

# **2022 4th International Conference on Sustainable Technologies for Industry 4.0 (STI 2022)**

**Dhaka, Bangladesh  
17-18 December 2022**



**IEEE Catalog Number: CFP22U08-POD  
ISBN: 978-1-6654-9046-7**

**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:	CFP22U08-POD
ISBN (Print-On-Demand):	978-1-6654-9046-7
ISBN (Online):	978-1-6654-9045-0

**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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

# Table of Contents

146	PestDetector: A Deep Convolutional Neural Network to Detect Jute Pests.....1
365	Bangladeshi Local Vehicle Recognition with A Comprehensive Dataset using Transfer Learning Techniques.....7
641	Assessment of Sentiments: A Performance Evaluation on Bangla Noisy Text.....13
708	A New Perspective of Improving Initialization for Particle Swarm Optimization.....18
742	An automated detection of Scabies skin disease Using Image Processing and CNN.....24
842	A Hybrid Bipolar DC-Link Converter Based on SEPIC-Cuk Combination.....30
886	A Proposed Hybrid Microgrid Model for 37no Halishahar ward of Chattogram City Corporation, Bangladesh Using MATLAB Simulink.....35
1109	Effects of Aging Factors on PV Modules Output Power: An Experimental Investigation.....40
1118	Book Review Sentiment Classification in Bangla using Deep Learning and Transformer Model.....45
1198	Anomaly Based Network Intrusion Detection Using Ensemble Classifiers.....51
1204	Exploiting Deep Learning Based Classification Model for Detecting Fraudulent Schemes over Ethereum Blockchain.....57
1342	Identification of Influential Genes for Colorectal Cancer Using Machine Learning Approaches.....63
1351	A Comparison between YOLOV7 and YOLOV5-based detection of Combat Targets and Camouflaged Militia.....69
1505	An Application Programming Interface to Recognize Emotion using Speech Features.....75
1570	A New Approach to Analysis of Public Sentiment on Padma Bridge in Bangla Text.....81
1577	A LED-based Functional Light Source for Characterization of Thin Film Solar Cells.....87
1681	An Energy Efficient Model of Software Development Life Cycle for Mobile Application.....91
1721	Design and Development of an IoT-based Smart System to Monitor and Control Environment of a Laboratory.....97
2061	Deep Learning Enabled State of Charge Estimation for Electric Vehicle Batteries Under Noise Effects.....105
2070	Risk Analysis and Support System for Autistic Children using IoT.....112
2253	Design and Implementation of a Data-Driven Fuel Management System.....118
2309	Identification of Influential Genes for Lung Cancer Using Machine Learning Approaches.....123
2319	Energy Management System for Micro Grid Environment.....129
2393	Spherical and Rod-shaped Gold Nanoparticles for Surface Enhanced Raman Spectroscopy.....133
2461	High Performance Computing in Decentralized Network.....137
2506	Remotely Controlled Real-Time Health Surveillance System of COVID-19 Patients.....143
2530	Dual Side Polished PCF Based Surface Plasmonic Refractive Index Sensor for Detection of Water Pollution.....149
2681	Bangla E-Commerce Sentiment Analysis Using Machine Learning Approach.....154
2689	Performance Evaluation of 2.4 kW Alkaline Fuel Cell Stack for Emergency Applications.....159
2740	Trade-off Between Latency and Energy for Offloading Tasks in Maritime Internet of Things.....164
2970	Prospect of Electric Boat in Dhaka: An Alternate Way of Transportation.....170
3093	A Fusion of Three Custom-tailored Deep Learning Architectures for Waste Classification.....176
3253	Design of a Slotted Patch Circular Antenna Array for Breast Tumor Identification.....182
3315	A Cross-Corpus Deep Learning Approach to Social Media Emotion Classification.....188
3415	Bengali Handwritten Digit Recognition using CNN with Explainable AI.....194

