

2021 IEEE 3rd Global Conference on Life Sciences and Technologies (LifeTech 2021)

**Nara, Japan
9 – 11 March 2021**



**IEEE Catalog Number: CFP21T07-POD
ISBN: 978-1-6654-4808-6**

**Copyright © 2021 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:	CFP21T07-POD
ISBN (Print-On-Demand):	978-1-6654-4808-6
ISBN (Online):	978-1-6654-1875-1

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

DEEP RETINEX NETWORK FOR ESTIMATING ILLUMINATION COLORS WITH SELF-SUPERVISED LEARNING.....	1
<i>Kouki Seo, Yuma Kinoshita, Hitoshi Kiya</i>	
AN INTERPRETABLE DL-BASED METHOD FOR DIAGNOSIS OF H. PYLORI INFECTION USING GASTRIC X-RAY IMAGES.....	6
<i>Reima Ishii, Xiaoyong Zhang, Noriyasu Homma</i>	
MULTI-COLOR BALANCING FOR CORRECTLY ADJUSTING THE INTENSITY OF TARGET COLORS.....	8
<i>Teruaki Akazawa, Yuma Kinoshita, Hitoshi Kiya</i>	
POSE ESTIMATION OF MULTIPLE X-RAY CAMERAS USING PLANAR MARKERS AND EIPOLAR CONSISTENCY.....	13
<i>Pragyan Shrestha, Hidehiko Shishido, Yuichi Yoshii, Itaru Kitahara</i>	
NONCONTACT MEASUREMENT FOR THE AUTONOMIC NERVOUS SYSTEM THROUGH RGB CAMERA.....	18
<i>Ryohei Tsuji, Shima Okada, Tianyi Wang</i>	
DEVELOPMENT OF NOSE DETECTION AND AN INFRARED IMAGE MATCHING SYSTEM FOR MENTAL FATIGUE EVALUATION.....	20
<i>Kazuho Takahashi, Osamu Sakata</i>	
STUDYING THE EFFECT OF HAND MOVEMENT VISUAL DELAY ON THE SENSE OF AGENCY.....	23
<i>Hani M. Bu-Omer, Fumitoshi Osaki, Akio Gofuku</i>	
TRUST FACTORS OF SOCIAL ENGINEERING ATTACKS ON SOCIAL NETWORKING SERVICES.....	25
<i>Yuki Kano, Tatsuo Nakajima</i>	
INDEX OF GAIT STABILITY USING INERTIAL MEASUREMENT UNIT.....	29
<i>Kyogo Kazumura, Yasuhiro Akiyama, Taro Naganeo, Shogo Okamoto, Yoji Yamada</i>	
PRINCIPLES OF BEHAVIOR FOR SOLVING PROBLEMS IN MAN-MACHINE COLLABORATION.....	31
<i>Yuka Koremura, Rieko Hojo, Shoken Shimizu</i>	
DETECTING INTERRUPTION EVENTS USING EEG.....	33
<i>Frank Bolton, Dov Te'Eni, Neta B. Maimon, Eran Toch</i>	
RISK DISTRIBUTION METHOD FROM WORKER BEHAVIOR MEASUREMENT USING BEHAVIOR-BASED SAFETY PROCEDURE.....	35
<i>Rieko Hojo, Tetsuo Sujino, Christoph Bördlein, Yuka Koremura, Shoken Shimizu</i>	
PRIVACY-PRESERVING IMAGE RETRIEVAL SCHEME ALLOWING MIXED USE OF LOSSLESS AND JPEG COMPRESSED IMAGES.....	37
<i>Kenta Iida, Hitoshi Kiya</i>	
FAKE-IMAGE DETECTION WITH ROBUST HASHING.....	40
<i>Miki Tanaka, Hitoshi Kiya</i>	

COMBINATION OF TEMPORAL AND SPATIAL DENOISING METHODS FOR CINE MRI	44
<i>Tsubasa Maeda, Satoshi Tamura, Satoru Hayamizu, Keigo Kawaji</i>	
AN MSB PREDICTION-BASED METHOD WITH MARKER BITS FOR REVERSIBLE DATA HIDING IN ENCRYPTED IMAGES	48
<i>Ryoichi Hirasawa, Shoko Imaizumi, Hitoshi Kiya</i>	
QUESTION ANSWERING FROM BRAIN ACTIVITY DATA VIA DECODER BASED ON NEURAL NETWORKS.....	51
<i>Saya Takada, Ren Togo, Takahiro Ogawa, Miki Haseyama</i>	
MUSIC PLAYLIST GENERATION BASED ON GRAPH EXPLORATION USING REINFORCEMENT LEARNING	53
<i>Keigo Sakurai, Ren Togo, Takahiro Ogawa, Miki Haseyama</i>	
EXOSKELETON-TYPE POWER ASSIST SUIT FOR LIFTING ASSISTANCE AND WALKING SUPPORT	55
<i>Chiharu Ishii, Ryo Sugiyama, Shun Iwayama</i>	
FINGER MOTOR FUNCTION EVALUATION DEVICE FOR HEMIPLEGIA PATIENTS AT HOME	57
<i>Takahiro Arai, Yuta Furudate, Kaori Chiba, Yuji Ishida, Sadayoshi Mikami</i>	
CLASSIFICATION OF ROBOT SERVICE DURING SIT-TO-STAND THROUGH SEGMENTS COORDINATION	59
<i>Tianyi Wang, Shima Okada, Masaaki Makikawa</i>	
ALIGNMENT OF ANATOMICAL FLEXION AXIS WHEN USING ONE-DEGREE-OF- FREEDOM ANKLE STRETCHING EXERCISER	61
<i>Ko Suzuki, Shogo Okamoto, Yasuhiro Akiyama, Yuma Shiraishi, Naomi Yamada, Yoji Yamada</i>	
METHOD OF OPERATING DISPLAY SCREEN BASED ON ABSOLUTE HAND POSITION INFORMATION OBTAINED THROUGH QZSS.....	64
<i>Yugo Nakamura, Tomohiro Hase</i>	
HUMAN EMOTION ESTIMATION USING MULTI-MODAL VARIATIONAL AUTOENCODER WITH TIME CHANGES	67
<i>Yuya Moroto, Keisuke Maeda, Takahiro Ogawa, Miki Haseyama</i>	
SAFETY PERFORMANCE OF INVERTED PENDULUM TYPE PERSONAL MOBILITY VEHICLE IN EMERGENCY BRAKING	69
<i>Ngo Minh, Kazuyuki Kojima</i>	
TOWARD HUMAN-CENTERED VISUAL DESIGN BASED ON SOUND SYMBOLIC INFORMATION	71
<i>Shota Murai, Tamaki Noguchi, Makoto Matsumoto, Sachi Itagaki, Kohta I. Kobayasi</i>	
AN APPROACH OF TRAJECTORY CLUSTERING USING DISTRIBUTED REPRESENTATION OF USER MOVEMENT	75
<i>Masaharu Hirota, Tetsuya Oda</i>	
COMPARISON OF MACHINE LEARNING ALGORITHMS FOR PATIENT HANDLING RECOGNITION BASED ON BODY MECHANICS	77
<i>Kodai Kitagawa, Takayuki Nagasaki, Sota Nakano, Mitsumasa Hida, Shogo Okamatsu, Chikamune Wada</i>	

