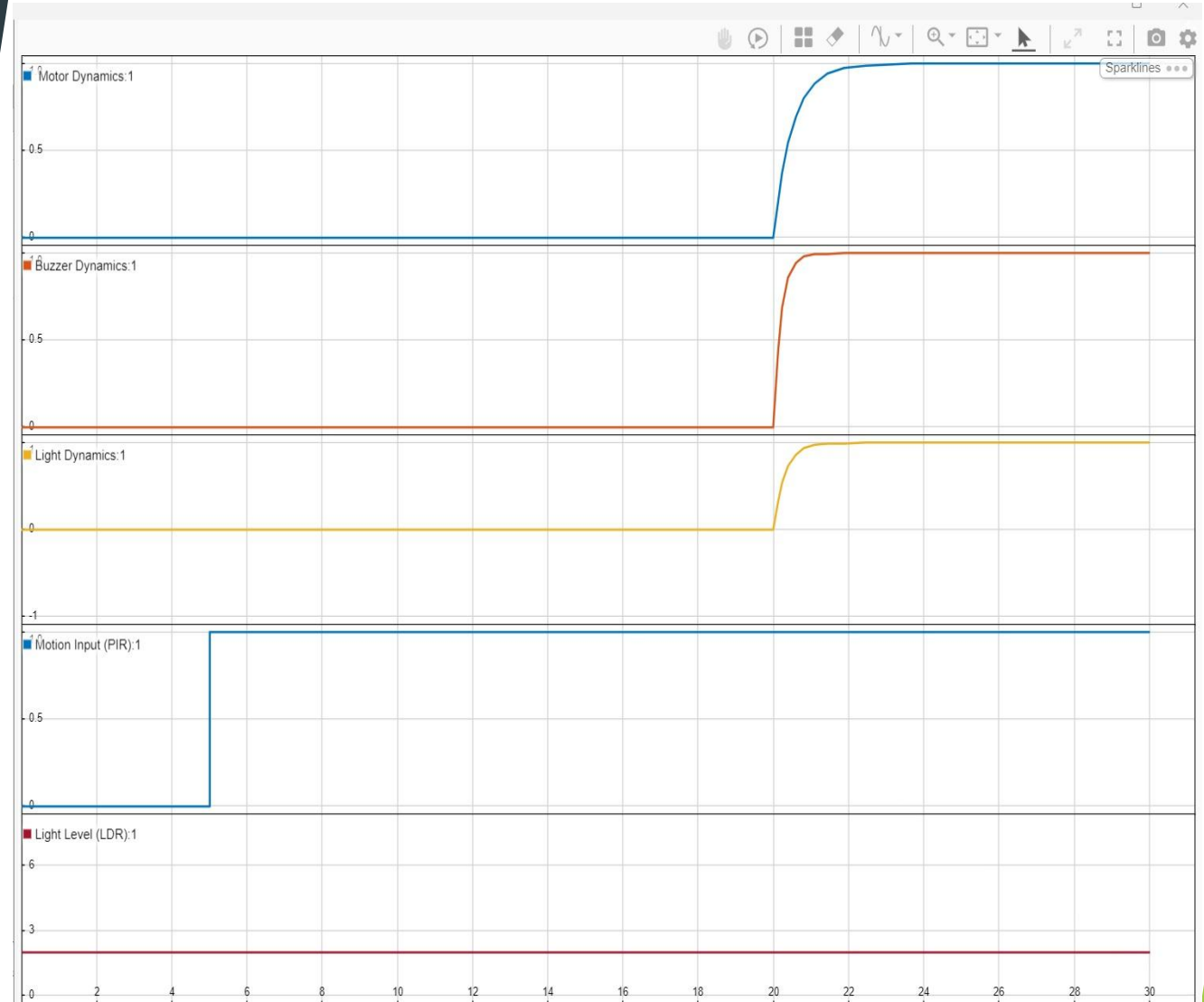
Day Time Simulation (LDR = 3)

- ▶ Motor ON
- ▶ Buzzer ON
- ▶ Light OFF
- ▶ Activates after 20 second arm delay
- ▶ Smooth first order rise



Night Time Simulation (LDR = 2)

- ▶ Motor ON
- ▶ Buzzer ON
- ▶ Light ON
- ▶ Correct Logic Behavior
- ▶ System Performs as Intended



Conclusion

- ▶ System meets all requirements
- ▶ Low cost, solar ready, easy to maintain
- ▶ Logic is reliable and safe
- ▶ Simulink Validates system behaviour
- ▶ Suitable for off grid deployment