# 2024 16th IIAI International **Congress on Advanced Applied Informatics (IIAI-AAI 2024)**

Takamatsu, Japan 6-12 July 2024



**IEEE Catalog Number: CFP2462T-POD ISBN**:

979-8-3503-7791-0

## Copyright © 2024 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:
 CFP2462T-POD

 ISBN (Print-On-Demand):
 979-8-3503-7791-0

 ISBN (Online):
 9798350377903

 ISSN:
 2472-0070

#### **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



## 2024 16th IIAI International Congress on Advanced Applied Informatics (IIAI-AAI)

#### **IIAI-AAI 2024**

#### **Table of Contents**

essage from the Congress General Chairxx
essage from the Program Chairxx
ganizing Chairs xxi
ogram Committeexxi
ganizing Committeexxx
SKM 2024
DDA: Middleware for Improving Setup and Preprocessing in Static Analysis of IoT Firmware  Minami Yoda (Nihon University, Japan), Shigeo Nakamura (The University of Electro-Communications, Japan), Yutaka Matsuno (Nihon University, Japan), Yuichi Sei (The University of Electro-Communications, Japan), Yasuyuki Tahara (The University of Electro-Communications, Japan), and Akihiko Ohsuga (The University of Electro-Communications, Japan)
Gram Applied to English Q&A Statements to Obtain Factor Scores
utomatic Few-Shot Selection on In-Context Learning for Aspect Term Extraction
proving Interpretability in Document-Level Polarity Classification by Applying Attention 2 Shingo Kato (Kyushu University, Japan) and Daisuke Ikeda (Kyushu University, Japan)
tracting Long COVID Knowledge from LitCovid: A Glossary-Based Approach
Tool for Associative Text Analysis to Enhance Efficiency in Exploring Historical Texts

Exploring Relationships Between People and Organizations: A Digital Humanities Research Tool Based on AI Technology for Knowledge Graph Analysis
A Social Recommendation Mechanism for Esports Team up
Designing a Probability Disclosure Mechanism for Loot Boxes Based on Consortium Blockchain 49 Yu-Hsi Ni (National Yang Ming Chiao Tung University, Taiwan) and Yung-Ming Li (National Yang Ming Chiao Tung University, Taiwan)
Global-Local Consistency for Cost-Effective Anomaly Localization with Point Annotations
Comparison with Detection of Bacteria from Gram Stained Smears Images by Various Object  Detectors
Activation Functions for Detection of Bacteria from Gram Stained Smears Images by YOLOv862  Kouya Kagemoto (Kyushu Institute of Technology, Japan) and Kouichi  Hirata (Kyushu Institute of Technology, Japan)
Retrieval Augmented Generation on Hybrid Cloud: A New Architecture for Knowledge Base  Systems
Ancestral-Path Descendant-Labels Histogram Distance for Rooted Labeled Trees
Defect Detection and Visualization of Understanding using Fully Convolutional Data  Description Models
A Time-Dependent GWR Model of the Flow of People in Kyoto City
Table-To-Text using Pre-Trained Large Language Model and LoRA

Uncovering the Critical Traits of Sustainable Brand Success in the Attention Economy from Social Media	97
Shih-Ya Liao (National Yang Ming Chiao Tung University, Taiwan) and Yung-Ming Li (National Yang Ming Chiao Tung University, Taiwan)	,
Annotation Along Arranged Bacteria to Detect Gram Positive Cocci from Gram Stained Smears Images	101
Ukyo Kashino (Kyushu Institute of Technology, Japan), Mayu Yoshida (Kyushu Institute of Technology, Japan), and Kouichi Hirata (Kyushu Institute of Technology, Japan)	. 101
Data Augmentation for Detection of Bacteria from Gram Stained Smears Images by YOLOv8 Ryunosuke Nakajo (Kyushu Institute of Technology, Japan), Minori Tsutsui (Kyushu Institute of Technology, Japan), and Kouichi Hirata (Kyushu Institute of Technology, Japan)	105
Generating High-Quality Distributed Representations of Words using Wiktionary and Sentence-BERT	109
Ryota Nishiura (Doshisha University, Japan), Seiji Tsuchiya (Doshisha University, Japan), and Hirokazu Watabe (Doshisha University, Japan)	. 107
NLPDedup: using Natural Language Processing for Data Deduplication	.115
Metaphor Detection with Additional Auxiliary Context	. 121
A Drug Abuse Detection Based on User Behavior and Linguistic Style	. 127
Sense Tagged Example Generation using BERTScore	131
LTLE 2024	
Developing a Meso-Viewpoint Discussion System to Promote Online Learning Performance Ling-En Chien (National Chengchi University, R.O.C.), Ming-Chaun Li (National Chengchi University, R.O.C.), Chih-Ming Chen (National Chengchi University, R.O.C.), and Huei-Chun Huang (National Chengchi University, R.O.C.)	. 136
Empowering Elementary Students' Scratch Programming Skills Through a Jigsaw Collaborative Learning Method in a Metaverse Virtual Space	. 142
University, R.O.C.)	

