

# **2018 12th International Conference on Sensing Technology (ICST 2018)**

**Limerick, Ireland  
4-6 December 2018**



**IEEE Catalog Number: CFP1818E-POD  
ISBN: 978-1-5386-5148-3**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

|                         |                   |
|-------------------------|-------------------|
| IEEE Catalog Number:    | CFP1818E-POD      |
| ISBN (Print-On-Demand): | 978-1-5386-5148-3 |
| ISBN (Online):          | 978-1-5386-5147-6 |
| ISSN:                   | 2156-8065         |

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# TABLE OF CONTENTS

|                                                                                                                                                                                            |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>ON OBTAINING RELIABLE SPATIAL INFORMATION FROM GAS STRUCTURES WITH A STEREO CAMERA SYSTEM .....</b>                                                                                     | <b>1</b>   |
| <i>Johannes Rangel, Andreas Kroll</i>                                                                                                                                                      |            |
| <b>CONDUCTING POLYMER COATED FILTER PAPER BASED DISPOSABLE ELECTRONIC TONGUE .....</b>                                                                                                     | <b>7</b>   |
| <i>Debasmita Mondal, Debjani Paul, Soumyo Mukherji</i>                                                                                                                                     |            |
| <b>AUTOMATIC SYSTEM FOR LI-ION BATTERY PACKS GAS LEAKAGE DETECTION .....</b>                                                                                                               | <b>13</b>  |
| <i>Valentin Mateev, Iliana Marinova</i>                                                                                                                                                    |            |
| <b>MEMS INTEGRATED MOO<sub>3</sub> NANOSTRUCTURES BASED ACETONE SENSOR .....</b>                                                                                                           | <b>17</b>  |
| <i>Priyanka Dwivedi, Anuroop, Saakshi Dhanekar, Samaresh Das</i>                                                                                                                           |            |
| <b>PERFORMANCE EVALUATION OF LED BASED SENSOR FOR WATER TURBIDITY MEASUREMENT .....</b>                                                                                                    | <b>20</b>  |
| <i>Mohamad Faizal Abd Rahman, Khairul Azman Ahmad, Rozan Boudville, Saiful Zaimy Yahaya</i>                                                                                                |            |
| <b>URBAN AREA PM<sub>2.5</sub> PREDICTION WITH MACHINE LEARNING METHODS: AN ON-BOARD MONITORING SYSTEM .....</b>                                                                           | <b>25</b>  |
| <i>Yu-Lun Chiang, Chao-Liang Hsieh, Hsiang-Yu Huang, Jen-Cheng Wang, Cheng-Ying Chou, Chih-Hong Sun, Tzai-Hung Wen, Jehn-Yih Juang, Joe-Air Jiang</i>                                      |            |
| <b>ENVIRONMENTAL MONITORING BASED ON INTERNET OF THINGS TECHNOLOGY .....</b>                                                                                                               | <b>31</b>  |
| <i>Thomas Cunin, Sean McGrath, Ciaran MacNamee</i>                                                                                                                                         |            |
| <b>CONTINUOUS DETECTION OF COPPER AND BROMIDE IN POLLUTED WATER USING F-EM SENSORS .....</b>                                                                                               | <b>35</b>  |
| <i>Ilaria Frau, Stephen Wylie, Patrick Byrne, Jeff Cullen, Olga Korostynska, Alex Mason</i>                                                                                                |            |
| <b>MOBILE GAS SENSING SYSTEM FOR DETECTION OF COMBUSTION POLLUTANTS - SUITABLE FOR DRONE BASED MEASUREMENTS .....</b>                                                                      | <b>39</b>  |
