ISSN 2218-7413

DOI: https://doi.org/10.3329/dujase

# DHAKA UNIVERSITY JOURNAL OF APPLIED SCIENCE & ENGINEERING

Volume 7, No. 1

January 2022



Faculty of Engineering and Technology University of Dhaka, Dhaka-1000, Bangladesh

Journal Website: https://www.banglajol.info/index.pho/DUJASE https://jase.du.ac.bd/ (On-line Paper Submission is Available Now)

# DHAKA UNIVERSITY JOURNAL OF APPLIED SCIENCE & ENGINEERING

ISSN 2218-7413

DOI: https://doi.org/10.3329/dujase

Vol. 7, No. 1 January 2022

#### **Editor**

#### Prof. Dr. Chowdhury Farhan Ahmed

Dept. of Computer Science and Engineering University of Dhaka Dhaka-1000, Bangladesh

#### **Convener of the Editorial Board**

#### Prof. Dr. Hafiz Md. Hasan Babu

Dean, Faculty of Engineering and Technology University of Dhaka Dhaka-1000, Bangladesh

#### **Members of the Editorial Board**

#### Prof. Dr. Saeed Mahmud Ullah

Dept. of Electrical and Electronic Engineering University of Dhaka Dhaka-1000, Bangladesh

#### Dr. Afroza Shelley

Associate Professor Dept. of Nuclear Engineering University of Dhaka Dhaka-1000, Bangladesh

#### Prof. Dr. A.N.M. Hamidul Kabir

Dept. of Applied Chemistry and Chemical Engineering University of Dhaka Dhaka-1000, Bangladesh

#### Dr. Sejuty Rahman

Associate Professor
Dept. of Robotics and Mechatronics Engineering
University of Dhaka
Dhaka-1000, Bangladesh

#### **Copyright Notice**

Authors who publish in the Dhaka University Journal of Applied Science and Engineering (DUJASE) agree to the following terms that:

1. **Journal** retain copyright and grant the Dhaka University Journal of Applied Science and Engineering (DUJASE) the right of first publication of the work.



3. Articles in Dhaka University Journal of Applied Science and Engineering (DUJASE) are licensed under a Creative Commons CC BY-NC-ND License Attribution-NonCommercial-NoDerivatives 4.0 International (CC-BY-NC-ND 4.0). This license permits Share —copy and redistribute the material in any medium or format.

Journal Website: https://www.banglajol.info/index.pho/DUJASE https://jase.du.ac.bd/ (On-line Paper Submission is Available Now)

> ISSN 2218-7413 DOI: https://doi.org/10.3329/dujase

### Members of the Advisory Panel

#### Professor B. C. Meikap

Professor and Head
Department of Chemical Engineering
Indian Institute of Technology Kharagpur

Kharagpur 721 302, West Bengal, INDIA
Mobile: +919414624980
Email: bcmeikap@che.iitkgp.ac.in,
bcmeikap@gmail.com

#### Prof Dr. Mohammad Tariqul Islam, CEng, FIET,

SMIEEE, SMIEICE
Department of Electrical, Electronic and Systems
Engineering
Faculty of Engineering & Built Environment
Universiti Kebangsaan Malaysia (UKM),
43600 Bangi, SE; Amgpr, Malaysia

#### Dr. Naoyuki Takaki

Email: tariqul@ukm.edu.my

Professor, Department of Nuclear Safety Engineering *Tokyo City University, Japan* Setagaya Campus: Tokyo Toshi Daigaku Email: ntakaki@tcu.ac.jp

#### Dr. Mayeen Uddin Khandaker

Professor, Sunway University, Malaysia Centre for Applied Physics and Radiation Technologies Petaling Jaya, Malaysia

Email: mayeenk@sunway.edu.my

#### Bidyut Baran Saha, Ph.D

Professor and Principal Investigator
Multiscale Science and Engineering for Energy and the
Environment Thrust (MSE3)
International Institute for Carbon-Neutral Energy
Research (WPI-12CNER), Kyushu University
744 Motooka, Ntshi-ku, Fukuoka-shi,
Fukuoka 819-0395, Japan

Email: saha.baran.bidyut.213@m.kyushu-u.ac.jp

#### Dr. Hasan Shahid

Robotics and Renewable Energy **Queen Mary University of London**Phone: +44(0) 20 7882 3319,
E-mail: m.h.shaheed@qmul.ac.uk

