

2025 International Conference on Activity and Behavior Computing (ABC 2025)

**Al Ain, United Arab Emirates
21-25 April 2025**



IEEE Catalog Number: CFP25VJ9-POD
ISBN: 979-8-3315-3438-7

**Copyright © 2025 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:	CFP25VJ9-POD
ISBN (Print-On-Demand):	979-8-3315-3438-7
ISBN (Online):	979-8-3315-3437-0

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 Learning—Based Image Matching Algorithm with Improved Detection and Tracking Performance.....	1
<i>Fatmah Alhefeiti, Karthik Balakrishnan, Naser Alsaedi, Tetiana Habuza</i>	
PXAI-Coach: Designing and Evaluating a Person-Centric Explainable AI Dashboard for Athlete Health Monitoring and Coaching	11
<i>Sang Won Bae, Anamaria Laccetti, Melik Ozolcer, Tongze Zhang</i>	
Enhancing Silent Speech Decoding Using EEG and Gradient Boosting Classifiers: A Comparative Analysis of XGBoost and LightGBM on a Native Arabic Silent Speech Dataset.....	24
<i>Rizwan Shah, Amina Riaz, Shahnawaz Quershi, Ali Zia, Uzair Iqbal</i>	
Accelerometer-Based Multi-Domain Feature Extraction for Parkinsonian Activity Recognition.....	35
<i>Hong Thien An Nguyen, Van Anh Dao, Quoc Huy Pham, Dang Khoa Nguyen, Quynh Nhu Pham, Nhat Tan Le</i>	
PIM: Physics-Informed Multi-task Pre-training for Improving Inertial Sensor-Based Human Activity Recognition	45
<i>Dominique Nshimiyimana, Vitor Fortes Rey, Sungho Suh, Bo Zhou, Paul Lukowicz</i>	
Recognising Depression Using Facial and Cephalic Feature Extractors with Machine Learning - Answer to BeyondSmile Challenge.....	56
<i>Justyna Skibinska, Abbas Shah Syed, Asma Channa, Zafi Sherhan Shah, Shehram Shah Syed, Junaid Baloch</i>	
EEG-Based Silent Speech Classification Using Native Arabic Silent Speech Dataset with Model Comparison and Optimization.....	67
<i>M Ishlah Buana Angkasa, M. Rafli Al Thoriq Mustafa, Mahadika Nafiz Luqman, Indah Chairunnisa, Chairina Ulfa, Muhammad Fikry</i>	
EEG-Based Arabic Silent Speech Classification Using Native Arabic Silent Speech Dataset: A Hybrid Model Combining Random Forest and SVM.....	74
<i>Muhammad Fathurrahman, Muhammad Sayuti, Khanifa Muslimah Siregar, Faiz Syukri Arta, Muhammad Syauqi Jazuli, Zeny Arsyia Fortilla, Muhammad Fikry</i>	
SOS: A Shuffle Order Strategy for Data Augmentation in Industrial Human Activity Recognition	80
<i>Anh Tuan Ha, Hoang Khang Phan, Thai Minh Tien Ngo, Anh Phan Truong, Nhat Tan Le</i>	
Dynamic Framework for Collaborative Learning: Leveraging Advanced LLM with Adaptive Feedback Mechanisms.....	87
<i>Hassam Tahir, Faizan Faisal, Fady Alnajjar, Muhammad Imran Taj, Lucia Gordon, Aila Khan, Michael Lwin, Omar Mubin</i>	
Geometrical, Graphical, and Transformer-Based Approaches for Recognizing Naturalistic Depression in Facial Behavior.....	97
<i>Tu Nhat Khang Nguyen, Nguyen Khang Le, Mai Phuong Tran, Anh Duc Tran, Nhat Tan Le</i>	
Facial Behavior-Based Depression Detection with Bi-LSTM and Evaluation Via Universal and Hybrid Methods.....	106
<i>Md. Rakibul Islam, Dip Sarker, Md. Tafhimul Haque Sadi, Labib Hasan Bayzid, Md. Kabiruzzaman, Shahera Hossain</i>	