| <i>Martin Degner, Hartmut Ewald</i>                                                                                                                                                        |            |
| <b>MODELING IDENTITY FOR THE INTERNET OF THINGS: SURVEY, CLASSIFICATION AND TRENDS .....</b>                                                                                               | <b>45</b>  |
| <i>Shantanu Pal, Michael J Hitchens, Vijay Varadharajan</i>                                                                                                                                |            |
| <b>FUTURE PROOFING IOT EMBEDDED PLATFORMS FOR CRYPTOGRAPHIC PRIMITIVES SUPPORT .....</b>                                                                                                   | <b>52</b>  |
| <i>Sven Plaga, Norbert Wiedermann, Matthias Niedermaier, Alexander Giehl, Thomas Neue</i>                                                                                                  |            |
| <b>SMART GOVERNANCE OF HETEROGENEOUS INTERNET OF THINGS FOR SMART CITIES .....</b>                                                                                                         | <b>58</b>  |
| <i>Aqeel H. Kazmi, Martin Serrano, Angelos Lenis</i>                                                                                                                                       |            |
| <b>CAN IOT ESCAPE CLOUD QOS AND COST PITFALLS .....</b>                                                                                                                                    | <b>65</b>  |
| <i>Lubna Dhirani, Thomas Neue, Shahzad Nizamani</i>                                                                                                                                        |            |
| <b>A LORA-BASED OPTIMAL PATH ROUTING ALGORITHM FOR SMART GRID .....</b>                                                                                                                    | <b>71</b>  |
| <i>Hsiang-Yu Huang, Kai-Sheng Tseng, Yu-Lun Chiang, Jen-Cheng Wang, Yu-Cheng Yang, Cheng-Ying Chou, Joe-Air Jiang</i>                                                                      |            |
| <b>RAPID SENSITIVITY CURVE MEASUREMENT FOR MEMS ACCELEROMETERS .....</b>                                                                                                                   | <b>77</b>  |
| <i>Ulrich Baehr, Matthew Lewis, Marvin Freier, Wolfgang Rosenstiel, Oliver Bringmann</i>                                                                                                   |            |
| <b>TORQUE SENSOR DESIGN CONSIDERING THERMAL STABILITY FOR HARSH INDUSTRIAL ENVIRONMENTS .....</b>                                                                                          | <b>83</b>  |
| <i>Muhammad Nazar Ul Islam, Peng Cheng, Bengt Oelmann</i>                                                                                                                                  |            |
| <b>MAGNETO-ELASTIC STRAIN SENSORS FOR USE ON STEEL RODS .....</b>                                                                                                                          | <b>87</b>  |
| <i>Frank Missell, Eduardo Bastos, Cristina Nunes</i>                                                                                                                                       |            |
| <b>CONTACT AREA DESIGN OF OHMIC RF MEMS SWITCH FOR ENHANCED POWER HANDLING .....</b>                                                                                                       | <b>91</b>  |
| <i>Anuroop, Deepak Bansal, Khushbu Khushbu, Prem Kumar, Amit Kumar, Kamaljit Rangra</i>                                                                                                    |            |
| <b>DESIGN AND FABRICATION OF MICRO-HALL-EFFECT SENSORS .....</b>                                                                                                                           | <b>96</b>  |
