

Editor-in-Chief

A. Joe Turner, Seneca, SC, USA

Editorial Board

Foundations of Computer Science

Mike Hinchey, Lero, Limerick, Ireland

Software: Theory and Practice

Michael Goedicke, University of Duisburg-Essen, Germany

Education

Arthur Tatnall, Victoria University, Melbourne, Australia

Information Technology Applications

Ronald Waxman, EDA Standards Consulting, Beachwood, OH, USA

Communication Systems

Guy Leduc, Université de Liège, Belgium

System Modeling and Optimization

Jacques Henry, Université de Bordeaux, France

Information Systems

Jan Pries-Heje, Roskilde University, Denmark

ICT and Society

Jackie Phahlamohlaka, CSIR, Pretoria, South Africa

Computer Systems Technology

Paolo Prinetto, Politecnico di Torino, Italy

Security and Privacy Protection in Information Processing Systems

Kai Rannenber, Goethe University Frankfurt, Germany

Artificial Intelligence

Tharam Dillon, Curtin University, Bentley, Australia

Human-Computer Interaction

Annelise Mark Pejtersen, Center of Cognitive Systems Engineering, Denmark

Entertainment Computing

Ryohei Nakatsu, National University of Singapore

IFIP – The International Federation for Information Processing

IFIP was founded in 1960 under the auspices of UNESCO, following the First World Computer Congress held in Paris the previous year. An umbrella organization for societies working in information processing, IFIP's aim is two-fold: to support information processing within its member countries and to encourage technology transfer to developing nations. As its mission statement clearly states,

IFIP's mission is to be the leading, truly international, apolitical organization which encourages and assists in the development, exploitation and application of information technology for the benefit of all people.

IFIP is a non-profitmaking organization, run almost solely by 2500 volunteers. It operates through a number of technical committees, which organize events and publications. IFIP's events range from an international congress to local seminars, but the most important are:

- The IFIP World Computer Congress, held every second year;
- Open conferences;
- Working conferences.

The flagship event is the IFIP World Computer Congress, at which both invited and contributed papers are presented. Contributed papers are rigorously refereed and the rejection rate is high.

As with the Congress, participation in the open conferences is open to all and papers may be invited or submitted. Again, submitted papers are stringently refereed.

The working conferences are structured differently. They are usually run by a working group and attendance is small and by invitation only. Their purpose is to create an atmosphere conducive to innovation and development. Refereeing is also rigorous and papers are subjected to extensive group discussion.

Publications arising from IFIP events vary. The papers presented at the IFIP World Computer Congress and at open conferences are published as conference proceedings, while the results of the working conferences are often published as collections of selected and edited papers.

Any national society whose primary activity is about information processing may apply to become a full member of IFIP, although full membership is restricted to one society per country. Full members are entitled to vote at the annual General Assembly, National societies preferring a less committed involvement may apply for associate or corresponding membership. Associate members enjoy the same benefits as full members, but without voting rights. Corresponding members are not represented in IFIP bodies. Affiliated membership is open to non-national societies, and individual and honorary membership schemes are also offered.

Daoliang Li Yingyi Chen (Eds.)

Computer and Computing Technologies in Agriculture VI

6th IFIP WG 5.14 International Conference, CCTA 2012
Zhangjiajie, China, October 19-21, 2012
Revised Selected Papers, Part I

Volume Editors

Daoliang Li
Yingyi Chen
China Agricultural University
China-EU Center for Information
and Communication Technologies in Agriculture (CICTA)
17 Tsinghua East Road, Beijing, 100083, P.R. China
E-mail: {dliangl, chenyingyi}@cau.edu.cn

ISSN 1868-4238

e-ISSN 1868-422X

ISBN 978-3-642-36123-4

e-ISBN 978-3-642-36124-1

DOI 10.1007/978-3-642-36124-1

Springer Heidelberg Dordrecht London New York

Library of Congress Control Number: 2013930789

CR Subject Classification (1998): J.0, I.2.9-11, I.2.6, H.4.2-3, I.4.8-9, I.5.1,
I.5.4, C.2.1, C.2.m, H.2.8, I.2.4, C.3

© IFIP International Federation for Information Processing 2013

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in any other way, and storage in data banks. Duplication of this publication or parts thereof is permitted only under the provisions of the German Copyright Law of September 9, 1965, in its current version, and permission for use must always be obtained from Springer. Violations are liable to prosecution under the German Copyright Law.