DEVELOPMENT OF BIOFEEDBACK DEVICE-USING MUSCLE FATIGUE SCALE	80
<i>Tadaaki Ikehara, Kazuyuki Kojima</i>	
REAL-TIME OBJECT DETECTION WITH DEEP LEARNING FOR ROBOT VISION ON MIXED REALITY DEVICE	82
<i>Jiazhen Guo, Peng Chen, Yinlai Jiang, Hiroshi Yokoi, Shunta Togo</i>	
EVALUATION OF A GAIT ANALYSIS TOOL USING POSTURE ESTIMATION TECHNOLOGY IN CLINICAL REHABILITATION.....	84
<i>Kanae Nishizaki, Tatsuki Izumiura, Hiromitsu Nishizaki, Shin-Ichi Izumi, Hitoshi Ikegami</i>	
EVALUATION OF THE EFFECT OF ASMR ON REDUCTION OF MENTAL STRESS: EEG STUDY.....	88
<i>Yoshiyuki Ohta, Keiichiro Inagaki</i>	
BIOMETRIC IDENTIFICATION METHOD USING IMAGE KEY AND P300: A PILOT STUDY.....	90
<i>Keiichiro Inagaki, Taishi Tanizaki</i>	
EEG CLASSIFICATION WITH TRANSFORMER-BASED MODELS.....	92
<i>Jiayao Sun, Jin Xie, Huihui Zhou</i>	
ONLINE BAYESIAN APPROACH FOR ESTIMATION AND CONTROL OF NEURAL SYSTEM.....	94
<i>Shuhei Fukami, Toshiaki Omori</i>	
MONITORING FLOOR VIBRATIONS TO EVALUATE OBJECTIVELY PHYSICAL ACTIVITY DURING HOUSEWORK ACTIVITIES	97
<i>Julien Tripette, Mio Sasaki, Mayumi Kuno-Mizumura, Nobuhisa Motooka, Yui Ohta</i>	
AN APPROACH TO CONSTRUCT AND VALIDATE TCM DATASET EFFECTIVE AGAINST BACTERIAL PNEUMONIA.....	102
<i>Pei Gao, Zheng Chen, Ming Huang, Naoaki Ono, Shigehiko Kanaya, Md Altaf-Ui-Amin</i>	
EDISENSOR: FACILITATING FOOD ELECTRICITY FOR EATING HABITS ANALYSIS.....	104
<i>Parinya Punpongsanon, Hiroki Ishizuka</i>	
PREDICTION OF BODY CONSTITUTIONS THROUGH LIFE-STYLE FOR HEALTH GUIDANCE	106
<i>Guang Shi, Zhen Chen, Shigehiko Kanaya, Md. Altaf-Ui-Amin, Naoaki Ono, Ming Huang</i>	
A STUDY OF BLUETOOTH LOW ENERGY (BLE) FRAMEWORKS ON THE IOT BASED HEART MONITORING SYSTEM	108
<i>Eko Sakti Pramukantoro, Akio Gofuku</i>	
IMPROVEMENT OF VISUAL ATTENTION BY DOTTED BACKGROUND NOISE.....	111
<i>Motoharu Takao, Yasuhiro Uehara, Akihiko Izawa</i>	
NIGHTSCAPE ASSESSMENT OF SHOPPING DISTRICT IN A VIRTUAL REALITY DISPLAY	114
<i>Wataru Ishii, Motoharu Takao</i>	
VIRTUAL REALITY AND FEELING OF FALLING: A PHYSIOLOGICAL WEARABLE TOOL FOR VIRTUAL REALITY SICKNESS	117
<i>Giovanni Gentile, Jacopo Lanzone, Alberto Ruzzon, Roberto Di Marco, Giorgio Ferriero, Patrizio Sale</i>	