| <i>Chia-Yen Lee, Ting-Chun Chien</i>                                                                                                                                                       |            |
| <b>INVASIVENESS ESTIMATION OF ELECTRO-OPTIC PROBE IN ELECTRIC FIELD .....</b>                                                                                                              | <b>102</b> |
| <i>Tomoya Naoe, Masahiro Yada, Mitsuru Shinagawa, Yoshinori Matsumoto, Jun Katsuyama, Hiroaki Tanaka, Yoshiaki Tanaka</i>                                                                  |            |
| <b>MODELLING THE LINEAR RESPONSE OF AN ELECTRIC FIELD SENSING SCHEME WHEN USING ELECTRODE-LESS LINBO<sub>3</sub> ASYMMETRIC MACH-ZEHNDER INTERFEROMETERS AND LASER AND LED LIGHT .....</b> | <b>113</b> |
| <i>Celso Gutierrez-Martínez</i>                                                                                                                                                            |            |

|                                                                                                                                         |            |
|-----------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>APPLICATION OF FIBER LASER DYNAMICS IN LEAK DETECTION FOR OPERATING WATER PIPELINE .....</b>                                         | <b>118</b> |
| <i>Zi Jian Law, Chang Hong Pua, Horng Sheng Lin, Faizd Abd Rahman</i>                                                                   |            |
| <b>SURFACE PLASMON RESONANCE BASED SENSOR USING POLYESTER OHP SHEET WAVEGUIDES .....</b>                                                | <b>123</b> |
| <i>Anjali Khatri, Arvind Dhawangale, Soumyo Mukherji</i>                                                                                |            |
| <b>A NOVEL APPROACH FOR WIRELESS LIQUID LEVEL MEASUREMENTS USING SAW SENSOR .....</b>                                                   | <b>127</b> |
| <i>Praveen Maurya, Nirupama Mandal, Joyanta Kumar Roy, Subhas Chandra Mukhopadhyay</i>                                                  |            |
| <b>DETECTION AND CHARACTERIZATION OF SURFING EVENTS WITH SMARTPHONES' EMBEDDED SENSORS .....</b>                                        | <b>132</b> |
| <i>Diana Gomes, Dinis Moreira, Joao Madureira</i>                                                                                       |            |
| <b>BENCH SYSTEM FOR IRON ORE MOISTURE MEASUREMENT .....</b>                                                                             | <b>139</b> |
| <i>Vinicius Lage, Alan Rêgo Segundo, Paulo Monteiro, Sávio Silva, Erica Pinto, Thomas Pinto, Marcelo Silva, Carina Silva</i>            |            |
| <b>DEVELOPMENT AND OPTIMIZATION OF PID CONTROL FOR FES KNEE EXERCISE IN HEMIPLEGIC REHABILITATION .....</b>                             | <b>143</b> |
| <i>Rozan Boudville, Zakaria Hussain, Saiful Zaimy Yahaya, Mohamad Faizal Abd Rahman, Nurul Izza Husin, Khairul Azman Ahmad</i>          |            |
| <b>DESIGN OF PIEZOELECTRIC BASED PRESSURE SENSORS FOR GAIT REHABILITATION USING D33 MODE POLARIZATION .....</b>                         | <b>149</b> |
| <i>Khairul Azman Ahmad, Asrulnizam Abd Manaf, Mohamad Faizal Abd Rahman, Rozan Boudville, Noramalina Abdullah</i>                       |            |
| <b>OBJECT DETECTION IN FOGGY CONDITIONS BY FUSION OF SALIENCY MAP AND YOLO .....</b>                                                    | <b>154</b> |
| <i>Ronak Sakhuja, Samarth Gupta, Sarthak Katyal, Sanjay Kumar</i>                                                                       |            |
| <b>CONVOLUTIONAL NEURAL NETWORKS FOR 3D VISION SYSTEM DATA A REVIEW .....</b>                                                           | <b>160</b> |
| <i>Niall O' Mahony, Sean Campbell, Lenka Krpalkova, Anderson Carvalho, Gustavo Velasco-Hernandez, Daniel Riordan, Joseph Walsh</i>      |            |
| <b>VISUAL UDDER DETECTION WITH DEEP NEURAL NETWORKS.....</b>                                                                            | <b>166</b> |
| <i>Sukumar Katamreddy, Pat Doody, Joseph Walsh, Daniel Riordan</i>                                                                      |            |