#### Professor Dr. Seiji Kurihara

Department of Applied Chemistry and Biochemistry *Kumamoto University, Japan*Email: kurihara@gpo.kumamoto-u.ac.jp

#### Dr. Nasimul Noman

Senior Lecturer
School of Electrical Engineering and Computing
University of Newcastle
New South Wales, Australia
Email: nasimul.noman@newcastle.edu.au

#### Dr. M. Julius Hossain

Head of Image and Data Analysis Group at the Center for Immunology *University of Southampton, UK* Email: julius.hossain@embl.de

#### GENERAL INFORMATION

- 1. Publication: The Dhaka University Journal of Applied Science and Engineering is published half-yearly in January and July as two issues per annual volume. This will be published both in printed form and soft copy form (archived in the Library of the University of Dhaka as digital form for the reader). The electronic version will be open accessed in the website of the journal.
- **2. Editorial Correspondence:** Editorial correspondences should be addressed to the Editor, The Dhaka University Journal of Applied Science and Engineering, Dean Office, Faculty of Engineering and Technology, University of Dhaka, Dhaka1000, Bangladesh. Email: <a href="mailto:editor.dujase@gmail.com">editor.dujase@gmail.com</a> or <a href="mailto:deanengg@du.ac.bd">deanengg@du.ac.bd</a>, Web: <a href="https://www.banglajol.info">https://jase.du.ac.bd</a>, Phone: +8801518333993.
- **3. Scope:** The Dhaka University Journal of Applied Science and Engineering publishes original research papers and short communications submitted by the teachers and researchers of the University of Dhaka as well as distinguish researchers from home and abroad on any area of Applied Sciences, Engineering and Technology.

#### 4. Submission Requirements

The article should be on original research work that enhances the existing knowledge in the given subject area. Review articles and survey papers are acceptable, even though new data/concepts are not presented. Articles that have not been submitted for publication or published elsewhere and expanded versions of conference proceedings are eligible for submission. Experiments, statistical and other analyses ought to be of high technical standard and are described in sufficient detail. The article should have title, abstract, appropriate keywords (3 to 5), appropriate introduction, research model/methods, results and discussion, conclusion, acknowledgement (if any), references and Supplementary data (if necessary). The author should follow manuscripts write-up guideline (Similar to IEEE double column format). All the pictures, diagrams and table should be clear and properly labeled. The article is presented in an intelligible fashion and is written in Standard English (either British or US). Appropriate references to related prior published works must be included.

#### **Manuscript Format**

Manuscript must be typed with font size 11 on A4 (210 mm x 297 mm) page with moderate margins and the length of the manuscript should not exceed 10 pages.

**Title Page:** Should contain a concise and informative title of the article, name(s), email addresses with academic or professional affiliation(s). The corresponding author should be mentioned clearly with email address, phone number, affiliation and postal address. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address.

**Abstract:** The title page should be followed by a page containing only the full title (short communication) and in case of a full paper, an abstract of up to 150 words briefly pointing out purpose, principles, main results and major conclusion. Nonstandard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

**Keywords:** 3-5 keywords should be included at the bottom of the abstract page. Please carefully select the appropriate keywords which can be used for categorizing and indexing the submitted manuscript.

**Introduction:** A short literature review of latest and relevant prior works should be included. The motivation behind the research should be included in short at the end of introduction.

**Materials and Methods:** Materials used in the research work should be mentioned clearly and the methodology followed should be described in such a way that the work can be reproduced easily. Adaptation of literature methods should me mentioned with proper reference and any change made should be described clearly.

**Result and Discussion:** A clear and concise result discussion should be included, where the results obtained should be justified and authors should establish the significance of the results.

**Headings:** Your article should be divided into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, and so on. Each heading must be in a separate line and clearly describe the contents inside the section/subsection.

**Tables, graphs and figures:** Should be kept to minimum. Tables of data represented by graphs should not be included unless they are absolutely necessary. Please submit tables as editable text and not as images. Good quality artwork files (JPG/PNG preferable) with a minimum of 300 dpi should be provided.

**Conclusion:** This section should summarize the outcome of the research and future directives for further expansion of the research. It should not repeat any comment already included in the abstract and result discussion sections.

**Acknowledgement:** Those individuals who provided help during the research (laboratory facilities, writing assistance or proof reading the article, etc.) should be acknowledged with due respect. Funding sources should also be mentioned with grant number (if any).

