Day vs. Night

TI Precision Labs – Light Sensors

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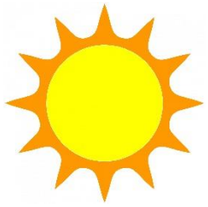
Day vs Night Use Case

Key Benefits

- System power savings

Applications



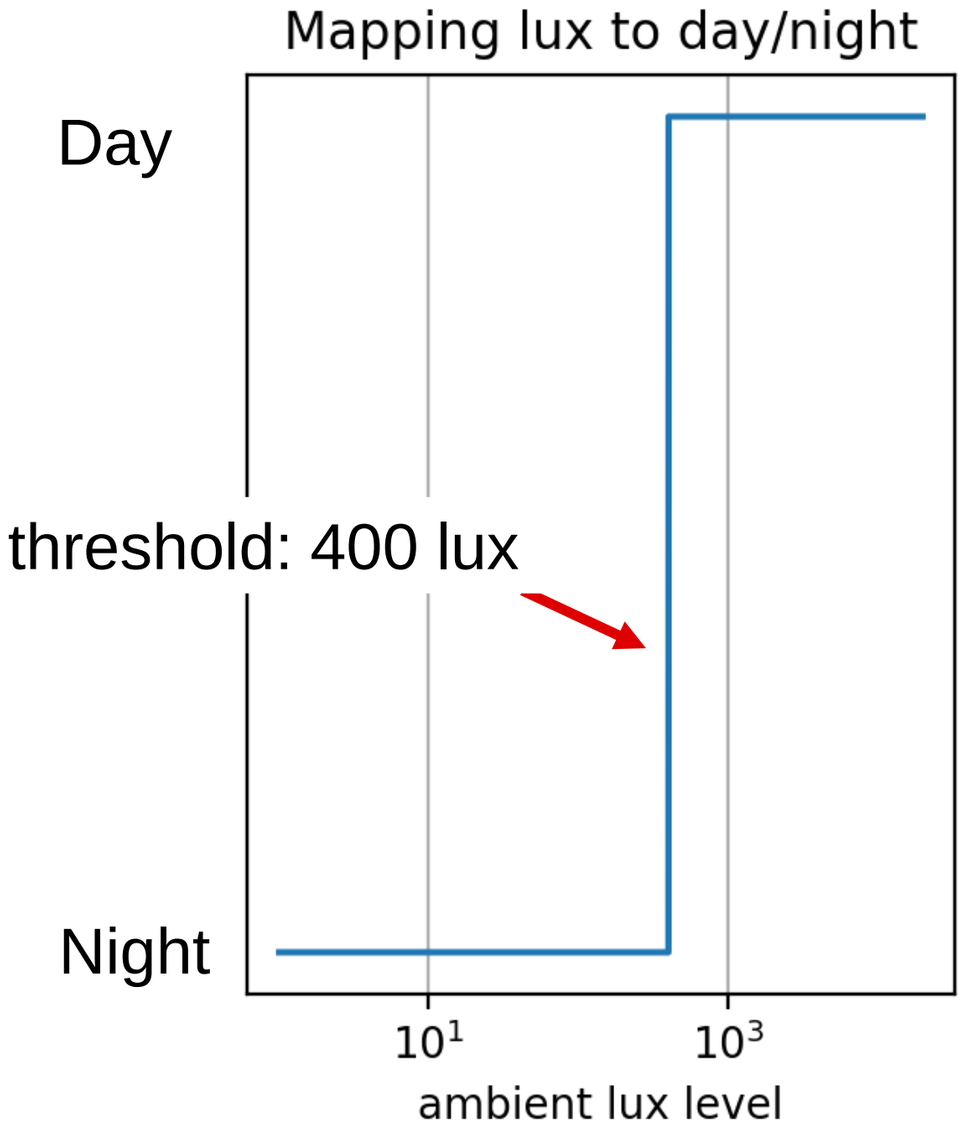