Examining Critical Thinking Skills in Game-Based Learning: A Behavioral Analysis Approach  Tsung-Yen Chuang (National University of Tainan, Taiwan), Yu-Hsuan Lu  (National University of Tainan, Taiwan), Szu-Kai Tsai (National  University of Tainan, Taiwan), and Wei-Fan Chen (Penn State  Wilkes-Barre, U.S.)	148
Subject Relevance Visualization using Word2Box Youji Ochi (Kindai University, Japan) and Nanako Hashimoto (Kindai University, Japan)	152
Towards Human-Level Evaluation: Assessing the Potential of GPT-4 in Automated Evaluation and Feedback Generation on Japanese Essays	156
The Impact of Collaborative Digital Reading Annotation System on Learning Performance and Motivation in Solving Mathematical Application Problems	162
Development and Implementation Results of a DX Literacy Standard Skills Survey using Generative AI  Masahiro Sakamoto (Hiroshima City University Graduate School of Information Sciences and Technology, Japan), Matsubara Yukihiro (Hiroshima City University Graduate School of Information Sciences and Technology, Japan), and Mouri Kousuke (Hiroshima City University Graduate School of Information Sciences and Technology, Japan)	166
Parent-Child Interaction in Game-Based Learning  Ming-Chaun Li (National Chengchi University, ROC), Chin-Chung Tsai (National Taiwan Normal University, ROC), and Huei-Tse Hou (National Taiwan University of Science and Technology, ROC)	172
Improvement of Argumentation Structure Visualization for Feedback on Students' Reports	178
Development of a Learning Support System for Improving Metacognition in Programming Exercises  Teppei Oyama (Kagawa University, Japan) and Koji Kagawa (Kagawa University, Japan)	186
A Cooperative Card Game for Learning Social Media Etiquette	190
Book Title Recognition on 360VR Images for VR Tour of Library Building	196

Cultivating Effective Classroom Management: The Implementation of an Adaptive Gamification
Platform  Chi-Fang Chang (National University of Tainan, Taiwan), Tsung-Yen Chuang (National University of Tainan, Taiwan), Wei-Fan Chen (The Pennsylvania State University, US), and Yen-Ning Su (National University of Tainan, Taiwan)
Development of Score Measurement and Attack Functions in a Security Exercise System Enable
Trial-and-Error
A Teaching Materials Recommendation System Considering Individual Characteristics
The Development of Robot-Embedded Cyber-Physical Learning Environment for Enhancing Learners' STEM Competencies
DSIR 2024
A Study on Real-Time Prediction of Course Dropout Students using LMS Logs
SCAI 2024
Minimizing Model Misclassification using Regularized Loss Interpretability
Automatic Generation of Patent Maps by Estimating Technical Problems and Solutions using T5
Dataset Construction and Verification for Detecting Factual Inconsistency in Japanese Summarization
Keisuke Iwamoto (Kyushu Institute of Technology, Japan) and Kazutaka Shimada (Kyushu Institute of Technology, Japan)
A Simple Method to Improve Contrastive Learning for Defect Recognition with a Small  Dataset
(Sanyo-Onoda City University, Japan)

Ray-Transformer Neural Radiance Field for Novel 3d View Synthesis from Single Image
Gated Self Attention Convolutional Neural Networks for Predicting Adverse Birth Outcomes259  Daniel Asfaw (University of Portsmouth, UK), Ivan Jordanov (University of Portsmouth, UK), Lawrence Impey (University of Oxford, UK), Ana Namburete (University of Oxford, UK), Raymond Lee (University of Portsmouth, UK), and Antoniya Georgieva (University of Oxford, UK)
Does Executive Compensation with ESG Target Improve Firm's ESG Performance? –Evidence from  Japan
Construction of Domain-Specified Japanese Large Language Model for Finance Through Continual Pre-Training
Relationship Between Qualitative Expressions in MD&A and Managements' Forecast Accuracy 280 Yutaka Kuroki (Sansan, Inc., Japan), Kei Nakagawa (Nomura Asset Management Co., Ltd., Japan), and Kiyoshi Yakabi (Osaka Metropolitan University, Japan)
Toward an Acceptable Dynamic Allocation Considering Fairness on Autonomous Car Parking 286 Suma Saathvika Duddela (Shizuoka University, Japan) and Naoki Fukuta (Shizuoka University, Japan)
Multimodal Adaptive Structural Deep Belief Network for Emotion Recognition on RAVDESS  Dataset
Dynamic Dual Sparse Topic Model: Integrating Temporal Dynamics and Sparsity with Spike and Slab Priors into Topic Model
Bayesian Analysis of Stochastic Conditional Duration Models with Intraday and Intra-Deferred Future Seasonalities in High-Frequency Commodity Market
Analysis of the Temporal Structure in Economic Condition Assessments
Cloud-Based Acute Kidney Injury and Mortality Prediction System with Machine Learning Hyperparameter Tuning Service

