

CANESTA'S MULTIFUNCTION SINGLE SENSOR ENABLES NEW GROWTH IN SAFETY SYSTEMS

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SAFETY AND SENSORS

The introduction of new safety features is high priority for automakers today due to growing government legislation, increasing liability concerns, and the invariable consumer desire for improved safety.

Various sensing technologies play a key role in delivering these features, detecting conditions both inside and outside of the vehicle in applications like parking assistance, adaptive cruise control, and pre-crash collision mitigation. Each of these applications is characterized by a unique customized technology, which -- for the most part -- provides either a ranging function or an object recognition function.

CURRENT SENSOR TECHNOLOGY SOLUTIONS AND THEIR LIMITATIONS

Automakers and their suppliers are faced with continued investment in these widely disparate technologies (e.g. ultrasonic, RADAR, LIDAR, digital image sensing, etc.) making it challenging to deploy them as quickly or as broadly as desired.

Going forward, the problem of disparate sensing technologies becomes even more pronounced. First, multiple features need to be provided in a single vehicle. Second, virtually all of the new sensing applications on automakers roadmaps -- such as pedestrian detection now being planned in Europe and Japan -- require both ranging and object recognition functions. Combining two incongruent technologies to accomplish this task (such as RADAR and digital image sensing) is expensive, difficult to implement, and doesn't solve the problem of inefficient development. What is needed is a low-cost system which provides both ranging and recognition functions together in a single small package through a flexible technology which can be leveraged across multiple and future applications.

CANESTA'S SOLUTION - CANESTAVISION™ 3D VISION ON A CHIP

Canesta, an early-stage company in San Jose, CA, has made significant breakthroughs in this regard by its invention of a low cost electronic perception technology. The technology includes new chip-based image sensors, similar in size, complexity and cost to commodity-priced video camera chips, that are uniquely able to resolve the three-dimensional features of a scene, fusing ranging and recognition together in a *single* low-cost sensor. Unlike the sensors in digital video cameras that see the world as flat images, CanestaVision™ additionally produces the distance from the sensor to the scene at every single pixel in the image, in real time. What is remarkable about this breakthrough is that the technology is implemented in a single, low-cost CMOS chip that - along with the appropriate software - enables enhanced and multiple applications through a fusion of functions. Ranging and recognition may now be delivered by one single device.

The availability of this technology in such a tiny, low-cost format means that new safety features will be deployed at a more rapid pace and become available in an even wider selection of vehicles. Pedestrian detection becomes feasible. Expensive RADAR systems which cannot discriminate objects can be replaced with a lower-cost more functional alternative. Weight-based sensors currently used in occupant sensing for advanced airbag deployment can be supplanted by new systems which perform additional functions like driver alertness monitoring. Investment in any one of these applications is leveraged in others and the volume of multiple applications drives added cost efficiencies. The applications are endless.

ABOUT CANESTA

Canesta was founded in April, 1999, and is located in San Jose, CA. The company has sold development kits to over 20 different companies in the automotive sector and has filed or has been granted in excess of 30 patents. Funding to date is approximately \$36 million; investors include: Venrock Associates, Carlyle Venture Partners, KGIF, Intel Capital, JP Morgan Partners, Apax Partners, TechFund Capital, and Thales Corporate Ventures.