Optimizing Facial Expression and Head Dynamics Data Processing to Enhance Depression Detection with Cutting-Edge AI Models	114
<i>Aldo Januansyah, Rifa Amril Sahputra, Muhammad Adhiguna Hasibuan, Muhammad Yudya Ananda Hasibuan, Faiz Syukri Arta, Muhammad Fikry</i>	
EAX: An Emotion and Action Unit Extraction Framework for Real Time Depression Recognition.....	125
<i>Nguyen Phat Vo, Hoang Khang Phan, Anh Tuan Ha, Quang Le, Nhat Tan Le</i>	
A Comparative Study of a Real-Time Multi-Person Tracking System in an Urban Square Dataset	134
<i>Pouya Jafarzadeh, Luca Zelioli, Fahimeh Farahnakian, Paavo Nevalainen, Jukka Heikkonen</i>	
Unsupervised Feature Aligned Domain Adaptation for WiFi-Based Human Activity Recognition.....	142
<i>Amany Elkelany, Robert Ross, Susan McKeever</i>	
Integrating Interactive 3D Applications for Enhanced Learning in Crown Preparations: A Comparative Experimental Study.....	152
<i>Enjy Ramadan, Omar Sherif, Ashraf Hany, Amr Akl, Noha Ezzat, John Medhat, Ayman Atia, Lamiaa Said Elfadaly</i>	
Gender Classification in Panoramic Dental X-Rays Using Few-shot Learning and Ensemble Models.....	162
<i>Aly Essam, Mohaned Gamal, Ayman Atia</i>	
ALOHA: Leveraging Additional Information to Learn Robust Representations for Human Activity Recognition	169
<i>Quynh Nguyen-Phuong Vu, Paula Lago, Sebastian Bader, Sozo Inoue</i>	
Social Robot Persuasiveness Based on Gaze and Proximity	181
<i>Omar Mubin, Subhash Neupane, Isha Kharub, Michael Lwin, Fady Alnajjar, Aila Khan, Zhao Zou</i>	
A Pilot Study on the Effectiveness of Text and Humanoid Voice Reminders for Drivers in a Simulator-Based Environment	188
<i>Zhao Zou, Fady Alnajjar, Michael Lwin, Abdullah Al Mahmud, Aila Khan, Muhammed Swavaf, Omar Mubin</i>	
Clustering-Based Multitask Classification for Predictive Consumer Behavior Modeling	197
<i>Seoyeong Park, Tahera Hossain, Takuro Yonezawa, Nobuo Kawaguchi</i>	
Smart Drones in Search and Rescue: Leveraging AI for Autonomous Decision-Making	206
<i>Naser Alsaedi, Emad Alomari, Hareeb Alseiri, Marwan Ahmed, Latifa Al Kaabi, Abdurrahman Bayrak, Tetiana Habuza</i>	
Real-Time Pedestrian Safety Enhancement Using Edge AI in Smart Urban Environments	216
<i>Marwan Dad Mohamed Ahmed, Saif Hamad Mubarak Almansoori, Abir Raza, Elarbi Badidi</i>	
Mitigating Roadkill Using Computer Vision and Machine Learning Techniques: A Case Study on Turtles in Australia	224
<i>Yasiru Kirindearachchi, Liwan Liyanage</i>	
Improving Human Behavior Recognition Using Bilateral Electrodermal Activity Data Collected from Wearable Devices.....	232
<i>Leonardo Alchieri, Vittoria Scocco, Nouran Abdalazim, Lidia Alecci, Silvia Santini</i>	
NEEDLE: Nurse Education Enhanced by Vision-Based Deep Learning Evaluation.....	242
<i>Matthias Tschöpe, Stefan Gerd Fritsch, Vitor Fortes Rey, Niranjana Narendran Nandurkar, Sarah Trevenna, Eloise Monger, Paul Lukowicz</i>	

