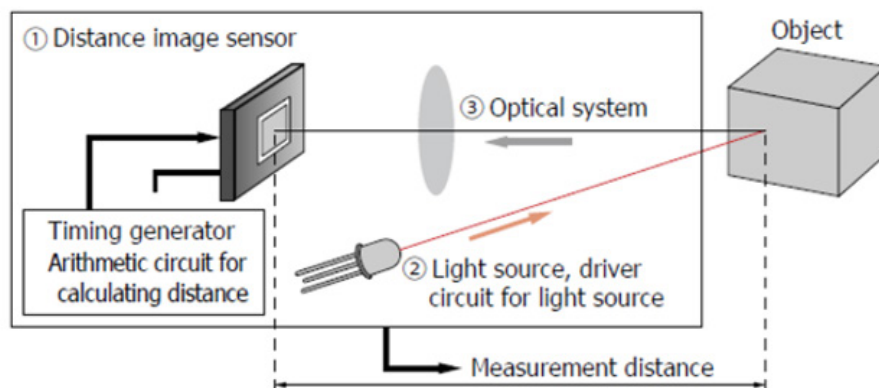


Distance Image Sensors: The key to advanced gesture detection and people counting applications

Distance image sensors measure the distance to the target object using the Indirect TOF (time-of-flight) method for meticulous distance measurements. Operating with pulse-modulated light sources, these sensors seamlessly integrate into various applications, delivering real-time, arithmetically processed distance data.

Hamamatsu Photonic's distance image sensors consist of a photosensitive area (linear or area array), shift register, output buffer amplifier, bias generator, timing generator, and other components. They can transfer data in the order of tens of nanoseconds and include features such as: drive voltage 5V or less, reduced effect of background light, compact chip size package (CSP) type.

Fig 1: Configuration example



There are many potential applications for distance image sensors including:

- Obstacle detection (self-driving, robot)
- Security (surveillance camera, intrusion detection)
- Factory automation (shape recognition, logistics, robots, object size)
- Motion capture, gesture detection
- Touchless operation (air conditioners, automatic door)

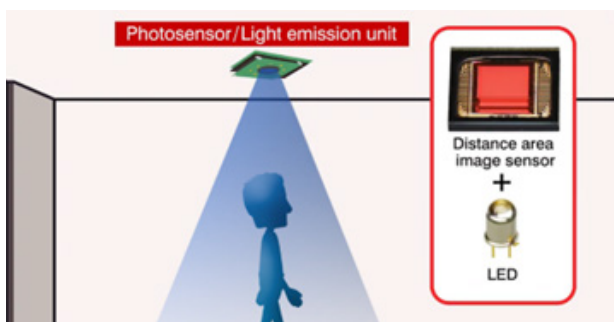
Key benefits of distance image sensors for people counting and gesture detection applications

People Counter

People counting with distance image sensors pose several challenges that can reduce accuracy, such as varying light conditions and overlapping individuals. Sensor placement is also integral to realizing reliable and consistent counting.

One example of a people-counting application is auditing people's movements in various environments. For such applications, you can apply a photosensor/light emission unit (distance area image sensor and LED) on a ceiling and track people's passage while also counting them. The distance information aids in monitoring people's height.

Fig 2: People counter [TOF] with demo unit installed on the ceiling ^[1]



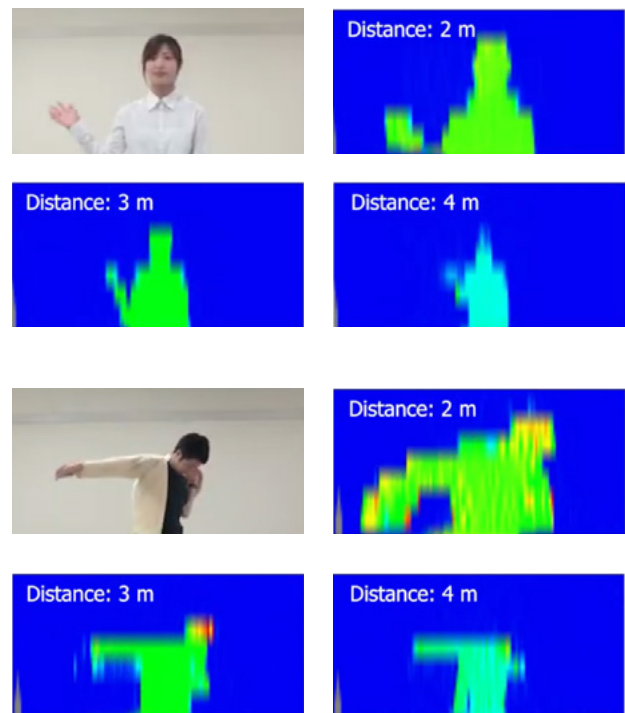
This data can be used to survey the quantity and movement of individuals in elevators, count and monitor customers in stores, record gate access,