HIERARCHICAL CLUSTERING OF NATURAL DISASTER IMAGES USING VISUAL FEATURES.....	120
<i>Ryosuke Harakawa, Kazuma Ohtomo, Koki Takahashi, Yoko Matsuda, Masahiro Iwahashi</i>	
RESEARCH ON RHEUMATOID ARTHRITIS DETECTION SUPPORT SYSTEM.....	122
<i>Takashi Muronosono, Toshiko Nishiyama, Shinya Kawajiri, Tetsuo Imai, Kenichi Arai, Toru Kobayashi</i>	
MODIFIED DYNAMIC TIME WARPING WITH LOCAL AND GLOBAL WEIGHTING FOR ONLINE SIGNATURE VERIFICATION.....	124
<i>Manabu Okawa</i>	
AN-EMG-CONTROLLED MOBILE ROBOT BASED ON A MULTI-LAYERED NON-CONTACT IMPEDANCE MODEL.....	126
<i>Taro Shibanoki, Masaru Sasaki, Toshio Tsuji</i>	
FOOT PROSTHESIS DESIGN TO RECOVER THE NATURAL BIOMECHANICAL POSITION IN RAMPHASTOS TUCANUS SPECIMEN.....	128
<i>Tatiana Andrea Hincapié Riaño, Lizeth Vega-Medina, Catalina Rodríguez</i>	
A 3D-PRINTABLE PROSTHETIC HAND BASED ON A DUAL-ARM OPERATION ASSISTANCE MODEL.....	133
<i>Taro Shibanoki, Kosuke Jin</i>	
DESIGN OF AN AUXILIARY DEVICE FOR HOME-BASED STROKE REHABILITATION	135
<i>Shuhao Zhang, Mengjie Huang, Liu Wang, Kai-Lun Liao, Rui Yang</i>	
AN OPEN-IOT APPROACH ON ELEVATOR FOR ENABLING AUTONOMOUS ROBOTIC VERTICAL MOBILITY	139
<i>Hangli Ge, Masahiro Matsui, Noboru Koshizuka</i>	
A BED-EXIT AND BEDSIDE FALL WARNING SYSTEM BASED ON DEEP LEARNING EDGE COMPUTING TECHNIQUES.....	142
<i>Wan-Jung Chang, Liang-Bi Chen, Yang-Kun Ou, Aaron Raymond See, Tzu-Chin Yang</i>	
IRIS LOCATION AND RECOGNITION BY DEEP-LEARNING NETWORKS BASED DESIGN FOR BIOMETRIC AUTHORIZATION.....	144
<i>Cheng-Shun Hsiao, Chih-Peng Fan, Yin-Tsung Hwang</i>	
IMAGE ENHANCEMENT AND ADJUSTMENT BASED ON HISTOGRAM EQUALIZATION OF PROFILE COMPRESSION ALGORITHM.....	146
<i>Chun-Hsiang Chang, Wei-Zhe Yan, Min-Hua Lu, Ting-Wei Chen, Yi-Cheng Liu, Yu-Cheng Fan</i>	
AN IMPROVEMENT OF VALUE TRACE PROBLEMS FOR POINTER STUDY IN C PROGRAMMING.....	148
<i>Xiqin Lu, Nobuo Funabiki, Htoo Htoo Sandi Kyaw, Shune Lae Aung, Nem Khan Dim</i>	
PERFORMANCE INVESTIGATION OF UNIT TESTING IN ANDROID PROGRAMMING LEARNING ASSISTANCE SYSTEM.....	153
<i>Yan Watequlis Syaifudin, Nobuo Funabiki, Devany C. Wijaya, Ikhlashul Mu'Aasyiqiin</i>	
A STUDY OF GRAMMAR-CONCEPT UNDERSTANDING PROBLEM FOR C PROGRAMMING LEARNING	158
<i>Xiqin Lu, Soe Thandar Aung, Htoo Htoo Sandi Kyaw, Nobuo Funabiki, Shune Lae Aung, Thin Thin Soe</i>	

AN IMPLEMENTATION OF OFFLINE ANSWERING FUNCTION FOR CODE COMPLETION PROBLEM IN PLAS	162
<i>Htoo Htoo Sandi Kyaw, Nobuo Funabiki, Minoru Kuribayashi</i>	
INVESTIGATING A METHOD TO REDUCE JAPANESE PEOPLE'S EMBARRASSMENT IN USING VOICE INPUTS.....	166
<i>Kenji Tsukamoto, Tatsuo Nakajima, Kota Gushima</i>	
THE RELATIONSHIP BETWEEN EACH LENGTH OF REM - NREM SLEEP CYCLE AND SLEEP STAGE	171
<i>Hiroko Sawai, Maki Matsumoto, Emi Koyama</i>	
AUTOMATIC DETECTION OF CHEWING AND SWALLOWING USING MULTICHANNEL SOUND INFORMATION	173
<i>Akihiro Nakamura, Takato Saito, Daizo Ikeda, Ken Ohta, Hiroshi Mineno, Masafumi Nishimura</i>	
A BATTERY-FREE SENSOR BASED FALL MONITORING SYSTEM FOR THE ELDERLY ON A STAIRCASE.....	176
<i>Wattana Banno, Norihiko Shinomiya</i>	
RECENT ADVANCES IN COMPUTER AUDITION FOR DIAGNOSING COVID-19: AN OVERVIEW.....	181
<i>Kun Qian, Björn W. Schuller, Yoshiharu Yamamoto</i>	
EEG ACTIVITY RELATED TO DECREASE IN PERSISTENCY OF GAIT CYCLE VARIABILITY DURING DISTRACTED WALKING	183
<i>Akihiro Nakamura, Yasuyuki Suzuki, Shunpei Yano, Taishin Nomura</i>	
THE HAND PREHENSILE MOVEMENT MODIFIED BY VISUAL ILLUSION IN IMMERSIVE VIRTUAL REALITY	185
<i>Daniel Choi, Taeyeong Jeong, Jihun Kim, Jaehyo Kim</i>	
COMFORT MANAGEMENT SYSTEM FOR PROVIDING INFORMATION TO MAINTAIN PHYSICAL AND MENTAL CONDITION	187
<i>Kazuma Nishigaki, Katsuma Takagi, Kanae Matsui</i>	
“RELATIONSHIP BETWEEN LEARNING BY TEACHING WITH TEACHABLE CHATBOTS AND THE BIG 5.....	191
<i>Koya Iwase, Kota Gushima, Tatsuo Nakajima</i>	
HUMAN BEHAVIOR GUIDANCE METHODS IN DISTRIBUTED VIRTUAL SHOPPING MALLS	195
<i>Yuta Matsushima, Kota Gushima, Tatsuo Nakajima</i>	
HEALTH PROMOTION WITH A WEB APPLICATION OF 100 DAYS 100 KM	198
<i>Termetch Sookhanaphibarn, Earn Suriyachay</i>	
CONFIGURING INTERFACE FOR IOT: NATURAL USER INTERFACE STUDY ON SENIOR ADULTS IN JAPAN.....	200
<i>Kenichiro Ito, Hiroki Kogami, Sooin Kang, Reina Yoshizaki, Yuriki Sakurai, Koki Nakano, Daisuke Yoshioka, Jiang Wu, Mahiro Fujisaki-Sueda-Sakai, Ikuko Sugarawa, Takahiro Miura, Ken-Ichiro Yabu, Tohru Ifukube</i>	
SELF-ADAPTIVE HYDROPONICS CARE SYSTEM FOR HUMAN-HYDROPONICS COEXISTENCE.....	204
<i>Jialong Li, Zhenyu Mao, Zhen Cao, Kenji Tei, Shinichi Honiden</i>	