**References:** All references must be numbered consecutively according to their appearance in the text. Reference citations in the text should be indicated by square brackets, e.g., [1, 4, 5], and included in a numbered reference list at the end according to the following style:

**For a paper in a journal:** J. G. Moreno-Torres, T. Raeder, R. Alaíz-Rodríguez, N. V. Chawla, and F. Herrera, "A unifying view on dataset shift in classification," *Pattern Recognition*, vol. 45, no. 1, pp. 521–530, 2012.

**For a paper in a conference:** R. Agrawal and R. Srikant, "Fast Algorithms for Mining Association Rules," *Proc. 20th Int'l Conf. Very Large Data Bases (VLDB '94)*, pp. 487-499, 1994.

For a book: B. Klaus and P. Horn, Robot Vision. Cambridge, MA, USA: MIT Press, 1986.

**For a chapter in a book:** L. Li, J. Yang, and C. Li, "Super-resolution restoration and image reconstruction for passive millimeter wave imaging," in *Image Restoration—Recent Advances and Applications*, A. Histace, Ed., Rijeka, Croatia: InTech, 2012, pp. 25–45.

#### **Cover Letter**

A cover letter signed (scanned signature) by the corresponding author must be submitted with the manuscript. The letter should state how the paper fits the Aims and Scope of the journal. Failure to include the cover letter will result in returning the paper to the author.

#### 5. Field of Interest

**Electrical and Electronic Engineering:** Electron Devices, Optoelectronics & Photovoltaic's, Electronics, Electronic Systems, Circuits and Systems, Smart Grid and Sustainable Energy, Renewable Energy, Biomedical Systems, Biometrics, Signal Processing, Healthcare System, Remote Sensing & Geosciences, Communication Systems, Antennas and Wireless Propagation, Device Fabrication, etc.

Applied Chemistry and Chemical Engineering: Chemical Engineering, Biochemical Engineering, Electrochemistry and Electrochemical Engineering, Chemical Technology, Chemical Industry and Market Analysis, Catalysis, Chemo metrics and Computational Chemistry, Nanotechnology and Materials Science, Analytical and Organic Chemistry, Fuel Technologies, Unit Operations and Separation Processes, Environmental Chemistry, Polymer Chemistry, Nuclear Chemistry, Climate Change, etc.

Computer Science and Engineering: Advanced Computer Architecture, VLSI, Sensors & Embedded Systems, Networking, Internet Technologies, Cloud Computing and Data Center Technologies, Artificial Intelligence, Machine Learning, Databases, Big Data Analysis, Data Mining and Knowledge Discovery, Intelligent Systems, Human Computer Interactions, Pattern Recognition, Image Processing, Computer Graphics, Computer Vision, Bioinformatics, DNA Computation, Software Engineering Technologies, Data Structure and Algorithms, Parallel and Distributed Computing, Software and Systems Security, Blockchain, Quantum Computing, etc.

Nuclear Engineering: Infrastructure Development for Nuclear plant, Nuclear Education Responses, Potentiality and Challenges, Nuclear Energy Applications in Industries and Agricultures, Nuclear Medicine, Reactor Physics, Thermal Hydraulics, Nuclear Safety, Nuclear I & C, Nuclear Physics, Fusion, and Laser Technology, Nuclear Fuel Cycle and Radioactive Waste Management, Nuclear Fuel and Reactor Materials, Radiation Application, Radiation Protection, Nuclear Structural Analysis and Plant Management & Maintenance, Nuclear Policy, Economics, and Human Resource Development, etc.

Robotics and Mechatronics Engineering: Mechatronics, Automation, Control Systems, Robotic Systems Modeling, Optimization, Simulation and Experiments, Industrial Automation, Process Control, Manufacturing Process. Aero-space Robotics and Challenges, Military Robots and Drones, Humanoid Robot, Human-Robot Interaction, Medical Robotics, Intelligent Robotic System.

**6. Submission of Manuscript:** Authors should submit two soft copies (pdf format) of the manuscripts to the editor (editor. dujase@gmail.com or deanengg@du.ac.bd) following the style and format of the journal. One copy must exclude authors names, affiliations and acknowledgement. This copy will be used for review process. The authors, at the time of submitting their manuscript, must certify that the work was carried out by the author(s) and the contents of the paper were not published

before or submitted for publication in any other journal (consent of every author is required for submission). If the article was previously rejected in this journal after peer review with encouragement to update and resubmit, then a complete "list of updates" must be included in a separate document. The list of updates should have the following regarding each comment: a) reviewers' concerns, b) authors' response to the concerns, c) actual changes implemented. In order to assist the referees, authors are requested to furnish copies of relevant unpublished or inaccessible references.

