Volker Wohlgemuth • Frank Fuchs-Kittowski Jochen Wittmann
Editors

Advances and New Trends in Environmental Informatics

Stability, Continuity, Innovation

Contents

Part I Design, Sustainability and ICT	
Analysis of Product Lifecycle Data to Determine he Environmental Impact of the Apple iPhone Hans-Knud Arndt and Chris Ewe	3
Sustainable Software Design for Very Small Organizations Stefanie Lehmann and Hans-Knud Arndt	15
Software Development Guidelines for Performance and Energy: Initial Case Studies Christian Bunse and Andre Rohde	25
Green ICT Research and Challenges Roberto Verdecchia, Fabio Ricchiuti, Albert Hankel, Patricia Lago and Giuseppe Procaccianti	37
Some Aspects of Using Universal Design as a Redesign Strategy for Sustainability Moyen M. Mustaquim and Tobias Nystrom	49
Part II Disaster Management for Resilience and Public Safety	
Development of Web Application for Disaster-Information Collection and Its Demonstration Experiment Foshihiro Osaragi, Ikki Niwa and Noriaki Hirokawa	63
Social Media Resilience During Infrastructure Breakdowns Using Mobile Ad-Hoc Networks Christian Reuter, Thomas Ludwig, Marc-Andre Kaufhold	75

Contents

Collection and Integration of Multi-spatial and Multi-type Data for Vulnerability Analysis in Emergency Response Plans Harsha Gwalani, Armin R. Mikler, Suhasini Ramisetty-Mikler and Martin O'Neill	89
EPISECC Common Information Space: Defining Data Ownership in Disaster Management Gerhard Zuba, Lina Jasmontaite, Uberto Delprato, Georg Neubauer and Alexander Preinerstorfer	103
Part III Energy Systems	
Integrating Social Acceptance of Electricity Grid Expansion into Energy System Modeling: A Methodological Approach for Germany Karoline A. Mester, Marion Christ, Melanie Degel and Wolf-Dieter Bunke	115
Dynamic Portfolio Optimization for Distributed Energy Resources in Virtual Power Plants Stephan Balduin, Dierk Brauer, Lars Elend, Stefanie Holly, Jan Korte, Carsten Kriiger, Almuth Meier, Frauke Oest, Immo Sanders-Sjuts, Torben Sauer, Marco Schnieders, Robert Zilke, Christian Hinrichs and Michael Sonnenschein	131
Distributed Power Management of Renewable Energy Resources for Grid Stabilization Bengt Liiers, Marita Blank and Sebastian Lehnhoff	143
Proposing an Hourly Dynamic Wind Signal as an Environmental Incentive for Demand Response Anders Nilsson and Nils Brandt	153
Part IV Energy System Modelling—Barriers, Challenges and Good Practice in Open Source Approaches	
Wind Energy Scenarios for the Simulation of the German Power System Until 2050: The Effect of Social and Ecological Factors Marion Christ, Martin Soethe, Melanie Degel and Clemens Wingenbach	167
AC Power Flow Simulations within an Open Data Model of a High Voltage Grid Ulf Philipp Miiller, Ilka Cussmann, Clemens Wingenbach and Jochen Wendiggensen	181

Contents xi

Part V Sustainable Mobility	
Empirical Study of Using Renewable Energies in Innovative Car-Sharing Business Model "in Tandem" at the University of Hildesheim Mohsan Jameel, Olexander Filevych and Helmut Lessing	197
Trends in Mobility: A Competitive Based Approach for Virtual Mobility Providers to Participate in Transportation Markets Alexander Sandau, Jorge Marx Gomez and Benjamin Wagner vom Berg	209
Part VI Life Cycle Assessment	
Regionalized LCI Modeling: A Framework for the Integration of Spatial Data in Life Cycle Assessment Juergen Reinhard, Rainer Zah and Lorenz M. Hilty	223
Open Calculator for Environmental and Social Footprints of Rail Infrastructures Francisco Barrientos, Gregorio Sainz, Alberto Moral, Manuel Parra, Jose M. Bem'tez, Jorge Rodriguez, Carlos Martinez, Francisco Campo and Ruben Carnerero	237
Part VII Health Systems	
A Computational Intelligence Approach to Diabetes Mellitus and Air Quality Levels in Thessaloniki, Greece Kostas Karatzas, Vassiliki Dourliou, Nikolaos Kakaletsis, Nikolaos Katsifarakis, Christos Savopoulos and Apostolos I. Hatzitolios	253
Aggregation and Measurement of Social Sustainability and Social Capital with a Focus on Human Health Andi H. Widok and Volker Wohlgemuth	263
Optimal Noise Filtering of Sensory Array Gaseous Air Pollution Measurements Barak Fishbain, Shai Moshenberg and Uri Lerner	275
Part VIII Frameworks, Platforms, Portals	
Generic Web Framework for Environmental Data Visualization Eric Braun, Clemens Dupmeier, Daniel Kimmig, Wolfgang Schillinger and Kurt Weissenbach	289

xii Contents

Creating a Data Portal for Small Rivers in Rostock Sebastian Hiibner, Ferdinand Vettermann, Christian Seip and Ralf Bill	301
Convergent Infrastructures for Municipalities as Connecting Platform for Climate Applications Jens Heider and Jorg Lassig	311
Part IX Others	
ICT Support of Environmental Compliance—Approaches and Future Perspectives Heiko Thimm	323
Communicating Environmental Issues of Software: Outline of an Acceptance Model Eva Kern	335
Partial Optimization of Water Distribution System Accounting for Multiobjective System Safety Marcin Stachura	347
Towards Environmental Analytics: DPSIR as a System of Systems Corrado Iannucci, Michele Munafo and Valter Sambucini	357