IMPLEMENTATION OF VR-BASED PERSONAL BASKETBALL TEAM-PRACTICE EQUIPMENT	207
<i>Hiroki Honma, Yoshiaki Iida, Yasuyuki Okumura, Katsuyuki Fujii, Yuki Kuno</i>	
STRAW FIGHTER: A GAMIFICATION-BASED SYSTEM FOR SUPPORTING VOCAL EXERCISE BY TUBE PHONATION.....	209
<i>Kenta Hamada, Tatsuya Kitamura, Naoko Kawamura</i>	
DEVELOPMENT OF A SYSTEM FOR FITNESS TO PROMOTE EXERCISE AND SUPPORT OPERATIONS USING SHOE DEVICES	211
<i>Kazuya Tamura, Makoto Inagaki, Tatsuki Terashima, Hiroki Shinka, Yuki Matsui, Kaho Miyamoto, Yasuo Kawai</i>	
DEVELOPMENT OF AUGMENTED REALITY-BASED APPLICATION TO SEARCH FOR ELECTRIC APPLIANCES AND FURNITURE	214
<i>Koki Sato, Takuya Soejima, Motoki Saito, Ryota Sasage, Nazuki Kamioka, Naomi Goto, Yasuo Kawai</i>	
VIRTUAL SHOE FITTING SYSTEM THAT USES AUGMENTED REALITY TO MEASURE FEET AND TRY ON SHOES.....	217
<i>Hiro Bizen, Minoru Yoshida, Makoto Jimbu, Yasuo Kawai</i>	
COMBINING SUPPORT VECTOR MACHINE AND POLYNOMIAL REGRESSING TO PREDICT TROPICAL CYCLONE TRACK.....	220
<i>Thu Zar Hsan, Myint Myint Sein</i>	
A COLLABORATIVE ENSEMBLE SYSTEM WITH PICTURE STORY FOR AESTHETIC SENSIBILITY LEARNING.....	222
<i>Huynh Thi Kim Chi, Kosuke Takano</i>	
3D CG IMAGE NOISE REMOVAL AND QUALITY ASSESSMENT BASED ON SPARSE DICTIONARY LEARNING.....	225
<i>Norifumi Kawabata</i>	
AUTOMATIC DETECTION OF MOUNTING BEHAVIOR IN CATTLE USING SEMANTIC SEGMENTATION AND CLASSIFICATION.....	227
<i>Su Myat Noe, Thi Thi Zin, Pyke Tin, Ikuo Kobayashi</i>	
PETROCHEMICAL CHARACTERISTICS OF THE GRANITOID ROCKS OF NORTHERN MYANMAR.....	229
<i>Htin Lynn Aung, Thaire Phyu Win, Thi Thi Zin</i>	
UNOBTRUSIVE NOTIFICATION BASED ON AUDITORY CHANGES IN AMBIENT MUSIC.....	231
<i>Yuuki Muranaka, Mohammed Al-Sada, Tatsuo Nakajima</i>	
EVACUATION GUIDE SUPPORTING SYSTEM USING UAV FOR COASTAL AREA.....	235
<i>Hideyuki Takahashi, Kenta Katayama, Nobuhide Yokota, Kazuya Sugiyasu</i>	
MEASUREMENT METHOD OF WALKING SUPPORT EFFECT USING THERMAL IMAGE DURING LONG-TIME WALKING	237
<i>Xiaoxing Xu, Satori Hachisuka, Takeshi Morita</i>	
EVALUATING EFFECTIVENESS OF ROBOT-ASSISTED RECREATION FOR OLDER ADULTS BY SPEECH ANALYSIS	240
<i>Tomoko Nariai, Shiroh Itai, Hiroaki Kojima</i>	

