Data Mining Trends and Applications in Criminal Science and Investigations

Part of the Advances in Data Mining and Database Management Book Series

Omowunmi E. Isafiade (University of Cape Town, South Africa) and Antoine B. Bagula (University of the Western Cape, South Africa)

Description:

The field of data mining is receiving significant attention in today's information-rich society, where data is available from different sources and formats, in large volumes, and no longer constitutes a bottleneck for knowledge acquisition. This rich information has paved the way for novel areas of research, particularly in the crime data analysis realm.

Data Mining Trends and Applications in Criminal Science and Investigations presents scientific concepts and frameworks of data mining and analytics implementation and uses across various domains, such as public safety, criminal investigations, intrusion detection, crime scene analysis, and suspect modeling. Explores the diverse ways that data is revolutionizing the field of criminal science.

Readers:

This publication meets the research needs of law enforcement professionals, data analysts, investigators, researchers, and graduate-level students.

ISBN: 9781522504634 Release Date: June, 2016 Copyright: 2016 Pages: 344

Topics Covered:

- Crime Analysis
- Crime Mapping
- Crime Suspect Monitoring
- Cyber Crime
- Data Analytics
- Forensic Investigations
- Visual Data Mining

Hardcover + E-Access = $210.00
Free E-Access: $210.00

Order Information
Phone: 717-533-8845 x100
Toll Free: 1-866-342-6657
Fax: 717-533-8661 or 717-533-7115
Online Bookstore: www.igi-global.com
# Table of Contents

**Foreword**

**Preface**

**Acknowledgment**

**Section 1**
**Challenges and Existing Strategies in Public Safety and Crime Mining**

**Chapter 1**
On the Advancement of Using Data Mining for Crime Situation Recognition: A comparative review
*Omonwnmi E. Isafiade, University of Cape Town, South Africa*
*Antoine B. Bagula, University of Western Cape, South Africa*
*Sonia Berman, University of Cape Town, South Africa*

**Chapter 2**
A Classification Framework for Data Mining Applications in Criminal Science and Investigations
*Mahima Goyal, Ambedkar Institute of Advanced Communication Technologies and Research, India*
*Vishal Bhatnagar, Ambedkar Institute of Advanced Communication Technologies and Research, India*
*Arushi Jain, Ambedkar Institute of Advanced Communication Technologies and Research, India*

**Section 2**
**HotSpot, Spatial and Visual Analytics**

**Chapter 3**
Visual Analytics for Crime Analysis and Decision Support
*Chih-Hao Ku, Lawrence Technological University, USA*
*Alicia Iribarri, California State University, USA*
*Goutam K Jena, Lawrence Technological University, USA*

**Chapter 4**
Crime Hotspot Detection - Computational Perspective
*Emre Efthimioglou, University of Minnesota, USA*
*Shashi Shekhar, University of Minnesota, USA*
*Xun Tang, University of Minnesota, USA*

**Chapter 5**
Visual Data Mining: A Great Opportunity for Criminal Investigation
*Mehrdad Ghazisag, University of the Western Cape, South Africa*
*Nathan De La Cruz, University of the Western Cape, South Africa*
*Antoine Bagula, University of the Western Cape, South Africa*
*James Connan, Rhodes University, South Africa*

**Section 3**
**Forensics, Suspect Modeling and Intelligence Gathering**

**Chapter 6**
On the use of Bayesian Network in Crime Suspect Modelling and Legal Decision Support
*Omonwnmi E. Isafiade, University of Cape Town, South Africa*
*Antoine B. Bagula, University of Western Cape, South Africa*
*Sonia Berman, University of Cape Town, South Africa*

**Chapter 7**
Forensic Investigation of Digital Crimes in Healthcare Applications
*Nourhene Ellouze, University of Carthage, Tunisia*
*Slim Rekhis, University of Carthage, Tunisia*
*Noureddine Boudriga, University of Carthage, Tunisia*

**Section 4**
**Denial of Service, Cyber-Crime and Intrusion Detection Management**

**Chapter 8**
Data Mining Analytics for Crime Security Investigation and Intrusion Detection
*Boutheina A. FESSI, University of Carthage, Tunisia*
*Yacine Djemaïel, University of Carthage, Tunisia*
*Noureddine Boudriga, University of Carthage, Tunisia*

**Chapter 9**
Automated Identification of Child Abuse in Chat Rooms by Using Data Mining
*Mohammadreza Keyvanpour, Alzahra University, Iran*
*Mohammadreza Ebrahimi, Concordia University, Canada*
*Necmiye Genc Neyezi, Ecole de Technologie Superieure – ÉTS, Canada*
*Olga Ormandjieva, Concordia University, Canada*
*Ching Y. Suen, Concordia University, Canada*

**Chapter 10**
Data Mining Techniques for Denial of Service Attacks Detection
*Pheeja Machaka, Council for Scientific and Industrial Research, South Africa*
*Andre McDonald, Council for Scientific and Industrial Research, South Africa*
*Fulufhele Nelwamondo, Council for Scientific and Industrial Research, South Africa*

**Chapter 11**
Thoughtful Discussion on Data Mining Trends and Applications in Criminal Science and Investigations
*Omonwnmi E. Isafiade, University of Cape Town, South Africa*
*Antoine B. Bagula, University of Western Cape, South Africa*

**Compilation of References**

**About the Contributors**

**Index**
Omowunmi Isafadet is currently a senior teaching assistant and a doctoral researcher at the University of Cape Town (UCT), South Africa. She obtained an M.Sc. degree in Computer Science from her current affiliation (UCT), in December 2012. Past affiliations were with the African Institute for Mathematical Sciences (AIMS) and the University of the Western Cape, Cape Town, South Africa, where she obtained a post-graduate diploma (PGDs) degree in Mathematical Sciences in June 2010, and a Bachelor (BSc.) honors degree in computer science from Federal University of Agriculture Abeokuta (FUNAAB), Nigeria. Omowunmi's area of research includes Machine learning, data mining & knowledge management, ubiquitous intelligence and pattern recognition. Omowunmi has quality journal publications, technical reports and refereed conference publications in the aforementioned research areas.

Antoine Bagula obtained his doctoral degree from the KTH Royal Institute of Technology in Sweden. He held lecturing positions at Stellenbosch University (SUN) and the University of Cape Town (UCT) before joining the Computer Science department of the University of the Western Cape (UWC) in January 2014. Since 20016, Professor Bagula has consulted for the UNESCO, the World Bank and other international organizations on different telecommunication projects. Professor Bagula has been on the technical programme committees of more than 50 international conferences and on the editorial board of international journals. He has also co-chaired international conferences in the field of telecommunications and ICT. Professor Bagula has authored/co-authored more than 100 papers in peer-reviewed conferences, journals and book chapters. Professor Bagula’s research interest is communication networking with a specific focus on the Internet-of-Things, Cloud Computing, Network security and Network protocols for wireless, wired, and hybrid networks integrating wireless and wired technologies and protocols.