

2022 IEEE-EMBS Conference on Biomedical Engineering and Sciences (IECBES 2022)

**Kuala Lumpur, Malaysia
7-9 December 2022**



**IEEE Catalog Number: CFP2226K-POD
ISBN: 978-1-6654-9470-0**

**Copyright © 2022 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:	CFP2226K-POD
ISBN (Print-On-Demand):	978-1-6654-9470-0
ISBN (Online):	978-1-6654-9469-4

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

IECBES 2022 PROCEEDING - TABLE OF CONTENTS

S01	Diagnostic, Therapeutic, and Rehabilitation Engineering	
S01-1	Intervention of Autism Spectrum Disorder (ASD) in a New Perspective: A Review on the Deployment of Adaptive Human-Robot Interaction (HRI) System in Enhancing Social Skill Impairments	1
S01-2	Automated Artificial Leg Mechanism for Above-Knee Amputees	7
S01-3	A FastDTW Based Lightweight Limb Motion Function Assessment Method	13
S01-4	A Review on Sit-To-Walk Biomechanics for Healthy Young and Older Adults	17
S02	Internet of Things and Big Data in Biomedical Engineering and Healthcare 1	
S02-1	An Investigation to Detect Driver Drowsiness From Eye Blink Artifacts Using Deep Learning Models	23
S02-2	Development of IoT-Based, Origami-Inspired Wearable Rehabilitation Device for Wrist-Finger Mobility Rehabilitation	30
S02-3	Development of a Digital Resources Sharing Platform for the Hospitals in Malaysia	35
S02-4	Determination of Radiation Delivery Parameters of Medical Linear Accelerators Using Data Analytics Pipeline	40
S03	Biomedical Imaging and Image Processing 1	
S03-1	Functional Connectivity Based Classification for Autism Spectrum Disorder Using Spearman's Rank Correlation	46
S03-2	Information Driven Angular Sampling for Reliable and Efficient SPECT Imaging	52
S03-3	A Deep Convolutional Neural Network for Early Diagnosis of Alzheimer's Disease	58
S03-4	Comparison of Different Models in Predicting COVID-19 Severity Based on Chest X-Ray Scans	62
S03-5	3D Multimodal k-Means and Morphological Operations (3D-MKM) Segmentation of Brain Tumors From MR Images	66
S03-6	Segmenting Brain Tumor With an Improved UNet Architecture	72
S04	Biomedical Instrumentation & Devices 1	

S04-1	Structural, Electrical and Raman Characterization of AgNP Coated Porous Silicon SERS Substrate for Detection Dengue NS1 Protein	78
S04-2	Performance of a Wireless Electrocardiogram System Based on Wi-Fi and BLE Technology	84
S04-3	A 2-In-1 Vital Sign Monitor With Smart Fever Type Classification for Home-Care Services	88
S04-4	Investigation of a Simplified Photometer Design for the Measurement of Ozone Gas Concentration	94
S05	Biomedical Signal Processing	
S05-1	Model-Based Analysis of Respiratory Mechanics and Parameters in Critically Ill Mechanically Ventilated Patients	100
S05-2	A Neural Network Approach to Estimate Lower Extremity Muscle Activity During Walking	106
S05-3	Gait Classification of Parkinson's Disease With Supervised Machine Learning Approach	112
S05-4	Convolution Neural Network Performance in Recognising EEG Signals of Dyslexic Children	117
S06	Engineering in Sports and Exercise	
S06-1	Development of an Exercise Application to Support Physical Function Improvement and Training for Remote Workers	121
S06-2	Verification of Mental Stress Reduction Effects of Exercise Support Apps and Communication Support App for Corporate Health Management	125
S06-3	Effect of Shoe Cushioning Hardness to Running Biomechanics	131
S06-4	Effect of Knee Flexion Angle on Squat Jump Performance	137
S07	Cardiovascular and Respiratory Systems	
S07-1	Effects of Data Structure in Convolutional Neural Network for Detection of Asynchronous Breathing in Mechanical Ventilation Treatment	142
S07-2	Real-Time Vital Sign Detection Using a 77 GHz FMCW Radar	148
S07-3	Enhancing Deep Learning-Based 3-Lead ECG Classification With Heartbeat Counting and Demographic Data Integration	154