| <b>MOTION-BLUR-FREE HIGH-SPEED VIDEO SHOOTING WITH FRAME-TIMING CONTROL .....</b>                                                       | <b>172</b> |
| <i>Michiaki Inoue, Qingyi Gu, Mingjun Jiang, Takeshi Takaki, Idaku Ishii, Kenji Tajima</i>                                              |            |
| <b>STEREO VISION SENSING: REVIEW OF EXISTING SYSTEMS.....</b>                                                                           | <b>178</b> |
| <i>Andrew O' Riordan, Thomas Newe, Daniel Toal, Gerard Dooly</i>                                                                        |            |
| <b>ENGAGING ACADEMICS FROM AN ENGINEERING TRAINING COLLEGE WITH ARDUINO SENSORS USING AN ACADEMIC DEVELOPMENT WORKSHOP .....</b>        | <b>185</b> |
| <i>Arthur James Swart, Pierre Hertzog</i>                                                                                               |            |
| <b>HOME ENERGY MANAGEMENT SYSTEM INCORPORATING HEAT PUMP .....</b>                                                                      | <b>191</b> |
| <i>Zhengnan Cao, Fergal O'Rourke, William Lyons, Xiaoqing Han</i>                                                                       |            |
| <b>DISTANCE-BASED CLUSTER HEAD ELECTION FOR MOBILE SENSING .....</b>                                                                    | <b>196</b> |
| <i>Ruairí de Fréin, Liam O'Farrell</i>                                                                                                  |            |
| <b>HIGHLY-SCALABLE AND GENERALIZED SENSOR STRUCTURES FOR EFFICIENT PHYSICALLY-BASED SIMULATION OF MULTI-MODAL SENSOR NETWORKS .....</b> | <b>202</b> |
| <i>Jörn Thieling, Jürgen Roßmann</i>                                                                                                    |            |
| <b>GAIT RELATED ACTIVITY BASED PERSON AUTHENTICATION WITH SMARTPHONE SENSORS .....</b>                                                  | <b>208</b> |
| <i>Basabi Chakraborty</i>                                                                                                               |            |
| <b>API MONITOR BASED ON INTERNET OF THINGS TECHNOLOGY .....</b>                                                                         | <b>213</b> |
| <i>Yang Feng, He Junyi, An WeiPeng, Colin Flanagan, Ciaran MacNamee, Sean McGrath</i>                                                   |            |
| <b>USING HYBRID SENSING METHOD FOR MOTION CAPTURE IN VOLLEYBALL TECHNIQUES TRAINING .....</b>                                           | <b>217</b> |
| <i>Ji Lin, Rumin Zhang, Jianwen Chen, Liaoyuan Zeng, Liu Jiang, Sean McGrath, Jiansong Yang</i>                                         |            |
| <b>AN ALGORITHM FOR OBSTACLE DETECTION BASED ONYOLO AND LIGHT FILED CAMERA .....</b>                                                    | <b>223</b> |
| <i>Rumin Zhang, Yifeng Yang, Wenyi Wang, Jianwen Chen, Liaoyuan Zeng, Sean McGrath</i>                                                  |            |
| <b>ADAPTIVE SHADOW REMOVAL ALGORITHM FOR FACE IMAGES .....</b>                                                                          | <b>227</b> |
| <i>Zhen Zeng, Rumin Zhang, Jianwen Chen, Liaoyuan Zeng, Wenyi Wang, Sean McGrath</i>                                                    |            |
| <b>SMART PARKING SYSTEM USING IMAGE PROCESSING AND ARTIFICIAL INTELLIGENCE .....</b>                                                    | <b>232</b> |
| <i>Sean McGrath, Eoin O'Connell</i>                                                                                                     |            |
| <b>PAPER-BASED HYDROGEN PEROXIDE SENSORS USING PORPHYRIN WITH CENTRAL IONS OF TI.....</b>                                               | <b>236</b> |
| <i>Young Tae Byun, Sun Ho Kim, Dong Jin Lee</i>                                                                                         |            |

|                                                                                                                                                                      |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>DIFFERENTIAL DETECTION FOR REDUCING LASER NOISE IN ELECTRO-OPTIC SENSOR SYSTEM.....</b>                                                                           | <b>240</b> |
