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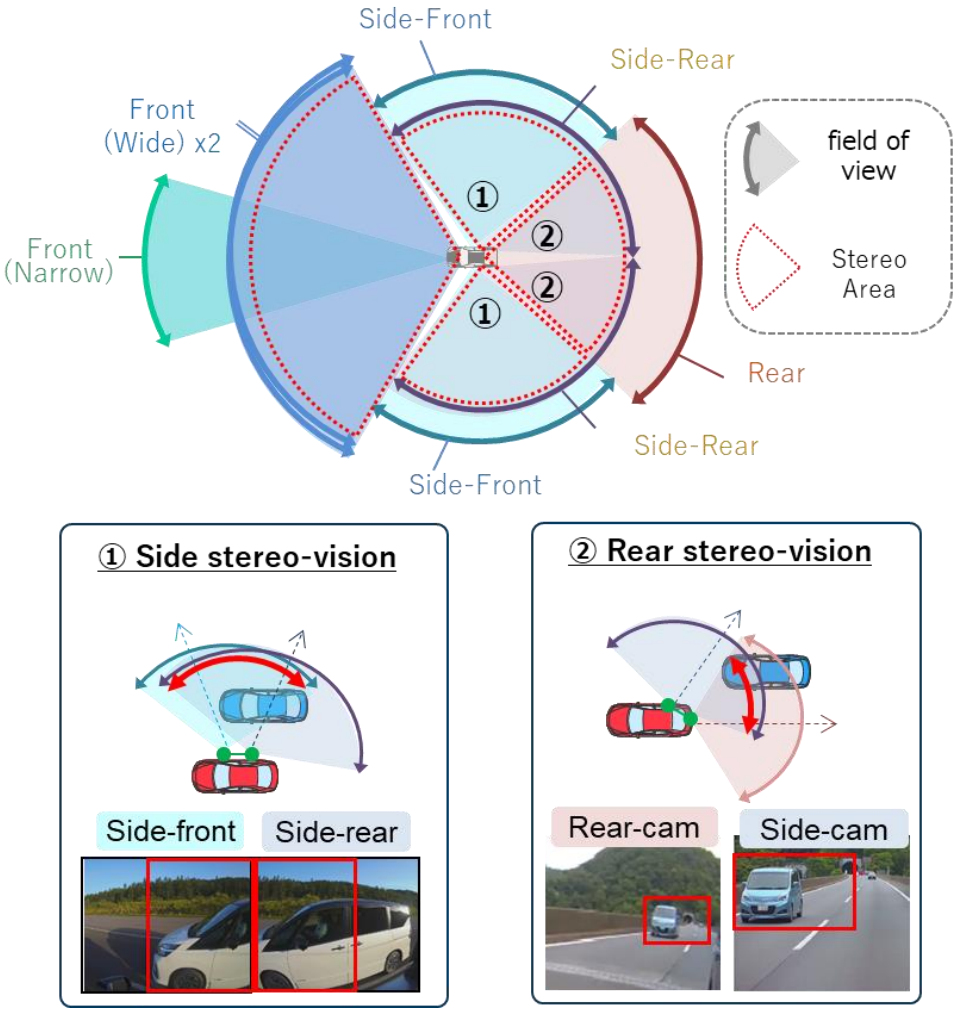
Hitachi Astemo Develops Prototype 360-Degree Stereo Vision with Multi-Camera 3D Sensing



Multi-camera 3D sensing

Tokyo, October 20, 2022 – Hitachi Astemo, Ltd. (President & CEO: Brice Koch; henceforth, "Hitachi Astemo") has developed a prototype 360-degree stereo vision system for automated vehicles traveling on regular streets. Based on multi-camera 3D sensing, the all-surrounding sensing system is both high-resolution and highly accurate.

Most of the current automated driving systems are limited to highway driving. To enable automated driving systems to be used on general roads, they need to accurately recognize the entire road environment around the vehicle, including a complex mix of objects such as pedestrians and bicycles. Radar and LiDAR systems with high-ranging accuracy, however, still face cost issues before they can see widespread adoption, and all-surrounding-area camera systems, which although are superior in terms of cost,

are mainly based on a monocular camera that is still continually evolving to improve accuracy and other issues.

Hitachi Astemo, together with the Research and Development Division of Hitachi, Ltd., leveraged their strengths in stereo camera technology to develop a prototype of the 360-degree stereo vision system, using multi-camera 3D sensing that enables distance measurement with the stereo camera technology. Instead of the conventional module consisting of two cameras with the same view angle and being nearly parallel to each other, the camera layout has been made more flexible to use a combination of approximately 10 cameras with different angles of view, including non-parallel cameras to provide stereoscopic 3D vision. By integrating multi-camera 3D sensing into a single in-vehicle camera system, the system realizes 360-degree stereo vision, with a cost advantage, high accuracy and resolution.

By generating highly accurate distance information in stereo and all around the vehicle, the system can detect such elements as the distance of a vehicle traveling in the adjacent lane, or a two-wheeled vehicle slipping through a line of cars from behind in a traffic jam. It can estimate the relative speed and direction of movement, and apply this information for vehicle control to avoid collisions and entanglement at intersections. In addition to basic object recognition of objects such as cars, motorcycles, pedestrians, and traffic lanes, the recognition function also includes turn signals, red lights, and brake lights to predict the behavior of other vehicles; as well as traffic signals, road signs, road edges, and free space areas available for driving—all of which are necessary to identify for while driving on ordinary roads.

Furthermore, Hitachi Astemo has improved reliability and environmental resistance in camera sensing such as features to resist water droplets and dirt adhering to the lens surface, or shielding the entire lens in the snow. The AI has learned malfunction patterns caused by these factors and can identify malfunction factors that occur in each camera, thereby preventing malfunctions.

Going forward, Hitachi Astemo will continue to strengthen its 360-degree stereo vision systems that combine cost advantages with high accuracy and resolution, as well as improved reliability and environmental resistance, with the aim to expand the scope of automated driving systems for use on general roads.

Hitachi Astemo is committed to strengthening its business and delivering technological innovation through a strategic business portfolio, which consists of the Powertrain &

Safety Systems business, Chassis business, Motorcycle business, Software business and Aftermarket business. Aiming for a better environment globally and growth around the pillars of “green,” “digital,” and “innovation,” we will deliver highly efficient internal combustion engine systems; electric systems that reduce emissions; autonomous driving for improved safety and comfort; advanced driver assistance systems; and advanced chassis systems. Through such advanced mobility solutions, we will contribute to realizing a sustainable society and provide enhanced corporate value for our customers.

■Company Profile
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Business: Development, manufacture, sales and service of machinery and equipment and systems for automotive parts and transportation and industrial use
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(https://www.hitachiastemo.com/en/).

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