The use of general descriptive names, registered names, trademarks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Preface

First of all, I must express my sincere thanks to all authors who submitted research papers to support the Sixth International Conference on Computer and Computing Technologies in Agriculture (CCTA 2012), held in Zhangjiajie, China, 19–21 October 2012.

This conference was hosted by China Agricultural University, the IFIP TC5 Working Group (WG) on Advanced Information Processing for Agriculture (AIPA), and the Agricultural Engineering Information Committee of the Chinese Society of Agricultural Engineering, and was organized by the China-EU Centre for Information and Communication Technologies (CICTA).

Proper scale management is not only the necessary approach to agromodernization and agro-industrialization but is also required by the growth in agricultural productivity, so, the application of different technologies in agriculture is becoming especially important. ‘Informatized Agriculture’ and the ‘Internet of Things’ have been chased by many countries recently in order to scientifically manage agriculture to achieve low costs and high income. CICTA aims to promote research and development in advanced and practical technologies applied in agriculture and to encourage international communication and cooperation, and has successfully held six international conferences on Computer and Computing Technologies in Agriculture since 2007.

The topics of CCTA 2012 cover a wide range of interesting theory and applications related to kinds of technology in agriculture, including the Internet of Things and cloud computing; simulation models and decision-support systems for agricultural production; smart sensors, monitoring and control technology; traceability and e-commerce technology; computer vision, computer graphics and virtual reality; the application of information and communication technology in agriculture; and universal information service technology and service systems development in rural areas.

We selected 108 best papers among all the papers submitted to CCTA 2012 for these proceedings. The papers have divided into two thematic sections. Creative thoughts and inspirations have been discovered, discussed and disseminated. It is always exciting when creative experts, professionals and scholars get together to share inspiring ideas and hopefully accomplish great developments in the technologies in high demand.

Finally, I would like to express my sincere thanks to all authors, speakers, session chairs and attendees both coming from abroad and from mainland China for their active participation and support of this conference.

Conference Organization

Organizer

China-EU Center for Information and Communication Technologies
in Agriculture (CICTA)

Chairman

Daoliang Li

Conference Secretariat

Lihong Shen

SPONSORS

China Agricultural University

The IFIP TC5 Working Group (WG) on Advanced Information Processing for
Agriculture (AIPA)

Agricultural Engineering Information Committee, Chinese Society
of Agricultural Engineering

Table of Contents – Part I

Research on the “Three Networks in One” Orchard Production Information Service System	1
<i>Yun Qiu, Jingchao Fan, Lin Hu, and Guomin Zhou</i>	
Rapid Identification of Waste Cooking Oil with Near Infrared Spectroscopy Based on Support Vector Machine	11
<i>Xiong Shen, Xiao Zheng, Zhiqiang Song, Dongping He, and Peishi Qi</i>	
A Decision Support System for Fish Feeding Based on Hybrid Reasoning	19
<i>Mingfei Zhang, Huiping Xue, Lianzhi Wang, and Daoliang Li</i>	
Design and Implementation of Parent Fish Breeding Management System Based on RFID Technology	27
<i>Yinchi Ma and Wen Ding</i>	
Design and Development of Dissolved Oxygen Real-Time Prediction and Early Warning System for Brocaded Carp Aquaculture	35
<i>Huiping Xue, Lianzhi Wang, and Daoliang Li</i>	
A Greenhouse Control with Sectional-Control Strategy Based on MPT Intelligent Algorithm	43
<i>Fengyun Wang, Lin Mei, Wenjie Feng, Lei Wang, Limin Wang, and Huaijun Ruan</i>	
Research on Digital Construction of Crop Plant Type Based on a Kind of Improved Functional-Structural Model and Component Technology	51
<i>Zhenqi Fan, Chunjing Si, and Quanli Yang</i>	
Edge Geometric Measurement Based Principal Component Analysis in Strawberry Leaf Images	58
<i>Jianlun Wang, Yu Han, Zetian Fu, Daoliang Li, Jianshu Chen, and Shuting Wang</i>	
The Research of the Strawberry Disease Identification Based on Image Processing and Pattern Recognition	69
<i>Changqi Ouyang, Daoliang Li, Jianlun Wang, Shuting Wang, and Yu Han</i>	

