
Abstract

The state of computing science and, particularly, software engineering and knowledge engineering is generally considered immature. The best starting point for achieving a mature engineering discipline is a solid scientific theory, and the primary reason behind the immaturity in these fields is precisely that computing science still has no such agreed upon underlying theory. As theories in other fields of science do, this paper formally establishes the fundamental elements and postulates making up a first attempt at a theory in this field, considering the features and peculiarities of computing science. The fundamental elements of this approach are informons and holons, and it is a general and comprehensive theory of software engineering and knowledge engineering that related disciplines (e.g., information systems) can particularise and/or extend to take benefit from it (Lakatos' concepts of core theory and protective belt theories).

Keywords

Computing science theory  Holarchy  Holons  Informons  Postulates

This is a preview of subscription content, log in to check access.

Notes

Acknowledgements
We would like to thank La Caixa, for providing all the information regarding SIPBC and for funding project P021005-056, and Rachel Elliott (CETTICO: Centre of Computing and Communications Technology Transfer), for her help in translating this paper.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References


applications. New York: Cambridge University Press.

Google Scholar (http://scholar.google.com
/scholar_lookup?title=The%20description%20logic%20handbook%3A%20Theory%20and%20applications&publication_year=2003)


Google Scholar (http://scholar.google.com


Google Scholar (http://scholar.google.com
/scholar_lookup?title=Mind%20and%20nature%20%3A%20A%20necessary%20unity&author=G.%20Bateson&publication_year=1979)


Google Scholar (http://scholar.google.com
/scholar_lookup?title=An%20essay%20toward%20solving%20a%20problem%20in%20the%20doctrine%20of%20chances&author=T.%20Bayes&journal=Philosophical%20Transactions%20of%20the%20Royal%20Society%20of%20London&volume=53&pages=370-418&publication_year=1763)


Google Scholar (http://scholar.google.com
/scholar_lookup?title=The%20complete%20murphy’s%20law&author=A.%20Bloch&publication_year=1990)


Google Scholar (http://scholar.google.com
/scholar_lookup?title=The%20computer%20scientist%20as%20toolsmith%20II&author=FP.%20Brooks&journal=Communications%20of%20the%20ACM&volume=39&issue=3&pages=61-68&publication_year=1996)


Google Scholar (https://scholar.google.com/scholar?q=Cara%C3%A7a-Valente%2C%20J.%20P.%2C%20G%C3%B3mez-P%C3%A9rez%2C%20A.%2C%20Juristo%2C%20N.%2C%20Pazos%2C%20J&hl=en&as_sdt=0,5&as_vis=1&vq=Proceedings%20of%20the%205th%20UNB%20artificial%20intelligence%20symposium%2C%20Canada%20(pp%2C%20309-%20319).&as_q=&as_ia=0&lr=lang_en&as_initials=0&as_friendly=0&as_qdr=all&as_ylo=1993&as_yhi=1993&as_vis=1&as_qdr=all&as_ylo=1993&as_yhi=1993


theories, architectures and languages, Hungary (pp. 21–35).

Google Scholar (https://scholar.google.com/scholar?q=Franklin%2C%20S.%20%26%20Graesser%2C%20A.%20%281996%29.%20Is%20it%20an%20agent%20or%20just%20a%20program%3F%3A%20A%20taxonomy%20for%20autonomous%20agents.%20In%20Proceedings%20of%20the%203rd%20International%20Workshop%20on%20Agent%20Theories%20and%20Languages%20in%20Hungary%20%28pp.%2021%E2%80%9335%29.)


Google Scholar (http://scholar.google.com/scholar_lookup?title=Webster%27s%20new%20world%20dictionary&publication_year=1986)


Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20systematic%20review%20of%20theory%20use%20in%20software%20engineering%20experiments&author=JE.%20Hannay&author=DIK.%20Sj%C3%B8berg&author=T.%20Dyb%C3%A5&journal=IEEE%20Transactions%20on%20Software%20Engineering&volume=33&


A New Approach to Computing Using Informons and Holons: Towards ...


1. **A Privacy-Preserving Trust Model Based on Blockchain for VANETs**
   Lu, Zhaojun... Liu, Zhenglin  
   *IEEE Access* (2018)

2. **A new approach to computing using informons and holons**
   de la Peña Esteban, F. David... Sierra, Juan Pazos  
   *Proceedings of the First International Conference on Data Science, E-learning and Information Systems - DATA '18* (2018)

3. **A Blockchain Based Decentralized Platform for Ubiquitous Learning Environment**
   Bdiwi, Rawia... Cherif, Arab Ali  