Industrial

Applications

Industrial

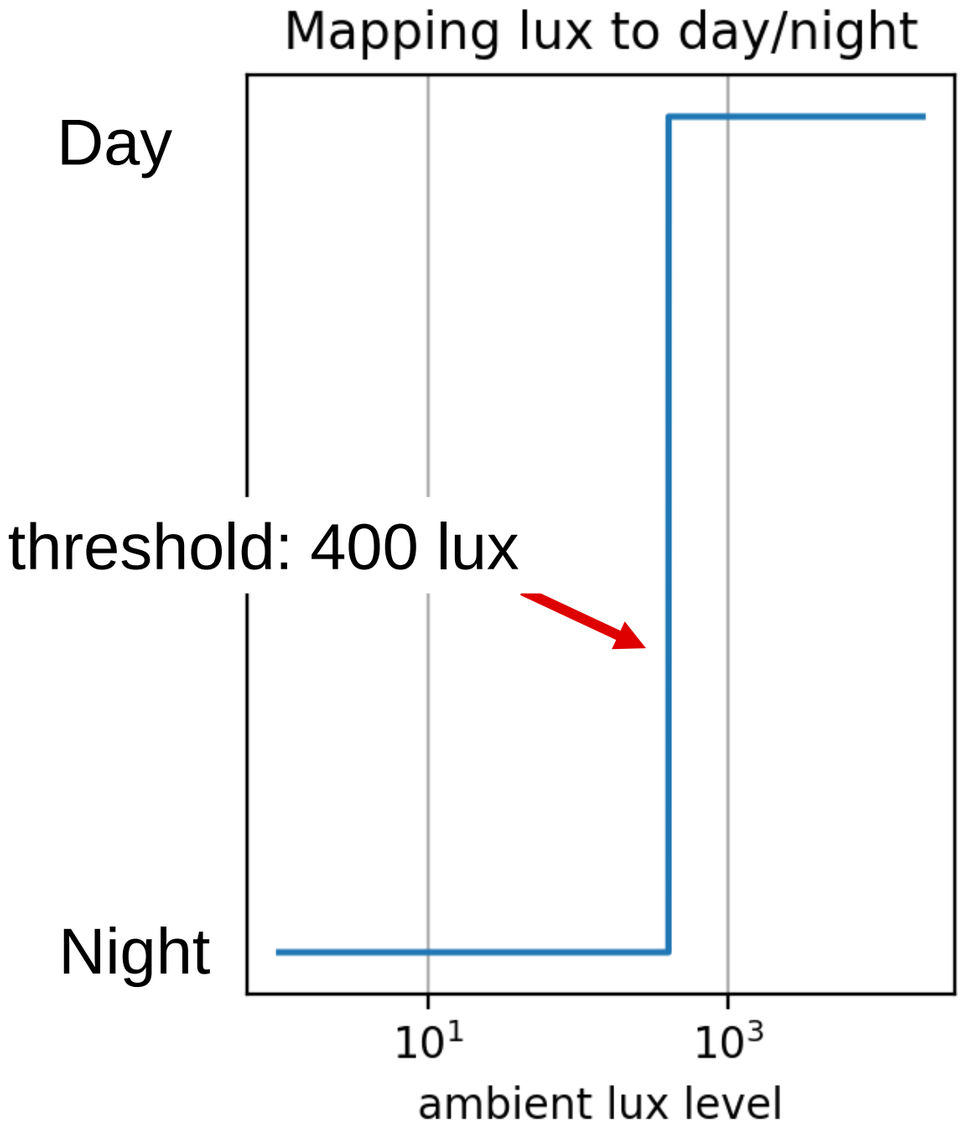
Threshold detection

- Binary value needed to indicate day/night based on comparison with threshold
- Based on value action is taken
  - E.g. turn on headlamp or IR illuminator



