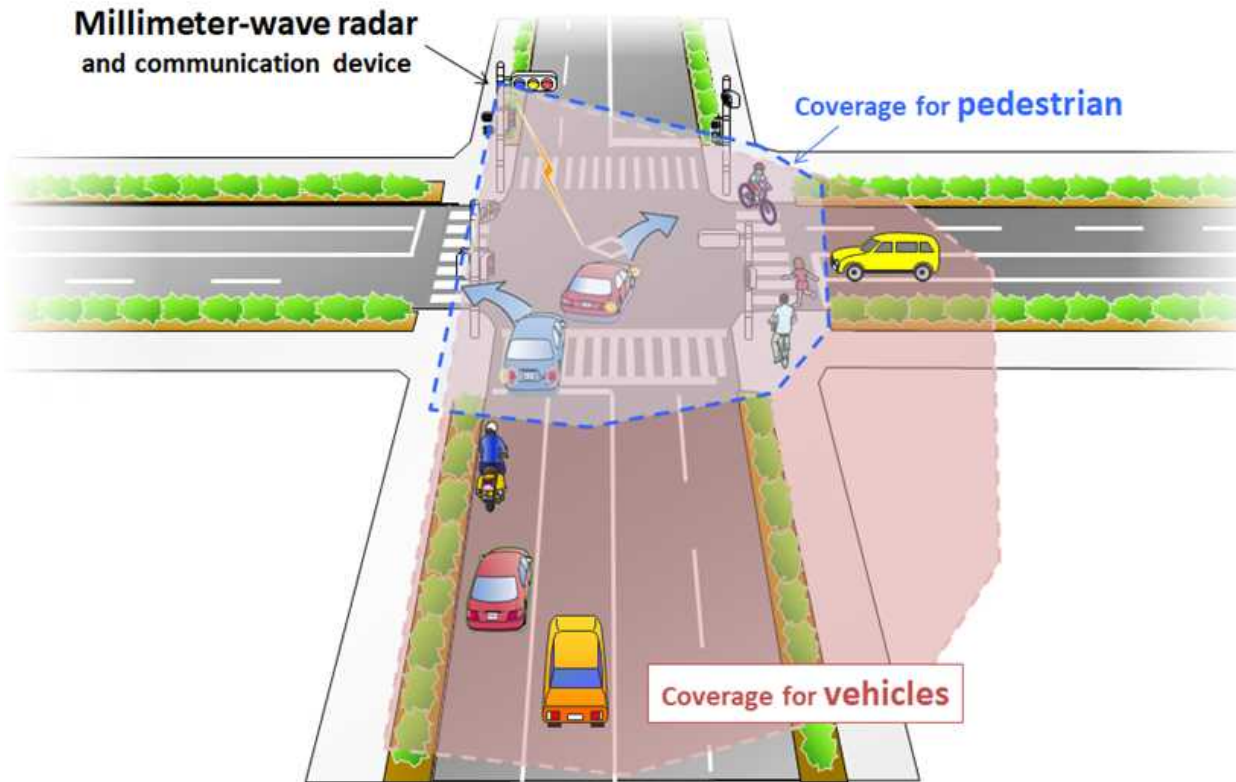


Infrastructure Radar System as Next-Generation Intelligent Transport System Utilizing ICT

(Panasonic Corporation)

Project summary

Technological development and demonstration experiment have been promoted with the aim of applying high-resolution millimeter-wave radar system to roadside sensor at intersection, assuming the adoption of this system to Intelligent Transport System (ITS) applications such as cooperative driving support.



- ✓ The radar sensing technology can accurately measure the speed of approaching vehicles and the position of crossing pedestrians, regardless the weather and time.
- ✓ In order to provide so-called look-ahead information as driving support, an appropriate wireless communication technology that shares sensor data in real time will be used.

Fig. 1 Concept of the radar system installed at intersection

High-resolution radar technology

There are growing expectations for spatial imaging using millimeter-wave radar, and short-range wide-angle scanning is becoming a standard function of high-resolution 79GHz band radar. Because of its high range resolution, the radar has excellent separation performance for multiple targets that are close to each other and have slight velocity differences.

