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Mario M. Kubek,
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Nr. 862

Autonomous Systems 2018

Proceedings of the 11th Conference

FernUniversität in Hagen
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To meet the expectations raised by the terms Industry 4.0, Industrial Internet and Internet of Things, real innovations are necessary, which can be brought about by information processing systems working autonomously. Owing to their growing complexity and their embedding in ever-changing environments, their design becomes increasingly critical. Thus, the many topics addressed in this book range from data integration on hardware level to methods for security and safety of data and to stochastic methods, data interferences as well as machine learning and search in decentralised systems. Their validity is proven by extensive simulation results. Also, applications for methods from deep learning and neurocomputing are presented. The sustainable management of energy systems using intelligent methods of self-organisation and learning is dealt with in the second major part of this book. As in these particular settings, the assessment of network vulnerabilities plays a crucial role, respective methods are discussed as well. Finally, the establishment of trustbased machine-to-machine communication is elaborated on in detail.

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Preface

Choose a job you love, and you will never have to work a day in your life.

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'Publish or Perish' is probably the most famous slogan of deans, university presidents and administration staff forcing their researchers to increase their numbers of written publications in highly ranked international conferences and journals. Rather sick brains created over the years more and more complex evaluation and control measures, neglecting that the own reputation of a researcher is the best quality assurance. Last but not least, an overwhelming number of grants and other third-party research money applications drastically reduce the time for state-of-the-art science once more. In fact, all those measures have a negative impact on the scientists' inspiration and creativity, do not contribute to a more successful scientific work and just hide the permanent underfinancing of today's universities.

The editors of the recent proceedings of the 11th Conference on Autonomous Systems, held again in the scenic environment of the small village of Cala Millor, wonder in this year for the first time, why the number of (optional) written contributions has reduced while the numbers of participants is almost constant. We found the answer to that question in an increasingly powerful wish of most scientists to slow down, go away from bureaucratic, unneeded and incomprehensible paperwork and senseless meetings. We think that it is the strong need to return to the roots of science, have time for a dispute or an interesting, but maybe not immediately goal-directed chat, a competition of ideas and last but not least to find an inspiring place away from more and more irrational world politics.

A consideration of the contents of the papers over the years reflects the changing interests of our participants triggered by a rapidly changing world around us. For the first time, huge amounts of data have been made available to various system levels by different sensors and applications all over the world in the last decade. Its exploitation became a huge business field and its influence is reflected within science in general as well as in the contributions of the first big part of our proceedings. Topics range from data integration on hardware level

to methods for security and safety of data and to stochastic methods, data interferences as well as machine learning. The second part of contributions is closer connected with the hardware and system level: data assessments, simulation results and new algorithms including intelligent methods of self-organisation and learning increasingly influence the design of systems and are presented by the authors.

We are thankful to our two invited speakers, Mrs. C. Yuan and Mr. P. Meesad, for accepting the difficult task to give us an overview of and some perspectives on those complex, often interdisciplinary developments. Furthermore, we wish to thank the members of the steering committee Mr. W. A. Halang and Mr. H. Unger for their constant support and trust extended to us. Last but not least, we have to thank again Mrs. Düring and Mrs. Kleine for their enduring support in all organising tasks of our event. In addition, we appreciate the support of FernUniversität in Hagen given to publish this volume.

Finally, we hope that we meet with our event the needs of the participants, can all together spend some quiet, inspiring and peaceful days in the Sabina Playa Hotel on Majorca Island with a lot of deep and fruitful discussions. We hope that all participants feel well in the special atmosphere of our event and will join us again in the next years.

Hagen, August 2018

Mario M. Kubek
Zhong Li

Contents

Hardware, Energy and Systems