and observe crowded areas at train platforms. It prioritizes privacy by only capturing data about the individual's shapes without obtaining their profiles or images. It can also be used in automated manufacturing to check the quantity and size of objects on factory assembly lines.

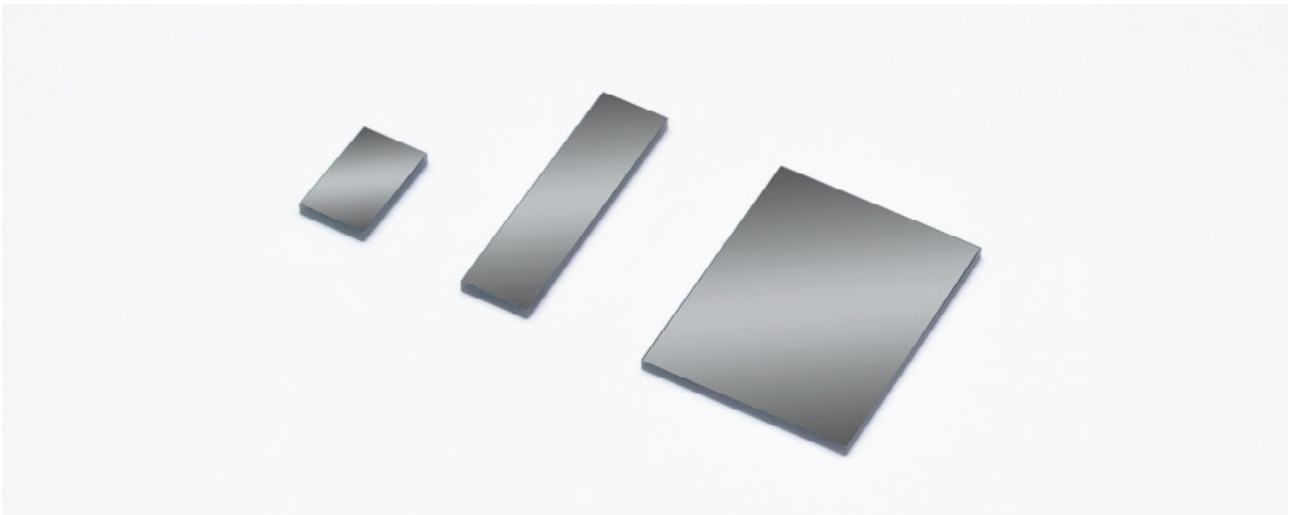
Gesture Detection

One of the newest additions to Hamamatsu's range of distance image sensors is a sensor with 128 x 8 pixels. This new image sensor can detect the motion of an object at low resolution. For example, it can follow the movement of a hand, or detect when someone is putting on, or taking off a jacket. It can also recognize simple gestures such as using a hand or finger to scroll through pages of a spatial display.

Fig 3: Motion detection of an object, showing imaging examples in assumed situations such as people counter, gesture detection and safety monitoring by using 128 x 8 pixels sensor. ^[2]



Low-resolution distance image sensors can be highly effective for short-distance gesture detection, offering a balance of cost, simplicity, and performance that meets the needs of many practical gesture detection applications.



Hamamatsu Photonics' distance image sensors ^[3]

Hamamatsu's advancements in distance image sensors are opening up new possibilities in various applications, such as people counting and gesture detection. These sensors, known for their exceptional precision and adaptability, have the potential to revolutionize how machines interact with their surroundings and with humans. As we continue to push the boundaries of what these sensors can accomplish, we look forward to creating more intuitive, efficient, and human-centered technological solutions. Visit our website to discover more about our distance image sensors and their potential to transform your applications.

For further technical details please contact our team of engineers at info@hamamatsu.eu

References

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^[3] Hamamatsu Photonics, "Distance Image Sensor," [Online]. Available: www.hamamatsu.com/eu/en/product/optical-sensors/distance-position-sensor/distance-image-sensor.html

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