Selection of Leaf Orientation Insensitive Bands for Yellow Rust Detection	78
<i>Lin Yuan, Jingcheng Zhang, Jinling Zhao, Shuhong Cai, and Jihua Wang</i>	
Forecasting the Total Power of China's Agricultural Machinery Based on BP Neural Network Combined Forecast Method	85
<i>Jinyan Ju, Lin Zhao, and Jinfeng Wang</i>	
Self-Organizing Map Analysis on Peanut Yield and Agronomy Characteristics	94
<i>Yujian Yang and Mingchuan Ji</i>	
Modeling and Simulating of Spatial Spread of Cross-Boundary Crop Diseases	101
<i>Jiaogen Zhou, Xu Chen, Jingyin Zhao, and Dongsheng Wang</i>	
Greenhouse Wireless Monitoring System Based on the ZigBee	109
<i>Minghua Shang, Guoying Tian, Leilei Qin, Jia Zhao, Huaijun Ruan, and Fengyun Wang</i>	
Application of an Artificial Neural Network for Predicting the Texture of Whey Protein Gel Induced by High Hydrostatic Pressure	118
<i>Jinsong He and Taihua Mu</i>	
The Classic Swine Fever Morbidity Forecasting Research Based on Combined Model	126
<i>Yi Liang and Shihong Liu</i>	
Application and Research of Man-Machine Interface and Communication Technique of Mobile Information Acquisition Terminal in Facility Production	133
<i>Jinlei Li, Xin Zhang, Quanming Zhao, Wengang Zheng, Changjun Shen, and Zhipeng Shi</i>	
CFD Modeling and Simulation of Superheated Steam Fluidized Bed Drying Process	141
<i>ZhiFeng Xiao, Fan Zhang, NanXing Wu, and XiangDong Liu</i>	
Feasibility Study of Veterinary Drug Residues in Honey by NIR Detection	150
<i>Hongqian Chen, Zhenhua Tu, Zhaoshen Qing, Xiaobin Qiu, and Chaoying Meng</i>	
Study on Anti-collapse Behavior of Solar Greenhouses Covering Rigid Plate under Snowstorm	157
<i>Chuanjia Hu, Yujia Dai, Jiahe Wang, Mengyan Song, Xiugen Jiang, and Min Ding</i>	

Study on Identification Method of Foreign Fibers of Seed Cotton in Hyper-spectral Images Based on Minimum Noise Fraction	166
<i>Laiqi Xu, Xinhua Wei, Xinyun Zhou, Dazhi Yu, and Jinmin Zhang</i>	
Study on Agricultural Information Push Technology Based on User Interest Model	177
<i>Xiaorong Yang, Qingtian Zeng, Nengfu Xie, and Lihua Jiang</i>	
Research on Computer Vision-Based Object Detection and Classification	183
<i>Juan Wu, Bo Peng, Zhenxiang Huang, and Jietao Xie</i>	
Automatic Detection of Kiwifruit Defects Based on Near-Infrared Light Source	189
<i>Pingping Li, Yongjie Cui, Yufeng Tian, Fanian Zhang, Xiaxia Wang, and Shuai Su</i>	
The Fractal Dimension Research of Chinese and American Beef Marbling Standards Images	199
<i>Jianwen Chen, Meiyong Liu, and Li Zong</i>	
Research and Application of Human-Computer Interaction System Based on Gesture Recognition Technology	210
<i>Zhenxiang Huang, Bo Peng, and Juan Wu</i>	
Crop Model-Based Greenhouse Optimal Control System: Survey and Perspectives	216
<i>Qiaoxue Dong, Weizhong Yang, Lili Yang, Yifei Chen, Shangfeng Du, Li Feng, Qinglan Shi, and Yun Xu</i>	
Cold Chain Logistics Monitoring System with Temperature Modeling	225
<i>Shaixin Guo, Fan Zhang, and Jianqin Wang</i>	
Wheat Three-Dimensional Reconstruction and Visualization System	234
<i>Hao Zhang, Qiang Wang, Hui Zhang, Yali Ji, Xinming Ma, and Lei Xi</i>	
Study on Agricultural Condition Monitoring and Diagnosing of Integrated Platform Based on the Internet of Things	244
<i>Jinying Yu and Wei Zhang</i>	
The System of Anti-bud Injury in Seedcane Cutting Based on Computer Vision	251
<i>Yiqi Huang, Xi Qiao, and Jian Yang</i>	
A Multi-parameter Integrated Water Quality Sensors System	260
<i>Mingli Li, Daoliang Li, Qisheng Ding, Ya Chen, and Chengfei Ge</i>	

