Successfully Designing FPGA-Card for Mobile Robot Research

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Abstract

This paper describes a new design of electronic board based on FPGA Cyclone III. The main objective of this idea is towards small size, fast Real Time processing, high integration and analog peripherals that are not disposal in available FPGA development kits. For the optimum performance a Microcontroller 8 Bits Flash CMS was used which is interfaced with FPGA and used as an ADC to make all the data processing on board in Real Time. This card can be used in many applications on the field of mobile robotics like autonomous navigation and intelligent parallel parking. To communicate and supervise all activities of mobile robots, an RF module was installed on the board which serves as a transmitter to a host computer that will receive all information in Real Time. The paper introduces many challenging issues which are being addressed to enhance in laboratories researchers project planning, designing and implementing capabilities. These issues are the FPGA performance, interfacing the microcontroller to the FPGA, implementing the flexible processing algorithms and high speed interconnection between the boards. The developed card was tested via the implementation of real time
algorithms, and was validated experimentally on a mobile robot system.

References

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Index Terms

Computer Science  Automated Systems

Keywords

FPGA, Microcontroller, Mobile robot, Robotics applications.