3457	A Novel Approach to Reduce Air Pollution Through Machine Learning Based PM2.5 Prediction.....	200
3513	Eye Controlled Wheelchair for Physically Disabled Persons using Viola Jones Algorithm and Hough Transform.....	208
3524	An Empirical Study of Pre-Trained CNN Models on COVID-19 CT Scan Images.....	212
3650	An Article Recommendation Technique from a Multi-Layer Reference Article Graph for Facilitating Chronological Learning.....	218
3751	Economical Design of Hybrid Solar Charging Station for Electric Vehicles (EVs) on the Dhaka-Chattogram Highway.....	224
3754	Sentiment Analysis on COVID-19 Vaccination in Bangladesh.....	230
3824	Optimizing LQG Controller for a Single-Phase Power Inverter in an AC Microgrid System.....	235
3850	Privacy, Security and Usability Comparison of Online Learning Platforms in Developing Countries: A Study on Bangladeshi Universities.....	240
3896	A Benchmark of Machine Learning and Deep Learning Algorithms for Detecting Fake News in Bangla Language.....	246
3930	Management and Control Strategies of Battery Switching in a Hybrid Energy Storage System.....	252
4298	A Hybrid Method for Analyzing the Situation Based on Cumulative Fully Vaccinated and Confirmed Cases of Covid-19 in Malaysia.....	258
4459	Multiple Optical Ring Resonators for Free Spectral Range Squeezing.....	264
4472	Design and Implementation of a Sine-Wave Inverter using Microcontroller with Modified Pulse Width Modulation Technique.....	270
4486	Hydrogen Fuel Cell Based Low Power DC Motor Driven Energy Efficient Electric Vehicle: A Comparative Analysis.....	275
4640	Study on Plausible Application of Bangabandhu Satellite -2 as a Search and Rescue Satellite Under Cospas-Sarsat Programme.....	281
4655	An Improved Model for Nutrient deficiency diagnosis of Rice Plant by Ensemble Learning.....	286
4729	Sign Language Recognition for Bangla Alphabets Using Deep Learning Methods.....	292
4744	High Frequency Closed-Loop H-Bridge Converter with CC-CV Mode for Electric Three-Wheelers Battery Charging Application.....	298
4915	Cost-effective IoT-Based Smart Stick for Visually Impaired Person.....	303
4936	Design and Analysis of a Dual-Band Miniaturized Rectangular Patch Antenna for Millimeter-Wave Applications.....	309
4937	SkinNet: An Improved Skin Cancer Classification System Using Convolutional Neural Network.....	315
4943	Contourlet Transformed Nakagami Image-based Breast Tumor Classification Using Deep CNN.....	321
5029	Revealing Climate Change from Moon Images with Dimensionality Reduction and Machine Learning.....	326
5068	Multiple Circular Ring-canals on the Starfish Routing Backbone in Wireless Sensor Networks.....	332
5091	IoT Based Transformer Load Sharing & Health Monitoring System.....	338
5156	7nm Gate-All-Around Nanowire n-FET for DNA Sequencing.....	342
5334	Design and Fabrication of an Automotive Electromagnetic Braking System.....	348
5434	Analysis of Data Transfer Mechanism among Wireless Devices in AsthaNet Healthcare Network.....	354
5490	Performance Analysis Rice Yield Model based on Historical Weather Dataset in Bangladesh.....	360
5528	Soil Impact on Photovoltaic Performance: A Laboratory-based Investigation.....	366

5755	Design and Performance Analysis of a Novel 3.5 GHz Q-Slot Antenna for Body-Centric Communications.....	370
5809	Blockchain in human resource management to hire the right candidate.....	376
5830	A New Approach to Detect Deepfake Video using Multi-Input Convolutional Neural Network.....	381
6036	DROM: Read Only Memory Storage in DNA Computing.....	387
6113	Environmental Impact of Land Use and Land Cover Change in Rampal, Bangladesh: A Google Earth Engine-Based Remote Sensing Approach.....	393
6131	FRAUD DETECTION OF CREDIT CARD USING DATA MINING TECHNIQUES.....	400
6229	Curvelet Transformed NIG Image-based Breast Tumor Classification Using Deep Learning.....	406
6297	A Quick Review of Non-isolated Bidirectional Converters as EV Chargers.....	411
6326	A Time of Use Tariff Based Demand Side Management Algorithm for Residential Consumers.....	416
6429	Comparative Analysis of Fine-Tuned MobileNet versions to Detect Brain Tumors from MRI images.....	422
6547	Designing and Performance-Analysis of a 3 DOF Robotic Manipulator Arm and its Higher Order Integration for 7 DOF Robotic Arm.....	428
6716	A Multiclass Approach to Identify Misogynistic Bangla Text from Social Media.....	434
6732	An Ensemble Based Stacking Architecture For Improved Bangla Optical Character Recognition.....	440
6781	Segmentation of Hemorrhagic Areas in Human Brain from CT Scan Images.....	446
6782	Internet of Things (IoT) for Water Quality Monitoring and Consumption Management.....	451
6822	Low-cost Task Offloading Scheme for Mobile Edge Cloud and Internet Cloud Using Genetic Algorithm.....	456
6831	Closed-Loop Switched Capacitor Cuk Converter Topology for Voltage Regulation and PFC Applications.....	462
6904	Machine Learning for Load Forecasting in a Green Data Center.....	466
6934	Design and Characterization of Photonic Crystal Fiber Based Surface Plasmon Resonance Refractive Index Sensor.....	471
6978	Fault Tolerance and Cost Effectiveness Analysis of Low-Powered 3D-TESH Network.....	477
7119	TT-Mote: An Architecture towards Perpetual Wireless Sensor Networks.....	483
7146	Design and Analysis of a Hybrid Power Charging Station for Electric Vehicles at Patenga, Chittagong.....	488
7150	High Altitude Airborne Hybrid Power Generation System Design in Saint Martin's Island.....	494
7182	Implementation of Encoder-Decoder based Long Short-Term Memory Network for Short-Term Electrical Load Forecasting.....	500
7274	Estimating Earth's Albedo from Moon Images using Random Forest will Enable Climate Change Monitoring.....	506
7338	A Robust Approach to Identify Banglish Words using Bangla Scripts.....	512
7344	An Effective Approach for Bengali Handwritten Punctuation Recognition by Using a Low-cost Convolutional Neural Network.....	518
7362	A 1kW Transformerless Inverter with Microcontroller-based Battery Charging System for Off-Grid Photovoltaic Modules.....	524
7434	An Approach to Identify Diseases in Betel Leaf Using Deep Learning Techniques.....	528
7447	Performance Analysis of a DQ0 Controlled Grid Forming Inverter for Grid Connected Photovoltaic System: A Case Study.....	533