Research and Development of Decision Support System for Regional Agricultural Development Programming	271
<i>Jiangang Liu, Yongchang Wu, Tingting Tao, and Qingquan Chu</i>	
Designation of R&D on Pig Production Intelligent Monitoring and Early Warning	282
<i>Fantao Kong, Liyuan Xin, Wen Yu, Jianzhai Wu, and Yongen Zhang</i>	
Research on the Inconsistency Checking in Agricultural Knowledge Base	290
<i>Nengfu Xie</i>	
Applications of Internet of Things in the Facility Agriculture	297
<i>Linli Zhou, Liangtu Song, Chengjun Xie, and Jie Zhang</i>	
Automatic Navigation Based on Navigation Map of Agricultural Machine	304
<i>Jianjun Zhou, Xiu Wang, Rui Zhang, Qingchun Feng, and Wei Ma</i>	
Mathematical Study of the Effects of Temperature and Humidity on the Morphological Development of Pleurotus Eryngia Fruit Body	312
<i>Juan Yang, Jingyin Zhao, Hailong Yu, Yunsheng Wang, Ruijuan Wang, and Lihua Tang</i>	
Development of a Web-Based Prediction System for Wheat Stripe Rust	324
<i>Weigang Kuang, Wancai Liu, Zhanhong Ma, and Haiguang Wang</i>	
Research on Semantic Text Mining Based on Domain Ontology	336
<i>Lihua Jiang, Hong-bin Zhang, Xiaorong Yang, and Nengfu Xie</i>	
The Research and Design of the Android-Based Facilities Environment Multifunction Remote Monitoring System	344
<i>Lutao Gao, Linnan Yang, Lin Peng, Yingjie Chen, and Yongzhou Yu</i>	
Application of the ARIMA Models in Drought Forecasting Using the Standardized Precipitation Index	352
<i>Ping Han, Pengxin Wang, Miao Tian, Shuyu Zhang, Junming Liu, and Dehai Zhu</i>	
Study of Cluster Formation Algorithm for Aquaculture WSN Based on Cross-Layer Design	359
<i>Xufeng Hua, Chengxun Chen, Yunchen Tian, Yongjun Guo, and Kezhi Xing</i>	
The Survey of Fishery Resources and Spatial Distribution Using DIDSON Imaging Sonar Data	366
<i>Wei Shen, Long Yang, Jin Zhang, and Guangxiong Peng</i>	

Study on Cultivated Land Concentrated Areas Delineation Based on GIS and Mathematical Morphology: A Case of Miyun County and Pinggu District in Beijing	376
<i>Yanmin Ren, Yongxia Yang, Yuchun Pan, Yu Liu, Yunbing Gao, Xiumei Tang, and Zhixuan Zeng</i>	
Design and Implementation of Rapid Grading Platform for Shape and Diameter of Oranges Based on Visual C#.NET	384
<i>Wenshen Jia, Wenfu Wu, Fang Li, Ligang Pan, Zhihong Ma, Miao Gao, and Jihua Wang</i>	
A Fast Processing Method of Foreign Fiber Images Based on HSV Color Space	390
<i>Qinxiang Wang, Zhenbo Li, Jinxing Wang, Shuangxi Liu, and Daoliang Li</i>	
An Intelligent Four-Electrode Conductivity Sensor for Aquaculture	398
<i>Jiaran Zhang, Daoliang Li, Cong Wang, and Qisheng Ding</i>	
Integration and Development of On-Site Grain Yield Monitoring System Based on IPC	408
<i>Xiang Guo, Lihua Zheng, Xiaofei An, Jia Wu, and Minzan Li</i>	
Development and Performance Test for a New Type of Portable Soil EC Detector	418
<i>Xiaoshuai Pei, Lihua Zheng, Yong Zhao, Menglong Zhang, and Minzan Li</i>	
Retracted: Water Temperature Forecasting in Sea Cucumber Aquaculture Ponds by RBF Neural Network Model	425
<i>Shuangyin Liu, Longqin Xu, Ji Chen, Daoliang Li, Haijiang Tai, and Lihua Zeng</i>	
Discussion on Calculation Method of Social Stability Price of Farmland Requisition Price: Taking Bazhou City as an Example	437
<i>Yapeng Zhou, Lin Liu, Yang Yang, Li Zhang, Hao Xu, Yigong Zhang, and Zhiwei Li</i>	
Quantitative Analysis of and Discussion on Social Security Price of Farmland in Land Requisition Price	444
<i>Yapeng Zhou, Lin Liu, Yang Yang, Ying Chen, Hao Xu, Wenting Zhao, and Na Hao</i>	
Erratum	
Water Temperature Forecasting in Sea Cucumber Aquaculture Ponds by RBF Neural Network Model	E1
<i>Shuangyin Liu, Longqin Xu, Ji Chen, Daoliang Li, Haijiang Tai, and Lihua Zeng</i>	
Author Index	451

