
Human Activity Recognition Using Wearable Sensors And Smartphones Chapman Hallcrc Computer And Information Science Series

Human Activity Sensing

Artificial Neural Networks and Machine Learning -- ICANN 2014

Sensors and Actuators in Smart Cities

Sensor Data Analysis and Management

Pervasive Computing

Developments Of Artificial Intelligence Technologies In Computation And Robotics - Proceedings Of The 14th International Flins Conference (Flins 2020)

2020 IEEE 63rd International Midwest Symposium on Circuits and Systems (MWSCAS)

Location- and Context-Awareness

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Deep Learning for Human Activity Recognition

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Technologies for Smart Sensors and Sensor Fusion

2018 IEEE ACM International Conference on Computer Aided Design (ICCAD)

On the Automatic Recognition of Human Activities Using Heterogeneous Wearable Sensors

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Reliability and Statistical Computing

Pattern Classification

Adaptive Human Activity Recognition and Fall Detection Using Wearable Sensors

Advances in Practical Applications of Survivable Agents and Multi-Agent Systems: The PAAMS Collection

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Human Activity Recognition Using Wearable Sensors
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Human Activity Recognition

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LOGAN RUSH

Human Activity Sensing Springer

This book constitutes the refereed proceedings of the First International Workshop on Human Behavior Understanding, HBU 2010, a satellite workshop of the International Conference on Pattern Recognition in Istanbul, Turkey, on August 22, 2010. The 13 revised full papers presented were carefully reviewed and selected from 29 submissions. The papers are organized in topical sections on analysis of human activities; non-verbal action dynamics; visual action recognition; and social signals.

Artificial Neural Networks and Machine Learning -- ICANN 2014 Springer

Deep learning methods offer a lot of promise for time series forecasting, such as the automatic learning of temporal dependence and the automatic handling of temporal structures like trends and seasonality. With clear explanations, standard Python libraries, and step-by-step tutorial lessons you'll discover how to develop deep learning models for your own time series forecasting projects.

Sensors and Actuators in Smart Cities Springer Nature

Exciting new developments are enabling sensors to go beyond the realm of simple sensing of movement or capture of images to deliver information such as location in a built environment, the sense of touch, and the presence of chemicals. These sensors unlock the potential for smarter systems, allowing machines to interact with the world around them in more intelligent and sophisticated ways. Featuring contributions from authors working at the leading edge of sensor technology, *Technologies for Smart Sensors and Sensor Fusion* showcases the latest advancements in sensors with biotechnology, medical science, chemical detection, environmental monitoring, automotive, and industrial applications. This valuable reference describes the increasingly varied number of sensors that can be integrated into arrays, and examines the growing availability and computational power of communication devices that support the algorithms needed to reduce the raw sensor data from multiple sensors and convert it into the information needed by the sensor array to enable rapid transmission of the results to the required point. Using both SI and US units, the text: Provides a fundamental and analytical understanding of the underlying technology for smart sensors Discusses groundbreaking software and sensor systems as well as key issues surrounding sensor fusion Exemplifies the richness and diversity of development work in the world of smart sensors and sensor fusion Offering fresh insight into the sensors of the future, *Technologies for Smart Sensors and Sensor Fusion* not only exposes readers to trends but also inspires innovation in smart sensor and sensor system development.

Sensor Data Analysis and Management Springer

ICCAD serves EDA and design professionals, highlighting new challenges and innovative solutions for integrated circuit design technology and systems

Pervasive Computing Springer Nature

Delivering accurate and opportune information on people's activities and behaviors has become one of the most important tasks within pervasive computing. Its wide spectrum of potential applications in medical, entertainment, and tactical scenarios, motivates further research and development of new strategies to improve accuracy, pervasiveness, and efficiency. This dissertation addresses the recognition of human activities (HAR) with wearable sensors in three main regards: In the first place, physiological signals have been incorporated as a new source of information to improve the recognition accuracy achieved by conventional approaches, which rely on accelerometer signals solely. A new HAR system, Centinela, was born from such concept, employing structural feature extraction along with classifier ensembles, and achieving over 95% of recognition accuracy. In the second place, real time activity recognition was enabled by Vigilante, a mobile HAR framework under the Android™ platform. Providing immediate feedback on the user's activities is especially beneficial in healthcare and military applications, which may require alert triggering or support of decision making. The evaluation demonstrates that Vigilante is energy efficient while maintaining high accuracy (i.e., up to 96.8%) and low response time. The system features MECLA, a mobile library for the evaluation of classification algorithms, which is also suitable for further machine learning applications. Finally, the activity recognition accuracy is improved by two new strategies for decision fusion and selection in multiple classifier systems: the failure product and the precision-recall difference. The experimental analysis confirms that the presented methods are beneficial, not only for recognizing human activities, but also for many other classification problems.