S07-4	Age-Based Sensitivity Analysis on Cardiac Hemodynamics Using Lumped-Parameter Modelling	160
S08	Biomedical Signal Processing 2	
S08-1	Vector-Quantized Zero-Delay Deep Autoencoders for the Compression of Electrical Stimulation Patterns of Cochlear Implants Using STOI	165
S08-2	EMG-Based Volitional Torque Estimation in Functional Electrical Stimulation Control	171
S08-3	Fall Risk Assessment Using Pressure Insole Sensors and Convolutional Neural Networks	177
S08-4	A Multi-Model Analysis for Driving Fatigue Detection Using EEG Signals	183
S08-5	Predictive Modeling Using ARX and ARMAX Models for Glycemic Control in Intensive Care Unit Patients	189
S08-6	Hand Segmentation and Joint Localization in Fluorescence Optical Imaging	195
S09	Special Session	
S09-1	Diagnosis of Cerebellar Ataxia Based on Gait Analysis Using Human Pose Estimation: A Deep Learning Approach	201
S09-2	A Hybrid Ensemble Learning With Generative Adversarial Networks for HEP-2 Cell Image Classification	207
S09-3	Image-To-Graph Transformation via Superpixel Clustering to Build Nodes in Deep Learning for Graph	213
S10	Biomedical Modeling and Simulation	
S10-1	Exploring the Vibrational and Rotational Temperatures of a DBD Plasma Jet for Wound Healing	218
S10-2	Modeling of Insulin Sensitivity for Sepsis-AKI and Sepsis Non-AKI	223
S10-3	Effect of Running Shoe Cushioning on Muscle Activation Using OpenSim	228
S10-4	An In-Silico Study on Effect of KCNQ1 P535T Mutation in Cardiac Ventricular Cells	234
S11	Biomedical Instrumentation & Devices 2	
S11-1	Surface Bacterial Mitigation by a DBD Plasma Sheet Generator	240
S11-2	Design of a Biochair to Facilitate Leg Muscles Rehabilitation	246

S11-3	Mechanical Noise Affects Rambling and Trembling Trajectories During Quiet Standing	252
S11-4	Correlation Between Multimodal Radiographic Features and Preoperative Seizure in Brain Tumor Using Machine Learning	258
S11-5	Force Sensing Performance of Hydrogel-Based Magnetorheological Plastomers With Graphite	264
S11-6	Eye Tracking System Measurement of Saccadic Eye Movement With Different Illuminance Transmission Exposures During Driving Simulation	270
S12	Biomedical Signal Processing	
S12-1	Techniques to Infer Frequency-Specific Audibility of Speech Using Single-Channel Cortical Responses	274
S12-2	Driver's Fatigue Classification Based on Physiological Signals Using RNN-LSTM Technique	280
S12-3	Deep Learning-Based Classification of Stress Levels During Real-World Driving Tasks	286
S12-4	Window-Based Time-Frequency Methods for Analyzing Epileptic EEG Signals	292
S12-5	Mu Rhythm EEG Signals Analysis During Fingers Movements in Mirror Therapy	298
S12-6	Multi-Class Tumor Diseases Classification Using Discrete Wavelet Transform and Principal Component Analysis	303
S13	Pre & Post COVID-19 Pandemic Response	
S13-1	NFNets-CNN for Classification of COVID-19 From CT Scan Images	308
S13-2	Explainable COVID-19 Three Classes Severity Classification Using Chest X-Ray Images	312
S14	Internet of Things and Big Data in Biomedical Engineering and Healthcare 2	
S14-1	A Gesture Controlled System to Train and Guide the Healthcare Workers While Donning and Doffing Personal Protective Equipment	318
S14-2	Development of Elbow-Wrist Telerehabilitation System - an Affordable, Available, Accessible, and Acceptable (4As) System	324
S14-3	Personalization of a Mobile EEG for Remote Monitoring	328

S14-4	Development of Real-Time Contact Force Control of a Collaborative Robot for Automated Ultrasound Scanning	334
S15	Pharmaceutical Engineering and Drug Delivery Systems	
S15-1	Bi-Layered Films Based on Sodium Hyaluronate and Chitosan as Materials for ENT Surgery	338
S15-2	Fabrication of Polyvinyl Alcohol Nanofibers for the Delivery of Biologically Active Molecules	344
S15-3	Thermosensitive and pH-Sensitive Drug Release From Taxifolin-Containing Collagen-Acrylic Hydrogels	350
S16	Internet of Things and Big Data in Biomedical Engineering and Healthcare 3	
S16-1	An IoT Rehab Device: HHI-Based NMES System for Motion Stimulation	355
S16-2	Depression Detection on Malay Dialects Using GPT-3	360
S16-3	A Smart and Home-Based Telerehabilitation Tool for Patients With Neuromuscular Disorder	365
S17	Neural Engineering and Brain Computer Interface	
S17-1	Smartphone-Based Natural Environment Electroencephalogram Experimentation-Opportunities and Challenges	370
S17-2	Strategies on Deep Brain Stimulation Devices for Effective Behavioral Studies in Rodents	376
S17-3	Linear Classifier Approach to Detect Alpha Parietal Modulation for Brain Computer Interface	382
S17-4	Hardware-Friendly Random Forest Classification of iEEG Signals for Implantable Seizure Detection	388
S17-5	Inefficacy Prediction of Alpha Up-Regulation Neurofeedback Training Using Eyes-Open Resting State Wavelet Features and Machine Learning	392
S18	Biomedical Imaging and Image Processing 3	
S18-1	Deep Learning Based Lumbar Metastases Detection and Classification from Computer Tomography Images	398

S18-2	Bicubic Interpolation and Gradient-Based Edge Detection with Skeletonization Segmentation (Bicubic-GES) on MR Optic Nerve Images for Examining NMOSD	404
S18-3	Reconstruction of Fetal Head Surface from Few 2D Ultrasound Images Tracked in 3D Space	409
S18-4	Investigating Evoked Action Potential in Human Optic Nerves Using MRI	415