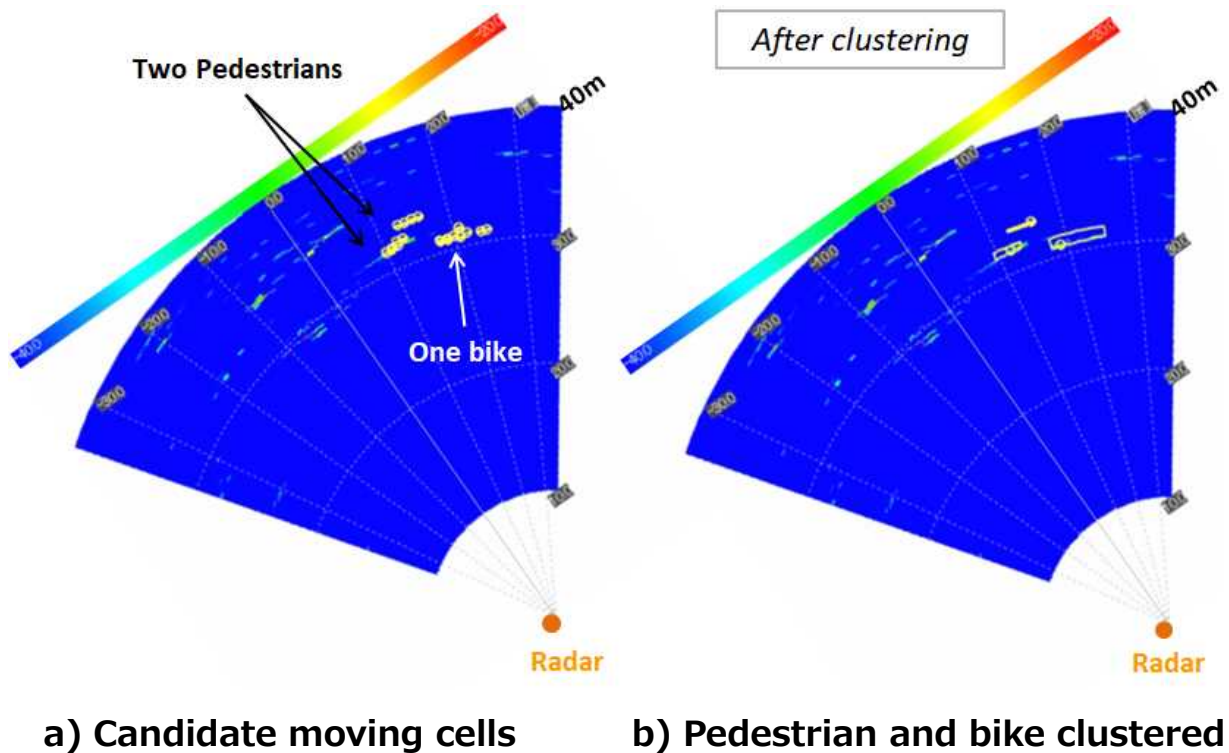
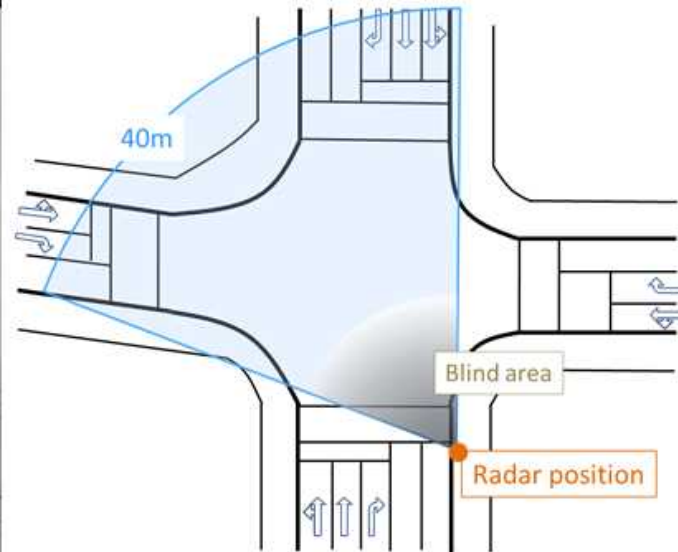
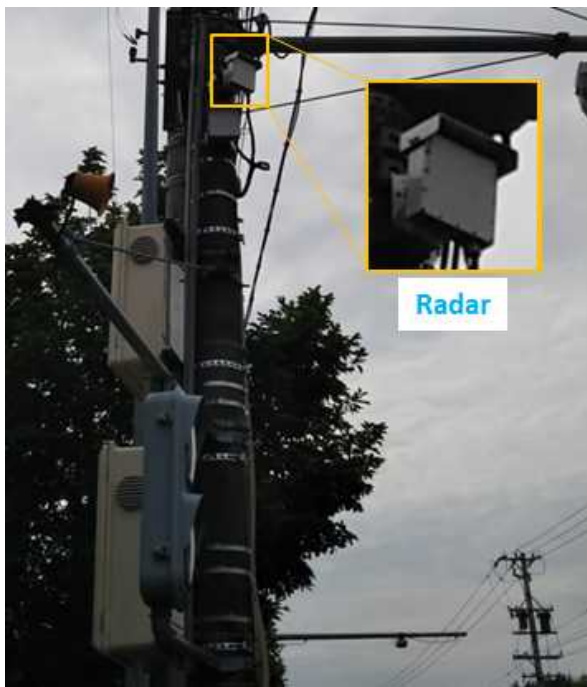


Fig. 2 Radar data processing to detect targets

- ✓ In order to improve the effective detection accuracy of the radar system, it is essential to optimize clustering and tracking based on the echo characteristics of targets.
- ✓ It is necessary to treat spatially spread candidate cells as part of the same group using the Doppler velocity or the like.
- ✓ Pedestrian detection has low distance dependence when resolving scattered points, however the echo intensity drops discontinuously.

Detection accuracy verification on public road

An experimental 79 GHz radar system had been installed at an actual public road intersection, and the radar detection performance of pedestrians and bikes on the crosswalks was verified, in condition of rainy at the time of large traffic volume.



a) Installation of the radar

b) Bird view of the intersection

Fig. 3 System configuration for public road experiment

- ✓ The experimental system consists of a radar unit attached 5m above the ground and adjusted to face diagonally across the intersection.
- ✓ The radar has a field of view on the horizontal plane of 70° and the vertical plane beam width is about 10° . The system is set to output the scan data at a frame period of 50ms, the maximum detection distance for a pedestrian is about 40m.
- ✓ When performing an interpolation processing using multiple frames, a detection rate of 95% and a false alarm rate of 2% is achieved.