

Intelligent Sensor LSI for Safety

<Program for Fostering Regional Innovation (Global Type) >

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Enterprises

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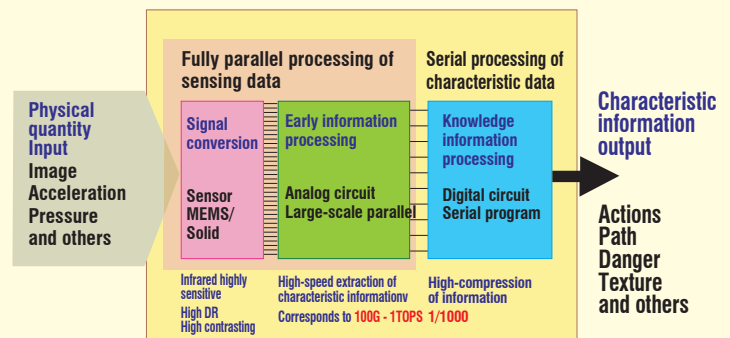
STANLEY ELECTRIC CO., LTD.

Purpose of the Research

The primary objective of this research is to develop a technology which enables to use means of protection for people to live happily such as safety in everyday life and prevention of traffic accident at a low cost. And the secondary objective of this research is to prove the effectiveness of the high-performance intelligent sensor LSI, which utilizes both of the sensor technology and the LSI large-scale parallel circuit technology, to promote its wide use, and to cultivate its development base as a core industry in the region. Furthermore, we are aiming to play a part in improving the detection capability of the sensor LSI by developing an original sensing method for the sensor element with the MEMS technology. Also by proving the effectiveness of the MEMS sensor element and by providing a development method which does not depend on the shrinkage of the element, we are aiming to expand the business opportunity for the venture businesses in the region.

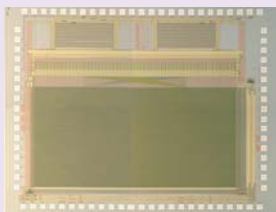
Summary of the Research

By integrating the sensor technology and the LSI large-scale parallel circuit technology, we will realize a high-performance intelligent sensor LSI. And by utilizing the MEMS technology, we will enhance the performance of the sensor element. Particularly in this research, we are going to develop a three-dimensional motion sensor LSI which realizes obtaining range information based on stereoscopy in real time. The LSI accumulates two image sensors and a circuit which performs complete parallel processing of the data output from the image sensors. Also, we will be using it as a core technology to develop devices to ensure safety in everyday life, and will reduce the device cost of the onboard hazard warning device and of the intruder monitoring device for household use to one-tenth or up to one-hundredth of the conventional cost.



Configuration of the intelligent sensor LSI

Results of the Research



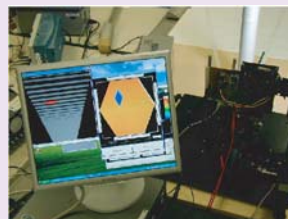
Parallax sensor LSI

The size of the chip is 4.2 mm x 3.3 mm. The prototype is produced with the 0.35 μm standard CMOS process. The two rectangle areas at the top are the two image sensors playing the role of the left and right eye, and the rectangle area below is the parallax detection circuit. The output signals from each image sensor are simultaneously sent to the parallax detection circuit in parallel, and the degree of correlation is detected for every correlation simultaneously in parallel.



2-eyed lens for the parallax sensor LSI

The left and right images are entered through the two holes 10 cm apart from each other, and the two images from the left and the right are placed together in one location by the reflex mirrors on the left and right and the prism at the center, and it is projected on the left and right eye on the parallax sensor LSI.



Scene of distance sensing experiment

The picture at the lower right shows the parallax sensor LSI device to which the 2-eyed lens is attached and a white bar which is in the view of the device. The output from it is sent to a PC and the detected range information is displayed on the monitor. The red mark indicated on the radar chart displayed on the left of the monitor is the location of the detected object.

Prospective Fields of Application

Onboard hazard detection and warning device

Automatically monitoring device for home security

Input device for hand gesture equipment

Vision for robots and others



Information

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