Application of Skeleton Image Detection in Basketball Free Throw Posture Research	, 324
Error Analysis of Option Pricing via Deep PDE Solvers: Empirical Study	329
Evaluating Patient Satisfaction Through Validated Predictive Classification Models	337
Forced and Natural Creative-Prototype Learning for Interpreting Multi-Layered Neural Networks	343
A Noh's Choreography Generation Rule and Systematization for Service Robots	351
Game Recommendation Based on Reviews and Neighbor Interaction with Generative Adversarial Networks	
Yidong Bai (Waseda University, Japan) and Toshiharu Sugawara (Waseda	363
University, Japan)  Cascading Taxonomic Attention Networks for Hierarchical Text Classification	. 369
Analysis of Investment Behavior of Individual Investors in the FX Market: Influence of FOMC and Beige Book Information	. 373
Wavelet Coherence of COVID-19 Pandemic Variables in Japan  Goizalde Badiola (University of the Basque Country (UPV/EHU), Spain)  and Manuel Grana (University of the Basque Country (UPV/EHU), Spain)	379
Almost Order Preserving Matching	. 385
A Method for Determining Utterance-Response Relationships Between Japanese Novel Lines for Constructing a Daily Dialogue Corpus	391

Time Scale Analysis of Long Sequential Robot Behavior Generated by gMLP
Orthogonal Vector Projection Method for Medical Diagnosis
Estimating the Impact of Classroom Speech using a Large Language Model
Application of Yolov5-Based Image Recognition Model in Product Categorization
Simulation of Classroom Speech by Elementary School Teachers using a Large Language Model with LoRA Hyperparameter
Implementation Method of an Autonomous Art Exhibition System with Open-Source Hardware 42 <i>Yosuke Tsuchiya (Musashino University, Japan) and Naoki Ishibashi (Musashino University, Japan)</i>
Model for Trust and Reliance on Technology: Exploring the Relationship Between Trustor,  Trustee, and Context
Adding Gaussian Noise to Sparse Frames from a mmWave Radar for Improving HAR
Consumer Price Index Dynamics Unveiled: Approximate Inverse Model Explanations (AIME) of News Text Data and Consumer Price Index Data
Detection of Pre Shoplifting Suspicious Behavior using Deep Learning
Optimal Execution Strategy using Deep Q-Network with Heuristics Policy
Skeleton Detection using Dual Radars with Integration of Dual-View CNN Models and mmPose 46 <i>Masaharu Kodama (Hosei University, Japan) and Runhe Huang (Hosei University, Japan)</i>

Measuring Semantic Similarity in Japanese Key Audit Matters	. 468
Enhancing Book Discovery: A Personalized Recommender System Powered by Large Language Models	. 476
A Fast Season Length Estimation using Sliding Discrete Fourier Transform for Time Series Streaming Data Thanapol Phungtua-eng (Shizuoka University, Japan) and Yoshitaka Yamamoto (Shizuoka University, Japan)	482
Classification of Capacitor Bank Switching using Fuzzy Interference Systems in 230 kV Substation  Theerasak Patcharoen (Mahanakorn University of Technology, Thailand), Chaichan Pothisarn (King Mongkut's Institute of Technology, Thailand), Atthapol Ngaopitakkul (King Mongkut's Institute of Technology, Thailand), Santipont Ananwattanaporn (King Mongkut's Institute of Technology, Thailand), Praikanok Lertwanitrot (Electricity Generating Authority of Thailand, Thailand), and Suntiti Yoomak (King Mongkut's Institute of Technology, Thailand)	488
Comparative Study for Discrete Wavelet Transform Between Single and Double Detection Approach to Fault Classification on Transmission Line  Praikanok Lertwanitrot (Rajabhat Rajanagarindra University, Thailand),  Atthapol Ngaopitakkul (King Mongkut's Institute of Technology,  Thailand), and Santipont Ananwattanaporn (King Mongkut's Institute of Technology, Thailand)	. 493
An Active Listening Dialogue Model Focued on "Open Questions" using Reinforcement Learning.  Nana Matsumoto (Kagawa University, Japan) and Kazuaki Ando (Kagawa University, Japan)	499
Association Rule Breaking Based Diversity for Recommender Systems	505
Surface Defect Detection in Industrial Parts using the YOLO-Based Method with Enhanced Spatial Features and Attention Mechanism  Zhi-Juan Jian (Soochow University, Taiwan) and Ming-Hsiang Su (Soochow University, Taiwan)	.511
No-Code/Low-Code Ophthalmic Lens Design using a Genetic Algorithm that Simplifies Optical Design Simulation	, 516
Bayesian Portfolio Optimization by Predictive Synthesis	523