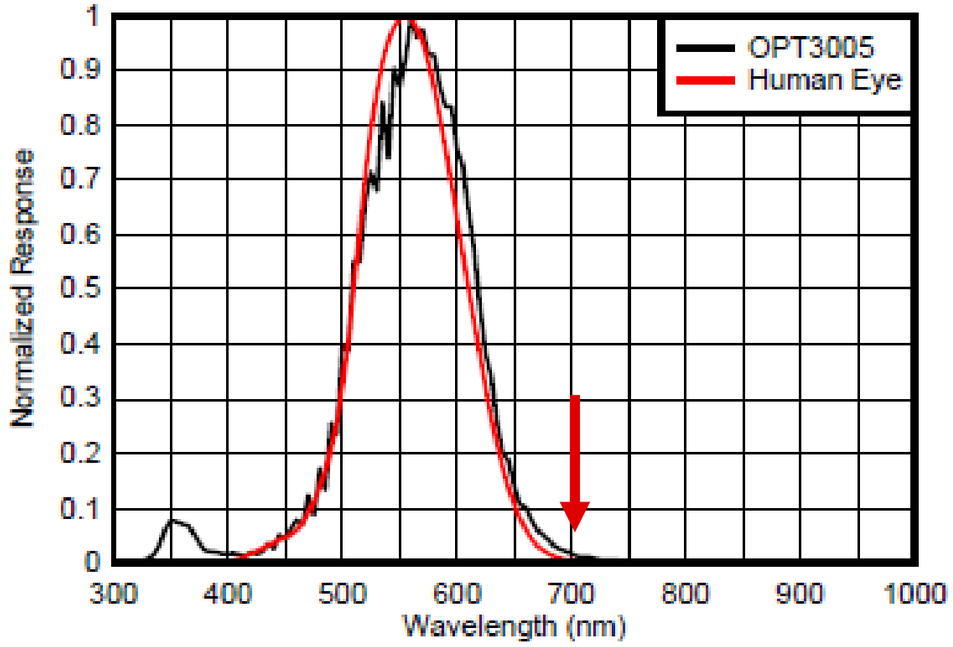
Threshold detection

- Binary value needed to indicate day/night based on comparison with threshold
- Based on value action is taken
  - E.g. turn on headlamp or IR illuminator
- Lux accuracy important for correct action
  - E.g. sunlight on a clear vs. cloudy day



IR illuminators and IR rejection

- Many cameras use IR LEDs to illuminate the scene under dark conditions
  - e.g. security cameras and video doorbells
  - Light sensor used to turn on/off the IR light



IR illuminators and IR rejection

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  - e.g. security cameras and video doorbells
  - Light sensor used to turn on/off the IR light
- IP security cameras
  - Sensor and IR LEDs behind domed glass
  - IR light reflected and enters the sensor from all angles
  - Angular IR rejection is important and not typically specified in datasheets
    - TI's OPT3004 and OPT3005 devices spec angular performance

Power

- Battery powered applications require low power
- Consider light sensors with very low power draw

Quiescent current	Dark	Active, V_{DD} = 3.6 V	1.8	2.5	µA
		Shutdown (M[1:0] = 00)[(2)], V_{DD} = 3.6 V	0.3	0.47	µA
	Full-scale lux	Active, V_{DD} = 3.6 V	3.7		µA
		Shutdown, (M[1:0] = 00)[(2)]	0.4		µA

Interrupts and Power

- Without interrupt function MCU needs to continuously read from sensors and compare to threshold
- Some light sensors allow comparison to be offloaded from MCU to the sensor
- Allows MCU to sleep until light crosses threshold
  - MCU power draw replaced with sensor lower power draw

Table 8-3. Transparent Hysteresis-Style Comparison Mode: Flag Setting and Clearing Summary(2) (4)

OPERATION	FLAG HIGH FIELD	FLAG LOW FIELD	INT PIN(1)	CONVERSION READY FIELD
The result register is above the high-limit register for fault count times. See the *Result Register* and the *High-Limit Register* for further details.	1	0	Active	1
The result register is below the low-limit register for fault count times. See the *Result Register* and the *Low-Limit Register* for further details.	0	1	Inactive	1

To find more light sensor technical resources and search products, visit ti.com/ambientlightsensors

Thanks for your time!
Please try the quiz.

Quiz

1. Which of the following help conserve power for a video surveillance application? (Select all that apply)
   a) Light sensor active current
   b) IR rejection of the light sensor
   c) Interrupt capability
   d) Control of IR illuminators by light sensor

Quiz

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Quiz

2. What would happen if the light sensor has poor IR rejection for a video surveillance application?
   a) IR LEDs are only on during night
   b) IR LEDs never turn on
   c) IR LEDs always stay on
   d) IR LEDs switch between on and off during night
   e) IR LEDs switch between on and off during the day

Quiz

2. What would happen if the light sensor has poor IR rejection for a video surveillance application?
   a) IR LEDs are only on during night
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   e) IR LEDs switch between on and off during the day