Developments Of Artificial Intelligence Technologies In Computation And Robotics - Proceedings Of The 14th International Flins Conference (Flins 2020) Springer

Activity recognition can be an important part of human health awareness. Many benefits can be generated from the recognition results, including knowledge of activity intensity as it relates to wellness over time. Various activity-recognition techniques have been presented in the literature, though most address simple activity-data collection and off-line analysis. More sophisticated real-time identification is less often addressed. Therefore, it is promising to consider the combination of current off-line, activity-detection methods with wearable, embedded tools in order to create a real-time wireless human activity recognition system with improved accuracy. Different from previous work on activity recognition, the goal of this effort is to focus on specific activities that an astronaut may encounter during a mission. Planetary navigation field test (PNFT) tasks are designed to meet this need. The approach used by the KSU team is to pre-record data on the ground in normal earth gravity and seek signal features that can be used to identify, and even predict, fatigue associated

with these activities. The eventual goal is to then assess/predict the condition of an astronaut in a reduced-gravity environment using these predetermined rules. Several classic machine learning algorithms, including the k-Nearest Neighbor, Naïve Bayes, C4.5 Decision Tree, and Support Vector Machine approaches, were applied to these data to identify recognition algorithms suitable for real-time application. Graphical user interfaces (GUIs) were designed for both MATLAB and LabVIEW environments to facilitate recording and data analysis. Training data for the machine learning algorithms were recorded while subjects performed each activity, and then these identification approaches were applied to new data sets with an identification accuracy of around 86%. Early results indicate that a single three-axis accelerometer is sufficient to identify the occurrence of a given PNFT activity. A custom, embedded acceleration monitoring system employing ZigBee transmission is under development for future real-time activity recognition studies. A different GUI has been implemented for this system, which uses an on-line algorithm that will seek to identify activity at a refresh rate of 1 Hz.

2020 IEEE 63rd International Midwest Symposium on Circuits and Systems (MWSCAS)

Springer Nature

The papers in this proceeding discuss current and future trends in wearable communications and personal health management through the use of wireless body area networks (WBAN). The authors posit new technologies that can provide trustworthy communications mechanisms from the user to medical health databases. The authors discuss not only on-body devices, but also technologies providing information in-body. Also discussed are dependable communications combined with accurate localization and behavior analysis, which will benefit WBAN technology and make the healthcare processes more effective. The papers were presented at the 13th EAI International Conference on Body Area Networks (BODYNETS 2018), Oulu, Finland, 02-03 October 2018.

Location- and Context-Awareness John Wiley & Sons

This book presents the latest developments in both qualitative and quantitative computational methods for reliability and statistics, as well as their applications. Consisting of contributions from active researchers and experienced practitioners in the field, it fills the gap between theory and practice and explores new research challenges in reliability and statistical computing. The book consists of 18 chapters. It covers (1) modeling in and methods for reliability computing, with chapters dedicated to predicted reliability modeling, optimal maintenance models, and mechanical reliability and safety analysis; (2) statistical computing methods, including machine learning techniques and deep learning approaches for sentiment analysis and recommendation systems; and (3) applications and case studies, such as modeling innovation paths of European firms, aircraft components, bus safety analysis, performance prediction in textile finishing processes, and movie recommendation systems. Given its scope, the book will appeal to postgraduates, researchers, professors, scientists, and practitioners in a range of fields, including reliability engineering and management, maintenance engineering, quality management, statistics, computer science and engineering, mechanical engineering, business analytics, and data science.

Planetary Navigation Activity Recognition Using Wearable Accelerometer Data CRC Press

Technological advancements in healthcare can contribute unquestionably in reducing healthcare strains by ensuring clinicians, doctors and other medical staff operate and conduct their daily

activities more efficiently in the hospital vicinity. Since the turn of the 21st century, Human Activity Recognition (HAR) has undergone significant research in the healthcare domain. HAR utilised with powerful technologies can benefit remote patient monitoring, the elderly, patients suffering from chronic illness and ambient assisted living. Human activity recognition has shown to be effective in benefiting clinicians in the treatment and remote monitoring of patients. This field is not only vital for diagnosis and treatment, but also an assessment of how likely a medical patient will fall ill or die from certain diseases or health problems. To show the great importance of activity recognition in the health sector, analytically driving an improvement in accuracy in classifying patients' activities improves the relationship of patients and clinicians as well as reducing the possibility of a fatality. With Artificial Intelligence at the forefront of its revolutionary capabilities, a bright future is in store if we can implement it beneficially into our healthcare service. This book reveals how.