**Submission Classification:** Please classify your manuscript according to the five major areas given in 6: Field of Interest. Hence, you should select anyone among EEE, ACCE, CSE, NE and RME.

- 7. Editorial Process/Review Process: All papers will be peer reviewed. The editor will process the paper in consultation with the departmental member of the editorial board, and the authors should incorporate necessary changes as suggested by the reviewers as well as the editorial board. The editorial board follows "blind review" process where the authors are not revealed to the reviewers in order to allow concentration on content. The submitted paper will be peer-reviewed by at least two reviewers. If they made contradictory reports with each other (80 to 100% difference) then the editorial board may assign third reviewer to make a decision. If both reviewers reject the paper, it will be rejected. Similarity check should be done on each paper using existing software of the University of Dhaka or other reputed one and the paper will be not be selected for publication until its similarity index is less than or equal to 25%. Final decisions on the papers will be made by the editorial board on the basis of the reports of the reviewers and similarity index. The editorial board will notify to all authors of acceptance or rejection of papers.
- **8. Proofs:** Corresponding author will receive a draft copy of the article after editing by the journal committee for final printing, which should be corrected and returned within seventy-two hours of receipt. No new material should be inserted in the text at the time of proof reading, except where prior permission has been obtained from the editor.

# DHAKA UNIVERSITY JOURNAL OF APPLIED SCIENCE & ENGINEERING

Vol. 7, No. 1 January 2022

## **CONTENTS**

1.	A Comparative Study of Missing Data Imputation Methods for Activity Recognition Task Afia Sajeeda, B M Mainul Hossain and Sumon Ahmed DOI: https://doi.org/10.3329/dujase.v7i1.62880	1-8
2.	Study of the Perturbation in Temperature Profile of an AGR Fuel Pin for Surface Roughness of Cladding by CFD Simulation in Ansys Fluent Sadek Hossain Nishat, Farhana Islam Farha and Md. Hossain Sahadath DOI: https://doi.org/10.3329/dujase.v7i1.62881	9-15
3.	Evaluation of Physico-Chemical and Nutritional Properties and Microbial Analysis of Some Local Jam and Jelly in Bangladesh  Md. Jayed Imrul Mozakkin, Barun Kanti Saha, Taslima Ferdous, Shah Md. Masum and M. Abdul Quaiyyum  DOI: https://doi.org/10.3329/dujase.v7i1.62882	16-21
4.	Violent Human Behavior Detection from Videos using Machine Learning Mohammad Sadat Hussain Rafsanjani and Ahmedul Kabir DOI: https://doi.org/10.3329/dujase.v7i1.62883	22-28
5.	A Practical Scheme to Improve Memorability of System-assigned Random Password Fairuz Nawer Meem, Rahat Al Noman, Pritom Saha, Muhammad Shakil Pervez, Ismat Rahman, Moinul Zaber and Sarker T. Ahmed Rumee DOI: https://doi.org/10.3329/dujase.v7i1.62884	29-37
6.	Locally Available Natural Dyes for Dyesensitized Solar Cells S. Karmakar, Q. M. Arman-Uz-Zaman, M. S. Hossain, A. Siddika, S. Tabassum, A. S. M. Ibrahim and S. Huque DOI: https://doi.org/10.3329/dujase.v7i1.62885	38-44
7.	GDPx: An Application Independent Pruning Technique to Reduce Computation Cost of Max-Product Belief Propagation Algorithm  Md. Mosaddek Khan and Nhat V. Q. Trung  DOI: https://doi.org/10.3329/dujase.v7i1.62886	45-57
8.	A Vertex-extension based Algorithm for Frequent Pattern Mining from Graph Databases  Md. Tanvir Alam, Chowdhury Farhan Ahmed and Md. Samiullah  DOI: https://doi.org/10.3329/dujase.v7i1.62887	58-65
9.	Evolution of Random Forest from Decision Tree and Bagging: A Bias-Variance Perspective Muhammad Ibrahim DOI: https://doi.org/10.3329/dujase.v7i1.62888	66-71
10.	Application of Image Analysis to Establish Potential Relationship between Intracellular Interaction and Cell Migration Behavior  Tanvir Ahmed, Muhammad Shafiul Munir and Dr. Shoeb Ahmed  DOI: https://doi.org/10.3329/duiase.v7i1.62889	72-81