| <i>Takafumi Ogawa, Riku Okada, Masahiro Yada, Mitsuru Shinagawa, Yoshinori Matsumoto, Jun Katsuyama, Hiroaki Tanaka, Yoshiaki Tanaka</i>                             |            |
| <b>EFFICACY STUDIES OF A NOVEL FIELD FEEDBACK CIRCUIT FOR GIANT MAGNETORESISTANCE SENSORS.....</b>                                                                   | <b>245</b> |
| <i>Tapabrata Sen, Chandrika Sreekantan Anoop, Siddhartha Sen</i>                                                                                                     |            |
| <b>MEASUREMENT OF INTERFACE POSITION BETWEEN SUBSTANCES IN A TANK BY RADIOFREQUENCY TECHNIQUES .....</b>                                                             | <b>251</b> |
| <i>Alexander S. Sovlukov, Alexander Prokhorenkov, Victoria Yatsenko, Alexey Maslov</i>                                                                               |            |
| <b>ON THE USE OF WIRELESS SENSOR NETWORKS IN PREVENTATIVE MAINTENANCE FOR INDUSTRY 4.0 .....</b>                                                                     | <b>256</b> |
| <i>Michael Walsh, Donato Catenazzo, Brendan O'Flynn</i>                                                                                                              |            |
| <b>TOWARDS THE DISTIBUTED EDGE - AN IOT REVIEW .....</b>                                                                                                             | <b>263</b> |
| <i>Jeff McCann, Liam Quinn, Sean McGrath, Eoin O'Connell</i>                                                                                                         |            |
| <b>ADAPTIVE ENERGY OPTIMIZATION ALGORITHM FOR INTERNET OF MEDICAL THINGS.....</b>                                                                                    | <b>269</b> |
| <i>Sandeep Pirbhulal, Wanqing Wu, Subhas Mukhopadhyay, Guanglin Li</i>                                                                                               |            |
| <b>A COMPRESSED SENSING-BASED 3D-RSS MAP COMPLETION FOR UAV ROUTES PLANNING.....</b>                                                                                 | <b>273</b> |
| <i>Hiroto Nishioka, Azusa Danjo, Shinsuke Hara, Takahiro Matsuda, Fumie Ono, Ryu Miura, Fumihide Kojima</i>                                                          |            |
| <b>SMART BUILDING BASED ON INTERNET OF THINGS TECHNOLOGY .....</b>                                                                                                   | <b>278</b> |
| <i>Nicolas Havard, Sean McGrath, Ciaran MacNamee, Colin Flanagan</i>                                                                                                 |            |
| <b>ARTIFICIAL NEURAL NETWORK-BASED METHOD TO CLASSIFY SEDIMENTARY ROCKS .....</b>                                                                                    | <b>282</b> |
| <i>Rodrigo Figueiredo, Mauricio Veronez, Francisco Tognoli, Márcio da Silva, Luiz Gonzaga Junior, Lucas Kupssinskü, Fabiane Bordin, Diego Brum, Caroline Cazarin</i> |            |
| <b>HIGH RESOLUTION MINIATURE MET SENSORS FOR HEALTHCARE AND SPORT APPLICATIONS .....</b>                                                                             | <b>287</b> |
| <i>Dmitry Zaitsev, Egorov Egor, Anna Shabalina</i>                                                                                                                   |            |
| <b>PROPOSAL OF A CHEAP PULSE WAVE VELOCITY (PWV) METER USING PHOTOPLETHYSMOGRAPHY .....</b>                                                                          | <b>293</b> |
| <i>Goutam Chakraborty, Emiko Ikeda, Hideyuki Takahashi, Tetsuo Kinoshita, Cedric Bornand</i>                                                                         |            |
| <b>TOWARDS RELIABLE IONOSPHERIC TOTAL ELECTRON CONTENT NOWCASTING.....</b>                                                                                           | <b>299</b> |
| <i>Aleksei Zhukov, Denis Sidorov, Yuri Yasyukevich, Anna Mylnikova</i>                                                                                               |            |