Table of Contents – Part II

Remote Sensing of Forest LAI from Multitemporal Optical Satellite Images over Mountain Area	1
<i>Yuechan Shi, Guijun Yang, Haikuan Feng, and Renli Wang</i>	
A Sampling Design for Monitoring of the Cultivated Areas of Main Crops at National Scale Based 3S Technologies in China	10
<i>Quan Wu, Zhiyan Pei, Fei Wang, Hu Zhao, Lin Guo, Juanying Sun, and Lijuan Jia</i>	
A Discussion on Spatial Distribution Differentiation Law of Peanut Quality in China Based on GIS Technology	20
<i>Liping Yang, Honghai Guo, Xinhua Li, and Shubo Wan</i>	
Research and Implementation of Measurement Data Wavelet De-noising and 3D Visualization of Farmland	27
<i>Weidong Zhuang, Chun Wang, and Xi Wang</i>	
Remote Sensing Recognition of Paddy Waterlogging Using Change Vector Analysis Model	36
<i>Xiaohu Gu, Jingcheng Zhang, Peng Xu, Yingying Dong, and Yansheng Dong</i>	
The Simulation Models of Nitrogen Accumulation and Partitioning in Plant for Protected Cultivated Tomato	44
<i>Yuli Chen, Hongxin Cao, Yan Zhu, Yan Liu, and Weixin Zhang</i>	
Systematic Random Deployment for Wireless Sensor Network in Agricultural Sampling-Interpolation Applications	53
<i>Hui Liu, Zhijun Meng, Hua Wang, and Min Xu</i>	
Using EPIC Model to Determine a Sustainable Potato/Cereal Cropping System in the Arid Region of the Loess Plateau of China	60
<i>Xuechun Wang, Jun Li, and Shishun Tao</i>	
Using Sequential Gaussian Simulation to Assess Geochemical Anomaly Areas of Lead Element	69
<i>Fengrui Chen, Shiqiang Chen, and Guangxiong Peng</i>	
Study on Bee Product Quality Control Chain Based on Agent	77
<i>Yue E, YePing Zhu, and YongSheng Cao</i>	