Database Systems for Advanced Applications Springer Science & Business Media

This book gathers the proceedings of the 8th International Conference on Frontiers of Intelligent Computing: Theory and Applications (FICTA 2020), held at NIT Surathkal, Karnataka, India, on 4-5 January 2020. In these proceedings, researchers, scientists, engineers and practitioners share new ideas and lessons learned in the field of intelligent computing theories with prospective applications in various engineering disciplines. The respective papers cover broad areas of the information and decision sciences, and explore both the theoretical and practical aspects of data-intensive computing, data mining, evolutionary computation, knowledge management and networks, sensor networks, signal processing, wireless networks, protocols and architectures. Given its scope, the book offers a valuable resource for graduate students in various engineering disciplines.

Human Activity Recognition with Wearable Sensors Springer Nature

Human Activity Recognition CRC Press

Human Worker Activity Recognition in Industrial Environments CRC Press

Understanding the behavior of groups or crowds in real time can provide valuable information to crowd management systems, helping prevent or avoid human tragedy in crowd emergencies. Wearable devices provide a powerful platform for understanding human behavior, however the infrastructure required to communicate data from these devices is often the first casualty in emergency situations. Peer-to-peer (P2P) methods for recognizing group behavior are therefore necessary, but the behavior of the group cannot be observed at any single location, creating an intriguing problem. This dissertation provides the tools to (1) understand which information is best for behavior recognition, (2) to detect different groups who may be in the same environment, and (3) to recognize the physical behavior or activities of the group, all in a P2P fashion. Furthermore, all of this is done while (4) respecting the limited resources and primary functions of the sensing devices, e.g. wearables and mobile phones. The combined contribution of this dissertation is the knowledge, algorithms and methods necessary for recognition of group behavior using only the wearable devices of its constituents.

13th EAI International Conference on Body Area Networks Springer

This book offer clear descriptions of the basic structure for the recognition and classification of human activities using different types of sensor module and smart devices in e.g. healthcare, education, monitoring the elderly, daily human behavior, and fitness monitoring. In addition, the

complexities, challenges, and design issues involved in data collection, processing, and other fundamental stages along with datasets, methods, etc., are discussed in detail. The book offers a valuable resource for readers in the fields of pattern recognition, human-computer interaction, and the Internet of Things.

Deep Learning for Human Activity Recognition Machine Learning Mastery

Learn How to Design and Implement HAR Systems The pervasiveness and range of capabilities of today's mobile devices have enabled a wide spectrum of mobile applications that are transforming our daily lives, from smartphones equipped with GPS to integrated mobile sensors that acquire physiological data. *Human Activity Recognition: Using Wearable Sensors and Smartphones* focuses on the automatic identification of human activities from pervasive wearable sensors—a crucial component for health monitoring and also applicable to other areas, such as entertainment and tactical operations. Developed from the authors' nearly four years of rigorous research in the field, the book covers the theory, fundamentals, and applications of human activity recognition (HAR). The authors examine how machine learning and pattern recognition tools help determine a user's activity during a certain period of time. They propose two systems for performing HAR: Centinela, an offline server-oriented HAR system, and Vigilante, a completely mobile real-time activity recognition system. The book also provides a practical guide to the development of activity recognition applications in the Android framework.

Human Behavior Understanding Eliva Press

Focusing on the vision-based and sensor-based recognition and analysis of human activity and behavior, this book gathers extended versions of selected papers presented at the International Conference on Activity and Behavior Computing (ABC 2020), held in Kitakyushu, Japan on August 26 – 29, 2020. The respective chapters cover action recognition, action understanding, gait analysis, gesture recognition, behavior analysis, emotion and affective computing, and related areas. The book addresses various challenges and aspects of human activity recognition in both the sensor-based and vision-based domains, making it a unique guide to the field.