| <b>DEVELOPMENT OF A SMART ROTAMETER WITH INTELLIGENT TEMPERATURE COMPENSATION .....</b>                                                                              | <b>303</b> |
| <i>Anamika Lata, Joyanta Kumar Roy, Nirupama Mandal, Praveen Maurya, Subhas Mukhopadhyay</i>                                                                         |            |
| <b>DETECTION AND CHARACTERIZATION OF BIOLOGICAL CELLS BY IMPEDANCE SPECTROSCOPY.....</b>                                                                             | <b>309</b> |
| <i>Arthur Luiz Alves de Araujo, Julien Claudel, Mustapha Nadi, Djilali Kourtiche</i>                                                                                 |            |
| <b>A MULTITONE ANALYSIS FOR BIOIMPEDANCE SPECTROSCOPY USING MINIMAL DIGITAL RESSOURCE.....</b>                                                                       | <b>315</b> |
| <i>Fabien Soulier, Achraf Lamlih, Vincent Kerzérho, Serge Bernard</i>                                                                                                |            |
| <b>A MICROSTRIP RESONATOR BASED SENSOR FOR GHZ CHARACTERIZATION OF IN VITRO CELL CULTURE.....</b>                                                                    | <b>319</b> |
| <i>Florian Kolbl, Nezar Boulboul, Morgane Commereuc, Emmanuelle Bourdel</i>                                                                                          |            |
| <b>INCREASING OPERATING FREQUENCY BAND OF CYTOMETRIC BIOSENSOR FOR SINGLE CELL IMPEDANCE CHARACTERIZATION .....</b>                                                  | <b>324</b> |
| <i>Julien Claudel, Arthur Luiz Alves de Araujo, Mustapha Nadi, Djilali Kourtiche</i>                                                                                 |            |
| <b>MEASUREMENT OF LIGHT SENSITIVITY OF CHROMIUM/POROUS SILICON SCHOTTKY DIODES MADE BY SILICON NITRIDE MASKING .....</b>                                             | <b>330</b> |
| <i>Michael J. Haji-Sheikh, Suma Rajashankar, Karthik Selvam</i>                                                                                                      |            |
| <b>DIRECT COMPARISON OF A CAPACITIVE TO AN ELECTRO-OPTIC ELECTRIC FIELD SENSOR.....</b>                                                                              | <b>336</b> |
| <i>Didier Robbes, Achille Junior Mbogol Touye, Corentin Jorel, Gwenaël Gaborit, Lionel Duvillaret</i>                                                                |            |
| <b>PH SENSING OF PRINTED FLEXIBLE SENSORS.....</b>                                                                                                                   | <b>341</b> |
| <i>Anindya Nag, Omer Dorsum, Subhas Mukhopadhyay, Jürgen Kosel</i>                                                                                                   |            |
| <b>AUTOMATED GROUND VEHICLE (AGV) AND SENSOR TECHNOLOGIES- A REVIEW .....</b>                                                                                        | <b>347</b> |
| <i>Liam Lynch, Thomas Newe, John Clifford, Joseph Coleman, Daniel Toal, Joseph Walsh</i>                                                                             |            |
| <b>EDA SENSOR-BASED EVALUATION OF A VEGETATION SUCCESSION LEARNING SYSTEM.....</b>                                                                                   | <b>353</b> |
| <i>Shuya Kawaguchi, Hiroshi Mizoguchi, Ryohei Egusa, Yoshiaki Takeda, Etsuji Yamaguchi, Shigenori Inagaki, Fusako Kusunoki, Hideo Funaoi, Masanori Sugimoto</i>      |            |

|                                                                                                                                               |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>OUTAGE PROBABILITY OF VITAL SIGNS DETECTING RADAR SENSOR SYSTEM .....</b>                                                                  | <b>358</b> |
| <i>Van Nguyen</i>                                                                                                                             |            |
