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SMART MOBILITY

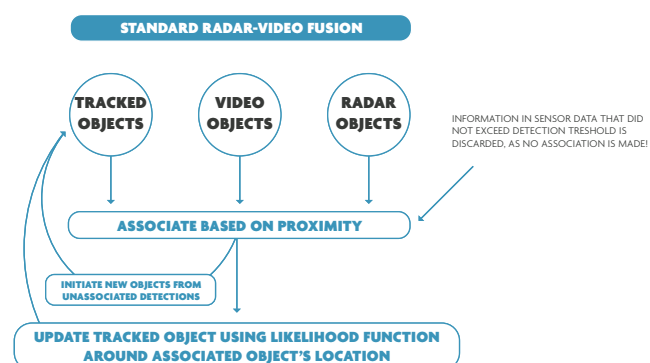
RADAR AND VIDEO AS THE PERFECT MATCH: A COOPERATIVE METHOD FOR SENSOR FUSION

Accurate detection and tracking of road users is essential for driverless cars and many other smart mobility applications. As no single sensor can provide the required accuracy and robustness, the output from several sensors needs to be combined. Especially radar and video are a good match, because their weaknesses and strengths complement each other. Researchers from IPI – an imec research group at Ghent University – developed a new technique to optimize radar-video fusion by exchanging information at an earlier stage.

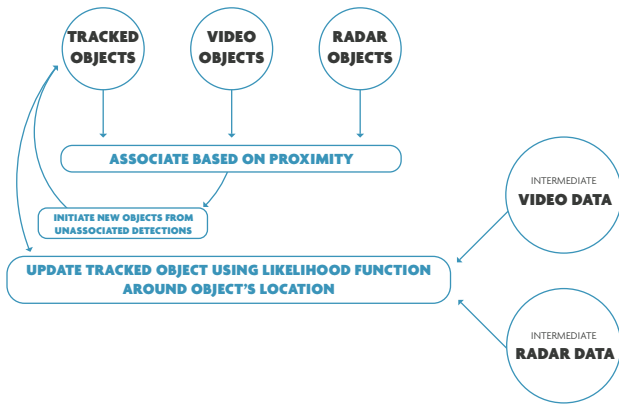
Each kind of sensor technology (e.g. radar, video, LiDAR, ultrasound, etc.) has its own limitations. For instance, cameras don't work well at nighttime, or in dazzling sunlight. And radar can be confused by reflective metal objects, like rubbish bins or soda cans. Fusing the output of these different sensors is thus very important for accurate object detection.

Currently, sensor fusion usually happens at a relatively late stage, after each sensor has performed object detection based on its own limited collection of sensor data.

In this way, a lot of sensor fusion potential is lost, especially in circumstances where one sensor underperforms compared to another. To mitigate this effect, our cooperative fusion



SMART, COOPERATIVE RADAR-VIDEO FUSION



approach adds an extra feedback loop: the processing pipelines of different sensors already exchange low or middle level information. In this way, sensors can resolve ambiguities in their own detection process, resulting in better data association at the object level and improved tracking performance.

MORE POWERFUL AND EASIER TO INTEGRATE

This approach realizes the full potential of sensor fusion without losing the benefits of easy system integration and the ability to source detection hardware from different suppliers, which are both important for OEMs (Original Equipment Manufacturers). With this technique, the strengths of each sensor improve the performance of the other. And in circumstances where one sensor is unreliable, its failure does not affect other sensors as they can still function independently as well.

Not only is this method much more powerful than the late object level fusion that is commonly used today, it also easier to implement, validate and homologate than the holistic approaches suggested in academic literature, which consider all information from all sensors all the time.

Though smart vehicles might be the most obvious application for this technology, accurate sensor fusion is actually also important in many other areas, e.g. smart intersections, retail analytics, hard surveillance, soft surveillance, etc.

LOOKING FOR INDUSTRIAL PARTNERS

We are interested in collaborating with OEMs and other industrial partners to integrate our technology concept into a final product and to share our expertise with both video and radar detection.

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