A QUANTITATIVE EVALUATION OF FOREHEAD CORRECTION TREATMENT USING AUTOMATED IMAGE ANALYSIS	244
<i>Tsuyoshi Moriyama, Kiwako Izumi, Kei Miyahara, Koichiro Kajiwara, Mamoru Sato</i>	
VERIFICATION OF GENERALIZABILITY OF WALKING ASSIST STATUS INDEX USING ELECTROMYOGRAPHY	247
<i>Satori Hachisuka, Xiaoxing Xu, Takeshi Morita</i>	
WALKING CANE VELOCITY ESTIMATION USING A VELOCITY UPDATE METHOD.....	249
<i>Ibai Gorordo Fernandez, Chikamune Wada, Siti Anom Ahmad</i>	
THE IMPACT OF ACTIVITY SENSORS ON ATTITUDES AND BEHAVIOR AMONG YOUNG AND ELDERLY PEOPLE	253
<i>Sahar Hamido, Xiuzhu Gu</i>	
DISTINGUISHING WORKING STATE BY PALM ORIENTATION.....	256
<i>Kenta Hayashi, Shingo Kumazoe, Shigemi Ishida, Yutaka Arakawa</i>	
A CLOUD-BASED FALL DETECTION SYSTEM FOR ELDERLY CARE WITH PASSIVE RFID SENSOR TAGS	261
<i>Koichi Takatou, Norihiko Shinomiya</i>	
AR-BASED NAVIGATION USING HYBRID MAP	266
<i>Yanlei Gu, Woranipit Chidsin, Igor Goncharenko</i>	
EXERCISE RECOGNITION SYSTEM USING FACIAL IMAGE INFORMATION FROM A MOBILE DEVICE	268
<i>Kaho Kato, Chengshuo Xia, Yuta Sugiura</i>	
A STUDY ON TIME SERIES ANALYSIS OF ENVIRONMENTAL DATA FOR PREDICTING EMOTIONAL CONDITIONS	273
<i>Koshiro Maeda, Isao Kurebayashi, Nobuyoshi Komuro, Keita Hirai</i>	
RESIDUAL-NETWORK-BASED DEEP LEARNING FOR PARKINSON'S DISEASE CLASSIFICATION USING VOCAL DATASETS.....	275
<i>Mitsuhiro Ogawa, Yiran Yang</i>	
MECHANISM FOR MULTITHREADED AND ASYNCHRONOUS SYSTEM CALL EXECUTION	278
<i>Ken Nakajima, Masahito Shiba</i>	
INDOOR LOCALIZATION USING LEAKY COAXIAL CABLE OVER A MULTIPATH-RICH LINEAR CELL ENVIRONMENT	280
<i>Junjie Zhu, Kenta Nagayama, Yafei Hou, Satoshi Denno</i>	
PERSON VERIFICATION USING ELECTROENCEPHALOGRAMS EVOKED BY NEW IMPERCEPTIBLE VIBRATION STIMULATION	282
<i>Yoshiaki Shindo, Isao Nakanishi</i>	
IOT BASED HARVESTING SYSTEM WITH IMAGE RECOGNITION.....	287
<i>Khine Zin Thet, Khin Than Mya</i>	
PEOPLE DETECTING AND COUNTING SYSTEM.....	289
<i>Ei Phyu Myint, Myint Myint Sein</i>	

MARKOV CHAIN MONTE CARLO METHOD FOR THE MODELING OF POSTURE CHANGES PRIOR TO CALVING	291
<i>Thi Thi Zin, Pyke Tin, Pann Thinzar Seint, Yoichiro Horii</i>	
DEVELOPMENT AND EVALUATION OF SWAHILI TEXT BASED CAPTCHA.....	293
<i>Isakwisa Gaddy Tende, Kentaro Aburada, Hisaaki Yamaba, Tetsuro Katayama, Naonobu Okazaki</i>	
AN APPLICATION OF DEEP-LEARNING TECHNIQUES TO FACE MASK DETECTION DURING THE COVID-19 PANDEMIC	298
<i>Ponlawat Khamlae, Kingkarn Sookhanaphibarn, Worawat Choensawat</i>	
ANALYSIS OF THE EFFECT OF SENSOMOTORIC INSERTS IN IN-TOE GAIT PATIENTS WITH DIRECTIONAL STATISTICS.....	300
<i>Kosuke Morinaga, Kotaro Matsuura, Astushi Kanbe, Shigekazu Ishihara, Toshio Tsuji</i>	
PROPOSAL OF CLOSE CONTACT CONFIRMATION METHOD IN CYBERSPACE FOR INFLUENCER MARKETING	305
<i>Astushi Isozaki, Naoki Suyama, Tetsuo Imai, Kenichi Arai, Toru Kobayashi</i>	
RESEARCH ON CONTACTLESS OPERATION METHOD FOR PUBLIC EQUIPMENT USING PERSONAL SMARTPHONE: *NOTE: SUB-TITLES ARE NOT CAPTURED IN XPLORE AND SHOULD NOT BE USED	307
<i>Hirokazu Kumamoto, Takashi Muronosono, Shinji Ohta, Tetsuo Imai, Kenichi Arai, Toru Kobayashi</i>	
MEASUREMENT FREQUENCY EVALUATION FOR BIOIMPEDANCE-BASED BLOOD- GLUCOSE ESTIMATION	309
<i>Reo Takamatsu, Kenichi Higuchi, Dairoku Muramatsu</i>	
A SENSOR-BASED HAND GESTURE RECOGNITION SYSTEM FOR JAPANESE SIGN LANGUAGE.....	311
<i>Xianzhi Chu, Jiang Liu, Shigeru Shimamoto</i>	
THE ROLE OF CONTINUOUS GLUCOSE MONITORING IN AUTOMATIC DETECTION OF EATING ACTIVITIES	313
<i>Lauriane Bertrand, Nathan Cleyet-Marrel, Zilu Liang</i>	
NON-INVASIVE SWALLOWING EXAMINATION DEVICE USING HETERO-CORE FIBER OPTIC PRESSURE SENSOR.....	315
<i>Masanori Maeda, Miyuki Kadokura, Ryoko Aoki, Masaru Kawakami, Yuya Koyama, Michiko Nishiyama, Kazuhiro Watanabe</i>	
VALIDATION OF CW DOPPLER RADAR EMBEDDED WITHIN DRIVING SEAT FOR HEARTBEAT DETECTION USING NHA	317
<i>Takuro Konishi, Hirohide Kawamura, So Furuta, Shigeki Hirobayashi, Kazuo Yoshida</i>	
EVACUATION GUIDANCE SYSTEM USING BEACON INFORMATION AND DIJKSTRA'S ALGORITHM.....	319
<i>Ken Shimizu, Daisuke Kushida</i>	
DESIGN OF AN AUTOMATED NON-INVASIVE ELECTROMECHANICAL VENTILATOR WITH FEEDBACK MECHANISM	324
<i>Rethwan Faiz, Nuzat Nuary Alam, Mohammad Hasan Imam</i>	

