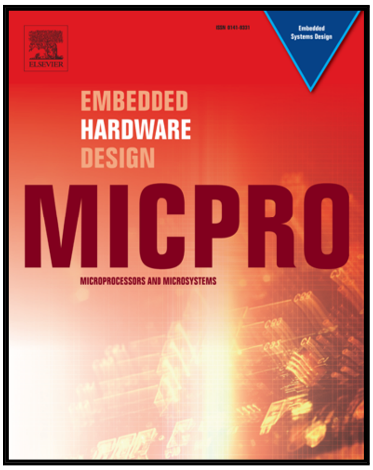

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A software stack for next-generation automotive systems on many-core heterogeneous platforms

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Abstract

The next-generation of partially and fully autonomous cars will be powered by embedded many-core platforms. Technologies for *Advanced Driver Assistance Systems (ADAS)* need to process an unprecedented amount of data within tight power budgets, making those platform the ideal candidate architecture. Integrating tens-to-hundreds of computing elements that run at lower frequencies allows obtaining impressive performance capabilities at a reduced power consumption, that meets the size, weight and power (SWaP) budget of automotive systems. Unfortunately, the inherent architectural complexity of many-core platforms makes it almost impossible to derive real-time guarantees using "traditional" state-of-the-art techniques, ultimately preventing their adoption in real industrial settings. Having impressive average performances with no guaranteed bounds on the response times of the critical computing activities is of little if no use in safety-critical applications. Project Hercules will address this issue, and provide the required technological infrastructure to exploit the tremendous potential of embedded many-cores for the next generation of automotive systems. This work gives an overview of the integrated Hercules software framework, which allows achieving an order-of-magnitude of predictable performance on top of cutting-edge Commercial-Off-The-Shelf components (COTS). The proposed software stack will let both real-time and non real-time application coexist on next-generation, power-efficient embedded platforms, with preserved timing guarantees.

Keywords: Autonomous Driving Assistance Systems, Many-core embedded

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