0 1	29
Junyu Li (Advanced Institute of Industrial Technology, Japan), Go Inoue (Advanced Institute of Industrial Technology, Japan), Maika Ono (Advanced Institute of Industrial Technology, Japan), Kazuaki Nishino (Advanced Institute of Industrial Technology, Japan), Rie Sato (Advanced Institute of Industrial Technology, Japan), Atsushi Shibata	
(Advanced Institute of Industrial Technology, Japan), Jun Ito (Advanced Institute of Industrial Technology, Japan), and Hisashi Hayashi (Advanced Institute of Industrial Technology, Japan)	
AIME Image Insights: Transforming Image Recognition with Approximate Inverse Model  Explanations	35
Integrating Textual and Financial Time Series Data for Enhanced Forecasting	41
Greenwashing Detection Mechanism Based on Multimodal Analysis and Social Intelligence 54 Shih-Yuan Huang (National Yang Ming Chiao Tung University, Taiwan) and Yung-Ming Li (National Yang Ming Chiao Tung University, Taiwan)	45
BMOT 2024	
Decoding Scheme Considering Differences in Operator Ability for Dual Resource-Constrained Scheduling Problem	49
Proposal of a Tourist Attractions' Introduction Creating Tool using Deep Learning	56
Relationship Between Color Schemes of Event Announcement Images and View Counts on Social  Media using GMM	62
Improvement of Examining Method with Construal Level Theory Perspective for Reward-Based Crowdfunding Performance	68
Application of Analytic Hierarchy Process for Order Assignment to Affiliated Stores	72

ABM Demonstrates New Successful Diversity Approach for Team Building and Outcomes 578  Junji Ochi (Advanced Institute of Industrial Technology, Japan),  Jun-ichi Asaka (Advanced Institute of Industrial Technology, Japan),  Kenta Abe (Advanced Institute of Industrial Technology, Japan),  Kentaro Iwata (Advanced Institute of Industrial Technology, Japan),  and Hisashi Hayashi (Advanced Institute of Industrial Technology,  Japan)
SBIT 2024
Personalized E-Shopping Recommendations for Sustainable Consumption
Jumpstarting and Evolving a Software Quality Management Initiative: From Pre-Web to DevOps 589 James J. Cusick (Ritsumeikan University, Japan)
Distributed Hierarchical AI Architecture for Meta-Described Local Dynamic Maps in Autonomous Driving
Statistical Analysis of the Influence of Service Quality on Customer Satisfaction of Information System Development
A Study on Station Power Model Index Utilizing Station to Station Conversion Factor for Lines Serving Tokyo Prefecture
Changes That Basic Income Can Produce Depending on Economic Conditions
A Consideration of Analyzing the Impact of Influencer Flames
IDDC 2024
Exploring the Potential of Novel Image-to-Text Generators as Prompt Engineers for CivitAI Models

Exploring Perceptions & Reactions to Digital Humans  Edward Abel (University of Southern Denmark, Denmark) and Anne Dorthe  Larsen (International Business Academy, Denmark)	.632
Analyzing User Behavior in Scenario-Based Virtual Reality Environments using Knowledge Graphs  Kensuke Taninaka (Kyushu University, Japan), Yoshiki Furuya (Kyushu University, Japan), Keigo Sakamoto (Kyushu University, Japan),  Tsunenori Mine (Kyushu University, Japan), and Shogo Fukushima (Kyushu University, Japan)	. 638
Improving Text Generation on Images with Synthetic Captions	. 644
DSTM 2024	
Extracting Impression from the Low-Rated Statements Posted at EC Sites Yuya Yokoyama (Advanced Institute of Industrial Technology, Japan), Takaaki Hosoda (Advanced Institute of Industrial Technology, Japan), and Tokuro Matsuo (Advanced Institute of Industrial Technology, Japan)	. 650
IIAI AAI 2024 Poster Abstracts	
A Study of Modified DANP Model and System Simulation Method in E-Commerce Logistics: Taking AMR Autonomous Mobile Robot Pickup Solution Selection as an Example	. 655
Development of Virtual Space for Individualized and Optimal Learning	. 661
Toward an Efficient and Resilient Electric Vehicle Charging Place Allocation using Multiagent Approach	663
Simulation of Pedestrian Crowds using Probability Value Cellular Automata	. 665
A Preliminary Implementation of an Explanation Mechanism for One's Own Curiosity by using Ontology and Knowledge Graph	667