THREE-DIMENSIONAL CULTURE TECHNOLOGY: SELF-ORGANIZED SPHEROID CULTURE DRIVES OSTEOCYTOGENESIS	329
<i>Jeonghyun Kim, Taiji Adachi</i>	
REAL TIME SENSOR SIGNAL PROCESSING TECHNIQUES USING SYMMETRIC DUAL-BANK BUFFER ON FREERTOS	331
<i>Dongkyu Jung, Daejin Park</i>	
ON THE DESIGN AND EVALUATION OF DECISION SUPPORT PLATFORM FOR PROSTATE CANCER DISEASE	333
<i>Sorawit Khumnaewnak, Chidchanok Choksuchat, Sirima Kanghae, Korakot Wichitsa-Nguan Jetwana, Nattawut Thongpim, Sureena Matayong, Tanan Beirananda</i>	
A CRITICAL LOOK AT THE DATA TO FIND A NORMAL RANGE OF VALUES FOR HEART RATE VARIABILITY	337
<i>Md Shoaib Bhuiyan</i>	
CONTINUOUS EXPERIMENTS FOR ELDERLY PERSON'S EXERCISE SENSING AND EVALUATION	341
<i>Tatsuya Yamazaki</i>	
SPEECH-BASED DEMENTIA CLASSIFICATION FOR FTLD DIAGNOSIS SUPPORT	344
<i>Shunya Hanai, Shohei Kato, Koichi Sakaguchi, Takuto Sakuma, Reiko Ohdake, Michihito Masuda, Hirohisa Watanabe</i>	
A STUDY FOR DETECTING MILD COGNITIVE IMPAIRMENT BY ANALYZING CONVERSATIONS WITH HUMANOID ROBOTS	347
<i>Kenta Yoshii, Masafumi Nishimura, Daiki Kimura, Akihiro Kosugi, Kaoru Shinkawa, Toshiro Takase, Masatomo Kobayashi, Yasunori Yamada, Miyuki Nemoto, Ryohei Watanabe, Eriko Tsukada, Miho Ota, Kiyotaka Nemoto, Tetsuaki Arai, Shinji Higashi</i>	
GAIT RECOGNITION WITH 2D POSE INFORMATION USING A SURVEILLANCE CAMERA	351
<i>Tomohiro Inoue, Megumi Chikano, Shuji Awai, Takeshi Konno</i>	
SMART MIRROR FOR ELDERLY EMOTION MONITORING	356
<i>Piyarat Silapasuphakornwong, Kazutake Uehira</i>	
ALZHEIMER DEMENTIA DETECTION BASED ON CIRCADIAN RHYTHM DISORDER OF HEARTRATE	360
<i>Naoya Matsuda, Iko Nakari, Ryotaro Arai, Hiroyuki Sato, Keiki Takadama, Masanori Hirose, Hiroshi Hasegawa, Makoto Shiraiishi, Takahide Matsuda</i>	
COMPLEX PROBLEM SOLVING DISCUSSION AND ITS PERFORMANCE INDICATORS	365
<i>Yingting Chen, Taro Kanno, Kazuo Furuta</i>	
RELATIONSHIP BETWEEN VERTICAL ACCELERATION AND AUTOCORRELATION FUNCTION DURING JUMPING ROPE	369
<i>Daisuke Goto, Masanobu Manno, Tianyi Wang, Tetsutaro Koda, Nao Miyamoto, Takuya Toyoshi, Shima Okada, Naruhiro Shiozawa</i>	
USING DEPTH MAP AS INTERFACE TO PREDICT COLLISION RISKS IN REMOTE PARTICIPATION ASSIST SYSTEM	371
<i>Takumi Kawamura</i>	
CLASSIFICATION OF IMAGINED AND HEARD SPEECH USING AMPLITUDE SPECTRUM AND RELATIVE PHASE OF EEG	373
<i>Ryota Sakai, Atsuhiko Kai, Seiichi Nakagawa</i>	