| <b>ANALYSIS OF TRANSIENT SIGNAL DUE TO PERSON MOVEMENT IN GATE SYSTEM<br/>USING INTRA-BODY COMMUNICATION.....</b>                             | <b>363</b> |
| <i>Kenta Nezu, Rikuma Ashizawa, Mitsuru Shinagawa, Daisuke Saito, Ken Seo, Kyoji Ohashi</i>                                                   |            |
| <b>AN INTELLIGENT SUPPORT SYSTEM FOR ELDERLY CARE WITH RFID TAGS AND A<br/>CLEANING ROBOT .....</b>                                           | <b>367</b> |
| <i>Naoki Mitabe, Norihiko Shinomiya</i>                                                                                                       |            |
| <b>NOVEL APPLICATION OF 3D RANGE IMAGE SENSOR TO CALORIC EXPENDITURE<br/>ESTIMATION BASED ON HUMAN BODY MEASUREMENT.....</b>                  | <b>371</b> |
| <i>Naoki Komiya, Mikihiro Tokuoka, Ryohei Egusa, Shigenori Inagaki, Hiroshi Mizoguchi, Miki Namatame, Fusako Kusunoki</i>                     |            |
| <b>PRELIMINARY STUDY OF A NON-INVASIVE PORTABLE DEVICE FOR CONTINUOUS<br/>MONITORING OF BLOOD ALCOHOL CONCENTRATION .....</b>                 | <b>375</b> |
| <i>Inês Seco, Pedro Gaspar, Manuel Magrinho, Miguel Castelo Branco</i>                                                                        |            |
| <b>A LOW-POWER WIRELESS NANO-POTENTIOSTAT FOR BIOMEDICAL APPLICATIONS<br/>WITH ISO 18000-3 INTERFACE IN 0.35 <math>\mu</math>M CMOS .....</b> | <b>382</b> |
| <i>Tatjana Fedtschenko, Alexander Utz, Alexander Stanitzki, Andreas Hennig, Andre Lüdecke, Norbert Haas, Rainer Kokozinski</i>                |            |
| <b>PHYSICAL REHABILITATION BASED ON SMART WALKER.....</b>                                                                                     | <b>388</b> |
| <i>Carlos Nave, Yongsheng Yang, Vítor Viegas, Octavian Adrian Postolache</i>                                                                  |            |
| <b>APPLICATION OF 3D RANGE IMAGE SENSOR TO BODY MOVEMENT DETECTION --<br/>SUPPORTING CHILDREN'S COLLABORATIVE LEARNING IN MUSEUMS--.....</b>  | <b>394</b> |
| <i>Mikihiro Tokuoka, Naoki Komiya, Hiroshi Mizoguchi, Ryohei Egusa, Shigenori Inagaki, Fusako Kusunoki</i>                                    |            |
| <b>PROPOSAL OF FRUIT BATTERY METHOD FOR ESTIMATING OIL PALM RIPENESS .....</b>                                                                | <b>399</b> |
| <i>Kaiko Minakata, Hiroyuki Wakiwaka, Norhisam Misron, K. Tashiro, Nor Aziana Aliteh, Hirokazu Nagata, Kazuki Kobayashi</i>                   |            |
| <b>FLEXIBLE AL/PZT/AL COMPOSITE FOR PIEZOELECTRIC APPLICATIONS .....</b>                                                                      | <b>403</b> |
| <i>Raynald Seveno, Benoit Guiffard, Julien Le Scomec</i>                                                                                      |            |
| <b>NFC POWERED CYCLIC VOLTAMMETRY WITH DYNAMIC OUTPUT VOLTAGE RANGE<br/>EXPLOITATION .....</b>                                                | <b>407</b> |
| <i>Inge Siegl, Carolin Kollegger, Christoph Steffan, Clemens Rabl, Wolfgang Pribyl</i>                                                        |            |
| <b>A CLOSED-LOOP CMOS INTERFACE FOR <math>\pm</math> 1G MEMS CAPACITIVE ACCELEROMETER.....</b>                                                | <b>413</b> |
| <i>Gangisetty Murali Krishna, Anmol Rattan, Sougata Kar, Siddhartha Sen</i>                                                                   |            |
| <b>ON-CHIP IMPLEMENTATION OF ANALOG LINEARIZATION SCHEMES FOR GIANT-<br/>MAGNETORESISTANCE SENSORS .....</b>                                  | <b>419</b> |
| <i>Tapabrata Sen, Ashis Maity, Siddhartha Sen</i>                                                                                             |            |
| <b>REAL-TIME 3D MAGNETOMETER CALIBRATION FOR EMBEDDED SYSTEMS BASED ON<br/>ELLIPSOID FITTING.....</b>                                         | <b>424</b> |
| <i>Salvatore Tedesco, Javier Torres-Sanchez, Brendan O'Flynn</i>                                                                              |            |
| <b>Author Index</b>                                                                                                                           |            |