Enhance the Image Recognition Capabilities of Drones in Low-Light Environments	669
Multiparty Quantum Key Agreement Protocol Based on 2-Qubit Grover Search with Swapping  *Tzung-Her Chen (National Chiayi University, Taiwan)	671
Machine Learning Detection of Hemodialysis Arteriovenous Graft Stenosis using Bilateral Pulse Oximetry  Jeen-Shing Wang (National Cheng Kung University, Tainan), Yen-Lung Tsai (National Cheng Kung University, Taiwan), and Jui-Chih Chang (Hualien Tzu Chi Hospital, Taiwan)	673
Research on Feature Selection Techniquess for Support Vector Regression-Based State of Health Estimation of Lithium-Ion Batteries  Jia-Hong Fang (National Taiwan University of Science and Technology, Taiwan), Rui-Teng You (National Taiwan University of Science and Technology, Taiwan), Yu-Shan Cheng (National Taiwan Ocean University, Taiwan), Bo-Jhih Chen (National Taiwan University of Science and Technology, Taiwan), and Yi-Hua Liu (National Taiwan University of Science and Technology, Taiwan)	675
A Preliminary Evaluation of a Hotel English Virtual Reality Educational Game with a Scenario-Based Audio Feedback Mechanism	677
Automated School Lunch Menu Planning with Machine Learning Algorithms  Hao-Yu Lin (National Cheng Kung University, Tainan), Jeen-Shing Wang (National Cheng Kung University, Tainan), and Ya-Ting C. Yang (National Cheng Kung University, Tainan)	679
Design and Preliminary Evaluation of a Simulated Interview Educational Game Combined with Dynamic Situation Path Mechanisms  Yen-Ting Ho (National Taiwan University of Science and Technology, Taiwan), Yu-Cheng Lin (Ahetheia University, Taiwan), Pei-Cing Ngu (National Taiwan University of Science and Technology, Taiwan), and Huei-Tse Hou (National Taiwan University of Science and Technology, Taiwan)	681
The Effects of Non-Violent Communication-Based Emotional Education using a Digital Storytelling Platform on Adolescents' Emotional Learning: Gender Differences	683

685
687
689
693
695
n 698
702

Design a Hierarchy Contextual Clue Scaffolding Oriented Educational Board Game with Mobile Technology for Understanding Basic Health Care Knowledge	704
Building Cloud Base Cyber Range by Designing an Efficient Container Distribution API using Docker	706
Sanggyu Shin (Tokai University, Japan)	
Construction and Examination of an Emotional Speech Synthesis System using a CNN Image Classification Model	708
Inverse Reinforcement Learning via Variational Attention Bottleneck	710
An Interactive Picture Storybook Scheme for Lower-Grade Elementary Students to Learn Music and Computational Thinking	712
Utilizing Social Trust Mechanisms to Minimize the Influence of False Ratings on Recommendation Systems	714
Development of a Convenient Hearing Test System for the Prevention of Frailty	716
A Virtual 3D Chemistry Laboratory with an Enhanced AI Chatbot to Facilitate Learning  Effectiveness	718
Design and Evaluation of the Framework of ChatGPT-Based Situational Non-player Character Scaffolding for Educational Games	720

Design of Creative Thinking Skills Training Activity using Board Game with Mobile  Technology
Shi-Chian Wang (National Taiwan University of Science and Technology, Taiwan), Yu-Chi Chen (National Taiwan University of Science and Technology, Taiwan), Pei-Chun Chung (National Taiwan University of Science and Technology, Taiwan), and Huei-Tse Hou (National Taiwan University of Science and Technology, Taiwan)
Parameter Identification of the Parameters of Lithium-ion Battery Model Based on  Metaheuristic Algorithms
An Educational Simulation Game Integrated with Generative AI as Conversational Contextual Scaffolding for Business English: A Preliminary Analysis of Learning Achievement,  Self-Efficacy and Cognitive Load
The Trajectory Tracking of the Quadrotor Based on Backstepping Sliding Mode Control
A System for Exploring People on the Web using Subject Headings
Author Index