A Study of Agricultural Zoning of Huang-Huai-Hai Plain Based on GIS	84
<i>Manping Hou, Jinmin Hao, Ying Shi, Jun Yang, Qian Wen, Mingzhu Cha, and Lingkun Xiong</i>	
Particle Swarm Optimization Algorithm Establish the Model of Tobacco Ingredients in Near Infrared Spectroscopy Quantitative Analysis	92
<i>Bibo Ma and Haiyan Ji</i>	
Grain Moisture Sensor Data Fusion Based on Improved Radial Basis Function Neural Network	99
<i>Liu Yang, Gang Wu, Yuyao Song, and Lanlan Dong</i>	
Application of Quadratic Rotation-Orthogonal Composite Experimental Design to Assess the Relationship between Growth Environment and Ultraweak Luminescence of Mint	109
<i>Yao Zhan, Yi Lin, Chunfang Wang, Jianping Li, and Yong Yu</i>	
Application of Quadratic Rotation-Orthogonal Composite Experimental Design to Assess the Relationship between Growth Environment and Ultraweak Luminescence of Osmanthus Tree Seedings.....	117
<i>Yong Yu, Yao Zhan, Yi Lin, Chunfang Wang, and Jianping Li</i>	
Construction of Monitoring System of Dangerous and Harmful Species of Import Taiwan Fruits and Vegetables Based on GIS.....	126
<i>Hong Chen, Qiyong Weng, Meixiang Chi, Rongzhou Qiu, and Jian Zhao</i>	
Design and Experiment of NIR Wheat Quality Quick Detection System	135
<i>Lingling Liu, Bo Zhao, Yinqiao Zhang, and Xiaochao Zhang</i>	
Research on Prediction Model and Characteristic Parameters on Dry Matter Accumulation in Wheat Based on Normalized Method and Grey System	142
<i>Juan Liu, Xiaoli Zhao, Shuping Xiong, Xinming Ma, Yanfeng Wang, and Jing Wang</i>	
Spatial Optimization and Mode Analysis of Primary Industry Structure in Yellow River Delta.....	150
<i>Ping Yang and Yujian Yang</i>	
The Implementation of Satellite Data (Land SAF) in the INCA Surface Temperature for Austria	161
<i>Jing Liu, Jingyu Bai, Yong Wang, and Alexander Kann</i>	
Rice Blast Area Monitoring Based on HJ-CCD Imagery.....	168
<i>Litao Wang, Jidong Xiong, and Yagang Du</i>	

Urban Wetland Change Detection Using Time-Series Remote Sensing Data	177
<i>Lin Liu, Yapeng Zhou, Li Wang, Jianchun Hou, and Mingquan Wu</i>	
Data Quality Evaluation of ZY-1 02C Satellite	187
<i>Mingquan Wu, Jie Wang, Ni Yao, Zhongwei Hou, and Changyao Wang</i>	
Intellectualized Identifying and Precision Control System for Horticultural Crop Diseases Based on Small Unmanned Aerial Vehicle	196
<i>Hongxin Cao, Yuwang Yang, Zhiyuan Pei, Wenyu Zhang, Daokuo Ge, Yiran Sha, Weixin Zhang, Kunya Fu, Yan Liu, Yuli Chen, Hongjun Dai, and Hainan Zhang</i>	
Creating Topologically Consistent 3D City Models of LOD+ with Extrusion	203
<i>Yunfei Shi and Biao He</i>	
The Study of Soil Fertility Spatial Variation Feature Based on GIS and Data Mining	211
<i>Chunan Li, Guifen Chen, Guangwei Zeng, and Jiao Ye</i>	
Study on Agricultural Park Planning Methods Based on Omni-Directional Information Processing Technology	221
<i>Xueyuan Chen, Yongchang Wu, and Bingwen Zhao</i>	
Design and Realization of Agricultural Information Intelligent Processing and Application Platform	229
<i>Dan Wang</i>	
Study on the Spatial – Temporal Variability of Soil Nutrients during Winter Wheat Growth Season	238
<i>Bei Cui, Wude Yang, Meichen Feng, Wenjiang Huang, and Xiaoyu Song</i>	
Research of Determination Method of Starch and Protein Content in Buckwheat by Mid-Infrared Spectroscopy	248
<i>Fenghua Wang, Ju Yang, Hailong Zhu, and Zhiyong Xi</i>	
Research Progress of Grain Quality Nondestructive Testing Methods ...	255
<i>Fenghua Wang, Zhiyong Xi, Ju Yang, and Xiaojing Yang</i>	
Maize Disease Diagnosis Model Based on Ontology and Multi-Agent...	263
<i>Liyang Cao, Xiaoxian Zhang, Xiaohui San, Li Ma, and Guifen Chen</i>	
Design of Wireless Sensor Network Middleware for Agricultural Applications.....	270
<i>Liang Zhao, Liyuan He, Xing Jin, and Wenjun Yu</i>	