EEGNETT: EEG-BASED NEURAL NETWORK FOR EMOTION RECOGNITION IN REAL-WORLD APPLICATIONS	376
<i>Yuxuan Zhu, Kenji Ozawa, Wanzeng Kong</i>	
GAMMA BAND FUNCTIONAL CONNECTIVITY ENHANCED BY DRIVING EXPERIENCE.....	379
<i>Sou Nobukawa, Nobuhiko Wagatsuma, Keiichiro Inagaki</i>	
POSSIBILITY OF USING INFORMATION AND COMMUNICATIONS TECHNOLOGY FOR SENIOR CITIZENS IN ONLINE SALONS	382
<i>Akane Maruyama, Eiko Inoue</i>	
TOWARD COOPERATION OF PERSONAL HEALTH DEVICES AND SMART APPLIANCES IN JAPAN SMART HOMES.....	386
<i>Van Cu Pham, Tao Xin, Marios Sioutis, Yuto Lim, Yasuo Tan</i>	
REFLECTING PERSONAL PREFERENCE OBTAINED FROM CLOTHING PHOTOS INTO FULL-COLOR LED LIGHTING	390
<i>Shigeru Owada, Karura Inagaki, Hiroshi Sugimura</i>	
MATCHING APPLICATION OF SERVICE CONSUMPTION: YATTEKOH	392
<i>Shoya Ogawa, Hu Urasaki, Tetsuo Imai, Kenichi Arai, Toru Kobayashi</i>	
HOME-LIFE ASSESSMENT LIST “HAL” FOR PROMOTING THE REVIEW OF LIFESTYLE HABITS	394
<i>Yoshiki Sano, Takahiro Sakai, Yusuke Uda, Hiroshi Sugimura, Masao Isshiki</i>	
RADAR-BASED GAIT CLASSIFICATION OF ELDERLY NON-FALLERS AND MULTIPLE FALLERS USING MACHINE LEARNING.....	399
<i>Keitaro Shioiri, Kenshi Saho, Masahiro Fujimoto, Yoshiyuki Kobayashi</i>	
THROUGHPUT MEASUREMENT FOR IEEE 802.11AD WITH VARIOUS OBSTACLES AND REFLECTORS BY REAL MACHINES	401
<i>Ryoko Nino, Takayuki Nishio, Tutomu Murase</i>	
AN ICT-BASED SUPPORTING SYSTEM FOR HOME-NURSING SERVICES	403
<i>Asuka Mibu, Norihiko Shinomiya</i>	
PATTERN RECOGNITION OF MENTAL STRESS LEVELS FROM DIFFERENTIAL RRI TIME SERIES USING LSTM NETWORKS	408
<i>Nan Bu, Masanori Fukami, Osamu Fukuda</i>	
MODELING OF COGNITIVE PROCESSES BASED ON GAZE TRANSITION DURING PROGRAMMING DEBUGGING.....	412
<i>Toru Kano, Ryuichi Sakagami, Takako Akakura</i>	
A BLE-BASED MONITORING SYSTEM FOR ESTIMATING CONGESTION ON UNIVERSITY CAMPUSES	414
<i>Yoshiaki Taniguchi, Tomoki Mukaida, Youji Ochi, Nobukazu Iguchi</i>	
ATMOSPHERE SHARING SYSTEM BY LIGHTING AND FRAGRANCE TO ENHANCE QUALITY OF WORK IN TELEWORK.....	416
<i>Takumi Ishikawa, Yoichi Yamazaki</i>	
BUS LOCATION SYSTEM WITH LORA TO COVER THE ENTIRE NONOICHI CITY.....	419
<i>Hikaru Yabe, Shuto Ishikawa, Shunsuke Tomioka, Sho Tsukahara, Ryotaro Sakauchi, Mikiko Sode Tanaka</i>	

EFFECTIVE TRANSMISSION WITH COLOR PLANE CORRELATIONS FOR BLOCK COMPRESSED SENSING	421
<i>Hsiang-Cheh Huang, Feng-Cheng Chang, Yueh-Hong Chen, Po-Liang Chen</i>	
RELIABLE TRANSMISSION WITH VARIABLE-SIZED BLOCK COMPRESSED SENSING	423
<i>Hsiang-Cheh Huang, Feng-Cheng Chang, Yueh-Hong Chen, Po-Liang Chen</i>	
ENHANCEMENTS OF DATA HIDING APPLICATIONS WITH QR CODE CONCEALMENT	425
<i>Hsiang-Cheh Huang, Yueh-Hong Chen, Feng-Cheng Chang, Yuh-Yih Lu</i>	
A DESIGN APPROACH FOR SOFTWARE ROBUSTNESS.....	428
<i>Feng-Cheng Chang, Hsiang-Cheh Huang</i>	
AN ELASTIC GEL-CHANNEL SYSTEM MIMICKING NON-LINEAR FLOWS IN MENINGEAL LYMPHATIC MICROVESSELS	432
<i>Alexander V. Sychev, Vasily E. Melnichenko, Anastasia I. Lavrova, Eugene B. Postnikov</i>	
DEVELOPMENT OF AN EVALUATION PROCEDURE FOR ASSIST WEAR DEVICES USED IN DAILY ACTIVITIES	434
<i>Hiroyuki Ohshima, Takumi Shimizu, Shigenobu Shimada</i>	
PIXEL-LEVEL DIABETIC RETINOPATHY LESION DETECTION USING MULTI-SCALE CONVOLUTIONAL NEURAL NETWORK.....	438
<i>Qi Li, Chenglei Peng, Yazhen Ma, Sidan Du, Bin Guo, Yang Li</i>	
A REVIEW ON QUANTITATIVE ANALYZING AXONAL TRANSPORT OF MITOCHONDRIA.....	441
<i>Tong Chen, Chenglei Peng, Ming Li, Xudong Chen, Sidan Du, Yang Li</i>	
EVALUATION METHOD OF RHEUMATOID ARTHRITIS BY THE X-RAY PHOTOGRAPH USING DEEP LEARNING	444
<i>Yuri Hioki, Koji Makino, Kensuke Koyama, Hirotaka Haro, Hidetsugu Terada</i>	
STUDY ON FINS KNIT BY TWO KINDS OF BIODEGRADABLE STRING FOR A MANIPULATABLE ENDOSCOPE.....	448
<i>Koji Makino, Hiromi Watanabe, Tatsuya Yamaguchi, Hidetsugu Terada, Naoto Sekiya</i>	
EXAMINATION OF RELIABILITY AND CONVENIENCE OF THE SAFEGUARDING SUPPORTIVE SYSTEM (SSS) - EXPERIMENTAL EVIDENCE AT A COMPANY	452
<i>Shoken Shimizu, Christoph Bördlein, Yuka Koremura, Rieko Hojo</i>	
INTERNETWORKED WRIST SENSING DEVICES FOR PERVASIVE AND M-CONNECTED ELDERCARE	454
<i>Alberto Faro, Daniela Giordano, Mario Venticinque</i>	
SHORTEST ALTERNATIVE PATH FINDING ON ROAD NETWORK.....	457
<i>Myint Thu</i>	
EXTENSION MODEL OF A GROWING ROD APPLIED FOR PULLING FORCE USING BIOMATERIAL	461
<i>Kent Ota, Koji Makino, Naofumi Taniguchi, Yudai Kitano, Tetsuro Ohba, Takaaki Ishii, Masaki Miyashita, Yasumi Ito, Hirotaka Haro, Hidetsugu Terada</i>	
CONSTRUCTION OF TRANSGENIC CELL LINE FOR PRODUCTION OF A CANINE MODEL OF FRAGILE X SYNDROME.....	465
<i>Hyunwoo Kwon</i>	

EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION IN BRAIN-COMPUTER INTERFACE	468
<i>Kazumi Kasahara, Tatsuhiko Nakamura, Kazumasa Uehara, Yousuke Ogata, Kenji Doya, Takashi Hanakawa</i>	
NOVEL SINGLE-CHANNEL EEG FEATURES CORRELATE WITH WORKING MEMORY LOAD.....	471
<i>Neta B. Maimon, Lior Molcho, Nathan Intrator, Dominique Lamy</i>	
HEARING SUPPORT SYSTEM FOR THE HEARING IMPAIRED	473
<i>Manabu Ishihara, Michiko Tsuda</i>	
ANEMIA EXAMINATION USING A HYPERSPECTRAL CAMERA IN TELECARE SYSTEM.....	475
<i>Naoki Kobayashi, Aoi Yoshino, Masahiro Ishikawa, Satoki Homma</i>	
TELECLINICAL SUPPORT SYSTEM VIA MR-HMD DISPLAYING DOCTOR'S INSTRUCTIONS AND PATIENT INFORMATION	477
<i>Keito Kamimura, Yuki Fujita, Tomofumi Miura, Yoshihisa Matsumoto, Yuka Maeda, Keiichi Zempo</i>	
SAFETY MANAGERMENTS WITH PERCEIVED RISK HOMEOSTASIS IN BIOFUNCTIONS.....	480
<i>Tohru Kiryu, Caijilahu Bao</i>	
DESIGN OF A TELEMETRIC GAIT ANALYSIS INSOLE AND 1-D CONVOLUTIONAL NEURAL NETWORK TO TRACK POSTOPERATIVE FRACTURE REHABILITATION	484
<i>Saathvik A. Boompelli, Sambit Bhattacharya</i>	
A STUDY ON INDOOR PHYSICAL ACTIVITY MONITORING USING BLUETOOTH SIGNAL STRENGTH.....	489
<i>Saida Salima Nawrin, Kei Ichiji, Shunsuke Yamaki, Norihiro Sugita, Makoto Yoshizawa</i>	
EFFECTS OF REPRODUCTION METHODS AND FAMILIARITY ON THE ABILITY TO LISTEN TO COMPETING WORDS	494
<i>Eishin Kirikane, Kenji Ozawa, Tomohiko Ise</i>	
A HYBRID TRANSFER LEARNING APPROACH FOR MOTOR IMAGERY CLASSIFICATION IN BRAIN-COMPUTER INTERFACE	496
<i>Xuying Wang, Rui Yang, Mengjie Huang, Zhengni Yang, Zitong Wan</i>	
EFFICIENT CREATION OF JAPANESE TWEET EMOTION DATASET USING SENTENCE-FINAL EXPRESSIONS	501
<i>Tatsuki Akahori, Kohji Dohsaka, Masaki Ishii, Hidekatsu Ito</i>	
A SYSTEM TO KEEP EXERCISING BY SUGGESTING AN APPROPRIATE EXERCISE TIMELY	506
<i>Yu Shibuya, Ryosuke Fujita</i>	
INVESTIGATION OF SOFT DISPLAY USING DIGITAL FABRICATION AND PHASE-CHANGE MATERIAL.....	510
<i>Motoki Miyoshi, Parinya Punpongsanon, Daisuke Iwai, Kosuke Sato</i>	
VITAL SIGN DETECTION USING SHORT-RANGE MM-WAVE PULSED RADAR	512
<i>Nima Bahmani, Markku Rouvala, Arto Kaarna</i>	

PROTOTYPING CRISP: A CAUSAL RELATION AND INFERENCE SEARCH PLATFORM APPLIED TO COLORECTAL CANCER DATA.....	517
<i>Samuel Budd, Arno Blaas, Adrienne Hoarfrost, Kia Khezeli, Krittika D'Silva, Frank Soboczanski, Graham Mackintosh, Nicholas Chia, John Kalantari</i>	
AN ARDUINOBASED DIGITAL HOLTER FOR THAI AMBULATORY AND PERSONAL HEALTHCARE.....	522
<i>Arunrot Thongklang, Ploypailin Thongnawakun, Theerasak Chanwimalueang, Nattapun Rattanajaruskul, Direk Sueaseenak</i>	
TRENDS BETWEEN INDOOR CO ₂ CONCENTRATION AND ELECTRICITY USAGE THROUGH TOPOLOGICAL DATA ANALYSIS	527
<i>Shun Endo, Shinji Yokogawa</i>	
THEORY OF THE OPTIMUM INTERPOLATION RECONSTRUCTION AND AN APPLICATION FOR 2D NMR SPECTROSCOPY	529
<i>Yuichi Kida, Takuro Kida</i>	
PERFORMANCE OF MULTI LAYER PERCEPTRON AND DEEP NEURAL NETWORKS IN SKIN CANCER CLASSIFICATION	534
<i>Yessi Jusman, Indah Monisa Firdiantika, Dhimas Arief Dharmawan, Kunnu Purwanto</i>	
IDENTIFICATION AND DETECTION OF IMMATURE WHITE BLOOD CELLS THROUGH DEEP LEARNING.....	539
<i>Ju-Huei Chien, Siwa Chan, Shin Cheng, Yen-Chieh Ouyang</i>	

Author Index