Tiny-EfficientNet-SE: A Squeeze-and-Excitation Enhanced CNN Architecture for Multi-Domain Classification on Edge Device.....	252
<i>Nyakuri Jean Pierre, Kizito Nkurikiyeyezu, Celestin Nkundineza, Omar Gatera</i>	
Predicting Volleyball Season Performance Using Pre-Season Wearable Data and Machine Learning	258
<i>Melik Ozolcer, Tongze Zhang, Sang Won Bae</i>	
Unraveling the Sandman’s Mystery: Predicting and Explaining Sleep Quality Over Eight Years	269
<i>Anthony Ford, Tongze Zhang, Anlan Dong, Sang Won Bae</i>	
AXAI-CDSS: An Affective Explainable AI-Driven Clinical Decision Support System for Cannabis Use.....	278
<i>Tongze Zhang, Tammy Chung, Anind Dey, Sang Won Bae</i>	
Improving Human Action Recognition in Australian Rules Football Through Video Data Augmentation	292
<i>Hongwei Yin, Richard O. Sinnott, Glenn T. Jayaputera</i>	
From Idea to Implementation: Real-Time & Real-World Classification Testing in Nursing Practice Research	302
<i>Sergio Staab, Leon Martin, Johannes Luderschmidt, Vincent Abt, Ludger Martin, Nadia Günter</i>	
Hybrid CNN-Dilated Self-attention Model Using Inertial and Body-Area Electrostatic Sensing for Gym Workout Recognition, Counting, and User Authentication	312
<i>Sizhen Bian, Vitor Fortes Rey, Siyu Yuan, Paul Lukowicz</i>	
AI-Based Analysis of BMI Impact on Gait Dynamics Across Speeds	324
<i>Rateb Katmah, Aamna Alshehhi, Abdul Aziz Hulleck, Muhammad Abdullah, Kinda Khalaf</i>	
Deep Learning Models to Predict Ankle Joint Reaction Force During Gait.....	332
<i>Abdul Aziz Vaqar Hulleck, Aamna Alshehhi, Muhammad Abdullah, Rateb Katmah, Manali Kunte, Marwan El-Rich, Kinda Khalaf</i>	
Few-Shot Human Activity Recognition Using Lightweight Language Models	337
<i>Federico Cruciani, Stefan Gerd Fritsch, Ian Cleland, Vitor Fortes Rey, Chris Nugent, Paul Lukowicz</i>	
Estimation of Speech Balloons with Unknown Words Based on Behavior of Reading Aloud English Comics.....	346
<i>Hayato Seki, Motoi Iwata, Koichi Kise, Taro Takaike</i>	
Optimization of an Induced Magnetic Field-Based Positioning System	353
<i>Sizhen Bian, Gerald Pirkl, Jingyuan Cheng, Paul Lukowicz</i>	
Predicting Wearing-Off in Parkinson’s Disease Patients Using Multimodal Time-Series Data and Ensemble Learning.....	362
<i>Md Ibrahim Mamun, Shahera Hossain, Md Atiqur Rahman Ahad</i>	
LLM Enabled Social Robots – Transforming Aged Care Through AI	368
<i>Hassam Tahir, Samina Ansari, Naeem Bushra, Aila Khan, Michael Lwin, Fady Alnajjar, Omar Mubin</i>	
Meme Similarity and Emotion Detection Using Multimodal Analysis	376
<i>Aidos Konyspay, Pakizar Shamoï, Malika Ziyada, Zhusup Smambayev</i>	

EEG Sleep Stages Prediction: A Hybrid LSTM and Random Forest Approach..... 386
Bao Pham, Nhi Phan Xuan Yen, Khai Le Quoc, Quang Linh Huynh

Author Index