

PEOPLE KOUNTER

MONITORING AND CONTROL SYSTEM

Outdoor works of art, retail centres, events and pedestrian traffic areas are just some of the circumstances where it can be useful to measure the number of people in transit. This can be difficult to calculate in areas where gates and physical measuring tools cannot be used, yet this kind of access data is valuable in terms of calculating the financial value of a given site, for advertising investments or security purposes, for example. CSP has key experience developing recognition algorithms for video surveillance or video promotion purposes, for applications that range from security to tourism. CSP studies the systems most suited to each setting based on open source platforms and low cost technology that is readily available on the market.

THE SOLUTION

People Kounter is a system for counting the number of people passing in front of a certain point or through a gateway, based on Microsoft Kinect sensor technology, widely available on the market. The system works by analysing the video stream produced by the Kinect camera in association with data generated by the related depth sensor. The Kinect must be positioned overhead, perpendicular to the ground. The algorithm is capable of counting the number of people entering or leaving an area with great precision, detecting them individually and excluding other objects that can interfere with the precision of the count.

Ideal for indoor settings, the system is also capable of interpreting crowd situations. The precision of Kinect, which ranges from 30 cm to 3 m, is ideal for different settings, as it recognises the movement of people identifying their heads without being conditioned by variations in ambient light or other environmental factors like two subjects in close vicinity, moving doors or other unexpected events.

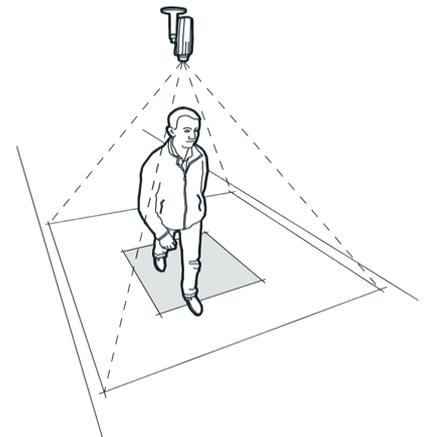


Figure 1 – The system in action

The system operates in three basic steps:

- **background subtraction** of the depth image captured by the Kinect sensor;
- **blob detection** by identifying the main points and tracing an outline – the hypothetical head;
- **blob tracing** in the video sequence to identify movements in or out of the count zone.

TECHNICAL CHARACTERISTICS

People Kounter offers:

- **Standard hardware:** the system can be created integrating low cost devices readily available on the market.



- **Accessibility:** a simple web interface to access the count data.
- **Modularity:** the system can be integrated into an existing solution or architecture with one or more counter points. uno o più punti di conteggio.

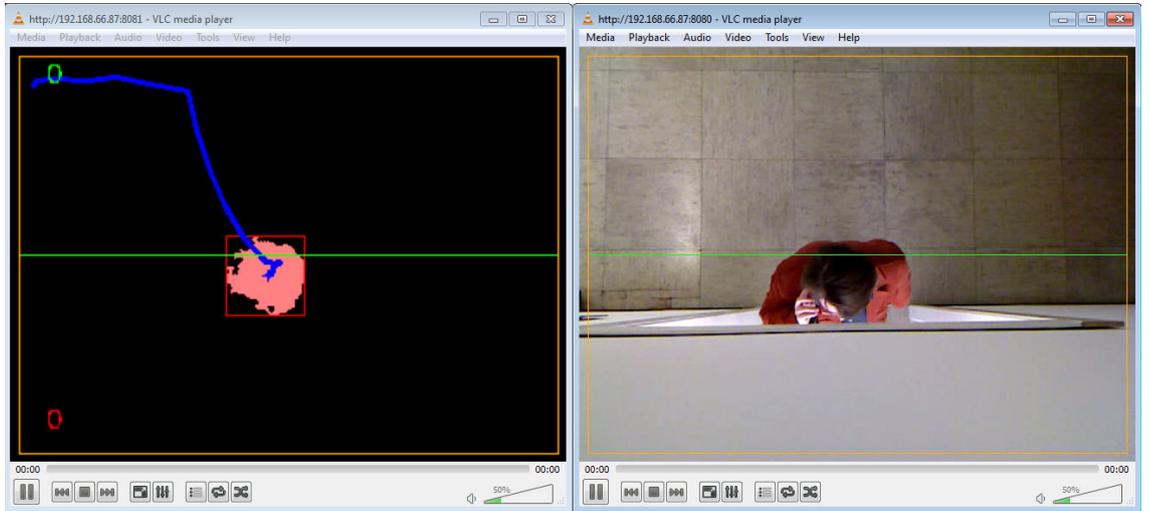
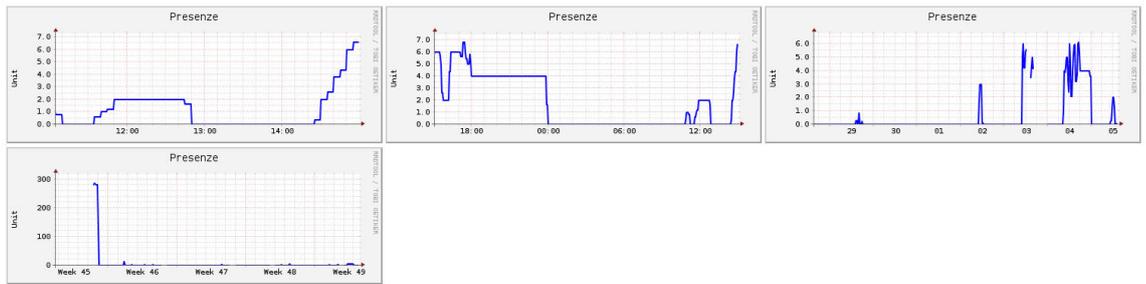


Figure 2 – Crossing a gateway point: real time tracking and visualisation

- **Open Source:** thanks to the availability of open source SDK libraries for Kinect, People Kounter gives ample scope for personal configurations of the system and algorithm.
- **Reliability:** tested in crowd situations and complex settings.
- **Statistics:** a detailed system of statistics records presences in real time, daily counts and past data.

Headcount



Daily incoming count

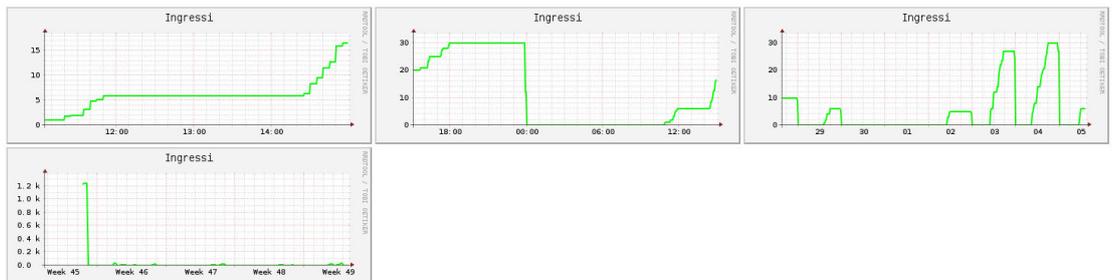


Figure 3 - Statistics