Vision-Based Human Activity Recognition Springer Nature

The book reports on the author's original work to address the use of today's state-of-the-art smartphones for human physical activity recognition. By exploiting the sensing, computing and communication capabilities currently available in these devices, the author developed a novel smartphone-based activity-recognition system, which takes into consideration all aspects of online human activity recognition, from experimental data collection, to machine learning algorithms and hardware implementation. The book also discusses and describes solutions to some of the challenges that arose during the development of this approach, such as real-time operation, high accuracy, low battery consumption and unobtrusiveness. It clearly shows that it is possible to perform real-time recognition of activities with high accuracy using current smartphone technologies. As well as a detailed description of the methods, this book also provides readers with a comprehensive review of the fundamental concepts in human activity recognition. It also gives an accurate analysis of the most influential works in the field and discusses them in detail. This thesis was supervised by both the Universitat Politècnica de Catalunya (primary institution) and University of Genoa (secondary institution) as part of the Erasmus Mundus Joint Doctorate in Interactive and

Cognitive Environments.

Handbook of Research on ICTs for Human-Centered Healthcare and Social Care Services

Springer Science & Business Media

In addition to creating the opportunity for collaboration, transformation, and innovation in the healthcare industry, technology plays an essential role in the development of human well-being and psychological growth. *Handbook of Research on ICTs for Human-Centered Healthcare and Social Services* is a comprehensive collection of relevant research on technology and its developments of ICTs in healthcare and social services. This book focuses on the emerging trends in the social and healthcare sectors such as social networks, security of ICTs, and advisory services, beneficial to researchers, scholars, students, and practitioners to further their interest in technological advancements.

Contactless Human Activity Analysis Springer Science & Business Media

This book provides a unified approach for developing a fuzzy classifier and explains the advantages and disadvantages of different classifiers through extensive performance evaluation of real data sets. It thus offers new learning paradigms for analyzing neural networks and fuzzy systems, while training fuzzy classifiers. Function approximation is also treated and function approximators are compared.

IoT Sensor-Based Activity Recognition Springer

Activity recognition has emerged as a challenging and high-impact research field, as over the past years smaller and more powerful sensors have been introduced in wide-spread consumer devices. Validation of techniques and algorithms requires large-scale human activity corpuses and improved methods to recognize activities and the contexts in which they occur. This book deals with the challenges of designing valid and reproducible experiments, running large-scale dataset collection campaigns, designing activity and context recognition methods that are robust and adaptive, and evaluating activity recognition systems in the real world with real users.

Intelligent Data Engineering and Analytics CRC Press

In the past decade, Human Activity Recognition (HAR) has been an important part of the regular day to day life of many people. Activity recognition has wide applications in the field of health care, remote monitoring of elders, sports, biometric authentication, e-commerce and more. Each HAR application needs a unique approach to provide solutions driven by the context of the problem. In this dissertation, we are primarily discussing two application of HAR in different contexts. First, we design a novel approach for in-home, fine-grained activity recognition using multimodal wearable sensors on multiple body positions, along with very small Bluetooth beacons deployed in the environment. State-of-the-art in-home activity recognition schemes with wearable devices are mostly capable of detecting coarse-grained activities (sitting, standing, walking, or lying down), but cannot distinguish complex activities (sitting on the floor versus on the sofa or bed). Such schemes are not effective for emerging critical healthcare applications for example, in remote monitoring of patients with Alzheimer's disease, Bulimia, or Anorexia because they require a more comprehensive, contextual, and fine-grained recognition of complex daily user activities. Second, we introduced Watch-Dog a self-harm activity recognition engine, which attempts to infer self-harming activities from sensing accelerometer data using wearable sensors worn on a subject's wrist. In the United

States, there are more than 35,000 reported suicides with approximately 1,800 of them being psychiatric inpatients every year. Staff perform intermittent or continuous observations in order to prevent such tragedies, but a study of 98 articles over time showed that 20% to 62% of suicides happened while inpatients were on an observation schedule. Reducing the instances of suicides of inpatients is a problem of critical importance to both patients and healthcare providers. Watch-dog uses supervised learning algorithm to model the system which can discriminate the harmful

activities from non-harmful activities. The system is not only very accurate but also energy efficient. Apart from these two HAR systems, we also demonstrated the difference in activity pattern between elder and younger age group. For this experiment, we used 5 activities of daily living (ADL). Based on our findings we recommend that a context aware age-specific HAR model would be a better solution than all age-mixed models. Additionally, we find that personalized models for each individual elder person perform better classification than mixed models.