7546	An Automatic Detection of Pneumonia from Chest Ionizing Radiation Images Using Machine Learning Algorithm.....	539
7674	Exergy-based performance evaluation of the thermal power plants in Bangladesh for in-depth understanding and future recommendations.....	544
7678	Cloud-Based Solar-Powered Remote Sensing and Monitoring for Severely Ill Patients Vitals to Ensure Appropriate Treatment and Medical Team Safety.....	550
7786	Heart Diseases Prediction Using Multiple Machine Learning Techniques.....	555
7918	SPOT (Sales Production based On Time-Series): A Comprehensive Approach to Sales Forecasting using Contextually-tailored Time Series Analysis.....	560
7989	SERNet: A Novel Speech Emotion Recognition System Using Ensemble Deep Learning Approach.....	566
8081	Modification of Dynamic Logic Circuit Design Technique for Minimizing Leakage Current and Propagation Delay.....	572
8185	A Novel Asymmetric Nine Level Inverter with Reduced Device Count Suitable for Renewable Energy Applications.....	577
8217	Designing SWET Based Hybrid Charging Stations for Electric Vehicles at Dhaka-Mawa Expressway in Bangladesh.....	583
8346	Forecasting of Solar Photovoltaic Output Energy using LSTM Machine Learning Algorithm.....	589
8347	Real-Time Computer Vision Based Autonomous Navigation System for Assisting Visually Impaired People using Machine Learning.....	595
8753	Automatic 3D Animated Bangla Sign Language Gestures Generation from Bangla Text and Voice.....	601
8885	Event Detection from Cricket Videos Using Video-Based CNN Classification of Umpire Signals.....	607
8898	Design of Grid Forming Inverter for Integration of Large-Scale Wind Farm in Weak Grid.....	612
8996	A DFT Investigation on Structural, Electric, and Thermodynamic Properties of Transition Metal (Cr, Mo, and W) Doped in Small Arsenic Cluster (As <sub>15</sub> ).....	618
9032	Automatic Bangla License Plate Recognition System for Low-Resolution Images.....	624
9054	A Deep Feature Ensemble-Based Hybrid Model for MRI Brain Tumor Multi-Classification.....	630
9090	Comparative Study of CZTS Solar Cell with Different Buffers and BSF Layer.....	636
9168	Vowel Recognition for Isolated Digit Using Wavelet Transform at Decomposition Level 3.....	641
9176	Mathematical Models for Tumor Cell Growth Estimation: An Analytical Review.....	645
9184	Design of A Microcontroller Based System for Harvesting Electricity from Exercise Bike.....	650
9269	Martian Craters Detection Using Neural Network Approach from Grayscale Satellite Imageries.....	655
9304	An Efficient Lead-free SnBr <sub>3</sub> based Perovskite Solar Cell: Design and Optimization using SCAPS-1D.....	661
9315	Sedimentation Analysis on Padma River Using Machine Learning Techniques.....	667
9489	Object Detection and Tracking: Deep Learning based Novel Tools to Generate Robust Human and Machine-Annotated Ground Truth Data for Training AI Models.....	673
9607	Solar Battery Charging Station for Electric Vehicles: Part I- Screening, Modeling, and Feasibility Analysis.....	679
9643	An IoT based Smart Robot that Aids in the Prevention of COVID19 Spread.....	685
9732	Mutual Information on Low-rank Matrix for Effective Intrusion Detection.....	691
9805	An SDN-based Secure Model for IoT Network in Smart Building.....	696
9964	An IoT Based Intelligent Healthcare Solution With ESP32 Using Machine Learning Model.....	702