

Record 1 of 1

Title: Towards mixed criticality task scheduling in cyber physical systems: Challenges and perspectives

Author(s): Capota, EA (Capota, Eugenia Ana); Stangaciu, CS (Stangaciu, Cristina Sorina); Micea, MV (Micea, Mihai Victor); Curiac, DI (Curiac, Daniel-Ioan)

Source: JOURNAL OF SYSTEMS AND SOFTWARE Volume: 156 Pages: 204-216 DOI: 10.1016/j.jss.2019.06.099 Published: OCT 2019

Times Cited in Web of Science Core Collection: 0

Total Times Cited: 0

Usage Count (Last 180 days): 6

Usage Count (Since 2013): 6

Cited Reference Count: 69

Abstract: Cyber physical systems (CPSs) are a fast-evolving technology based on a strong synergy between heterogeneous sensing, networking, computation and control modules. When coping with critical applications that require real-time performance and autonomous operation in uncertain conditions, the design of such complex systems is still facing significant difficulties. A particular challenge in this respect derives from the software intensive nature of these systems - the need to develop flexible and specifically tailored task scheduling techniques. In our view, an appropriate line of thinking is to take advantage of mixed criticality concepts following the lessons learned from avionics and automotive domains, where complexity, safety, determinism and real-time constraints are extreme. From this perspective, our work aims at facilitating the integration of mixed criticality systems-based strategy in cyber physical systems by identifying the particularities of the latter and their influence on scheduling mechanisms, by describing the standard mixed-criticality task model in the cyber physical systems context, and by analyzing and proposing the most suitable scheduling algorithms to be implemented in cyber physical systems. Moreover, the perspectives on future developments in this area are discussed, as new horizons in research arise with the integration of mixed criticality concepts in the cyber physical systems context. (C) 2019 Elsevier Inc. All rights reserved.

Accession Number: WOS:000483658000013

Language: English

Document Type: Article

Author Keywords: Cyber physical systems; Real-time scheduling; Mixed criticality systems; Multiple processing units

KeyWords Plus: ARCHITECTURE; HEURISTICS

Addresses: [Capota, Eugenia Ana; Stangaciu, Cristina Sorina; Micea, Mihai Victor] Politehn Univ, Comp & Informat Technol Dept, Vasile Parvan 2, Timisoara 300223, Romania.

[Curiac, Daniel-Ioan] Politehn Univ, Automat & Appl Informat Dept, Vasile Parvan 2, Timisoara 300223, Romania.

Reprint Address: Curiac, DI (reprint author), Politehn Univ, Automat & Appl Informat Dept, Vasile Parvan 2, Timisoara 300223, Romania.

E-mail Addresses: eugenia.capota@cs.upt.ro; cristina.stangaciu@cs.upt.ro; mihai.micea@cs.upt.ro; daniel.curiac@aut.upt.ro

Author Identifiers:

Author	Web of Science ResearcherID	ORCID Number
Curiac, Daniel-Ioan	H-1008-2013	0000-0001-6617-073X

Publisher: ELSEVIER SCIENCE INC

Publisher Address: STE 800, 230 PARK AVE, NEW YORK, NY 10169 USA

Web of Science Categories: Computer Science, Software Engineering; Computer Science, Theory & Methods

Research Areas: Computer Science

IDS Number: IU5WM

ISSN: 0164-1212

eISSN: 1873-1228

29-char Source Abbrev.: J SYST SOFTWARE

ISO Source Abbrev.: J. Syst. Softw.

Source Item Page Count: 13

Output Date: 2020-02-19