Research on the Method of Feature-Based Multi-scale Vector Data Model	280
<i>Yibing Dong, Jianyu Yang, Chao Zhang, Dehai Zhu, Xingyue Tu, and Xianzhe Qiao</i>	
The Current and Future Potential Geographical Distribution of the Italian Locust, <i>Calliptamus Italicus</i> (Linnaeus) (Orthoptera: Acrididae) in China	290
<i>Yujia Qin, Zhihong Li, Li Zhao, Glenn Fowler, and Yan Fang</i>	
A New Navigation Line Extraction Method for Agriculture Implements Guidance System	299
<i>Mingxuan Li, Man Zhang, Haiyan Huan, and Gang Liu</i>	
Definition and Standardization of Data Elements' Attributes in Land and Resources Management	309
<i>Lei Cong, Yongxia Yang, Dehai Zhu, Min Yin, and Jianlin Li</i>	
Design of Monitoring Network for Cultivated Land Quality in County Area Based on Kriging Estimation Variance	321
<i>Sai Tang, Jianyu Yang, Chao Zhang, Dehai Zhu, and Wenju Yun</i>	
The Potential Geographical Distribution of <i>Bactrocera cucurbitae</i> (Diptera: Tephritidae) in China Based on Eclosion Rate Model and ArcGIS	334
<i>Zhimei Li, Ningbo Wang, Jiajiao Wu, Jay Richard Stauffer, and Zhihong Li</i>	
The Potential Geographical Distribution of <i>Locusta migratoria tibetensis</i> Chen (Orthoptera: Acrididae) in Qinghai-Tibet Plateau	343
<i>Xiongbing Tu, Zhihong Li, Zehua Zhang, Zhigang Wu, Wenlong Ni, Liao Fu, and Yasen Shali</i>	
Study on Application of Scale Invariant Feature Transform Algorithm on Automated Geometric Correction of Remote Sensing Images	352
<i>Hui Deng, Limin Wang, Jia Liu, Dandan Li, Zhongxin Chen, and Qingbo Zhou</i>	
Research on Identifying Method of Freezing-Thawing Soil Hydraulic Properties	359
<i>Zilong Wang, Qiuxiang Jiang, Qiang Fu, and Tianxiao Li</i>	
Dynamic Simulation of Water Resources Sustainable Utilization of Kiamusze Based on System Dynamics	367
<i>Qiuxiang Jiang, Zilong Wang, and Qiang Fu</i>	
Visual Space Research and Application of the Data Mining in Soil Fertility Evaluation	376
<i>Hang Chen and Guifen Chen</i>	

Research on Construction and SWRL Reasoning of Ontology of Maize Diseases	386
<i>Li Ma, Helong Yu, Guifen Chen, Liying Cao, and Yueling Zhao</i>	
An Object-Oriented Binary Change Detection Method Using Nearest Neighbor Classification	394
<i>Jie Liang, Jianyu Yang, Chao Zhang, Jiabo Sun, Dehai Zhu, Liangshu Shi, and Jihong Yang</i>	
Quantifying the Type of Urban Sprawl and Dynamic Changes in Shenzhen	407
<i>Ruifang Hao, Wei Su, and Deyong Yu</i>	
Extraction of Water Body Based on LandSat TM5 Imagery – A Case Study in the Yangtze River.....	416
<i>Zhongshi Tang, Wenhao Ou, Yue Dai, and Yu Xin</i>	
Validation and Application of Model ISAREG in a Typical Semiarid Sand-Meadow Area of Horqin Sandy Land	421
<i>Yao Wu, Tingxi Liu, Luis Pereira, Paula Perards, and Haiyan Wang</i>	
The Classification Method of Multi-spectral Remote Sensing Images Based on Self-adaptive Minimum Distance Adjustment	430
<i>Junhua Liu, Chengming Zhang, and Shujing Wan</i>	
Analysis on Agricultural E-Commerce Platform Construction in Developed Areas Based on Rural Residents' Needs – Take the Case of Beijing	438
<i>Jian Cao and Yubin Wang</i>	
Real Time Detection of Soil Moisture in Winter Jujube Orchard Based on NIR Spectroscopy	447
<i>Xiaofei An, Minzan Li, Lihua Zheng, Yumeng Liu, and Yajing Zhang</i>	
Correlations between Nitrogen Content and Multispectral Image of Greenhouse Cucumber Grown in Different Nitrogen Level	456
<i>Wei Yang, Nick Sigrimis, Minzan Li, Hong Sun, and Lihua Zheng</i>	
A New Approach for Fast Calculation of Sloped Terrace Earthwork Based on GIS in the Hilly Regions	464
<i>Qingchun Zhang</i>	
The Estimation of Tree Height Based on LiDAR Data and QuickBird Imagery	472
<i>Wei Su, Rui Liu, Ting Liu, Jianxi Huang, Xiaodong Zhang, and Junming Liu</i>	
Author Index	483