

Editorial Board

Editor-in-Chief

Prof. Dr. Surendra Bahadur Tamrakar

Editorial Board Members

Prof. Dr. Kazuya Itoh
Prof. Dr. Chung-Won
Dr. Sanjay Giri
Er. Shesh Raj Kafle
Er. Bibat Thokar
Er. Sandesh Sharan Poudel
Er. Johnson Timalisina
Er. Saujanya Nepal
Er. Ashim Gautam
Er. Pranita Rana

Editorial Manager

Er. Deepak Bahadur Kunwar

Advisory Board Members

Prof. Dr. Padma Bahadur Shahi
Prof. Dr. Rajesh Karki
Prof. Dr. Ramesh Marasini
Assoc. Prof. Dr. Indra Prasad Acharya
Assoc. Prof. Dr. Deepak Bikram Thapa Chhetri
Dr. Prakash Ranjitakar
Dr. Puay How Tion
Dr. Rocky Talchabhadel
Dr. Hare Ram Shrestha
Er. Hemant Tiwari
Er. Vibek Gupta
Er. Niraj Bohara

Dear Authors, Reviewers, Collaborators, Advisory Committee Members, Colleagues, and Team Members,

Namaste!

First and foremost, I would like to express my sincere gratitude for your invaluable cooperation, contributions, and participation in the **2nd International Conference on Engineering Technology and Infrastructure Development (LEC Conference 2026)** held on Saturday, January 31, 2026 (17th Magh, 2082). The successful organization of this conference and the quality of the research presented have enabled us to publish this issue of the LEC Journal, namely the **International Journal on Engineering Technology and Infrastructure Development (InJET-InDev), Volume 2, Issue 2**.

As the Editor-in-Chief of *InJET-InDev* and Principal of Lalitpur Engineering College, I extend my heartfelt appreciation to all authors, reviewers, editorial board members, advisory board members, the LEC Journal team, and all well-wishers whose dedication and support have made this publication possible. This issue is a testament to the collective efforts, scholarly commitment, and academic excellence of our contributors and reviewers.

I would also like to extend special thanks to our journal and conference collaborative partners, **Safe and Sustainable Travel Nepal (SSTN) and the Society of Transport Engineers Nepal (SOTEN)**, for their continued support and collaboration. We also gratefully acknowledge our conference partner, **Green Decision Labs & Research (GD Labs and Research)**, for their valuable contribution to the successful organization of the event.

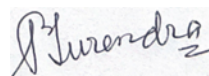
InJET-InDev aims to serve as a platform for disseminating innovative research findings, technological advancements, and scholarly ideas in the fields of engineering technology and infrastructure development. Through this initiative, we seek to foster academic exchange and collaboration among researchers, academicians, professionals, and practitioners from diverse disciplines. We believe that the research articles published in this issue will contribute meaningfully to the advancement of knowledge and practice in these important fields.

I encourage our readers to explore the valuable contributions presented in this volume and engage with the insights offered by the authors. We look forward to your continued support, participation, and scholarly contributions in future issues of *InJET-InDev*.

Moving forward, I warmly invite researchers, academicians, professionals, and practitioners to submit their high-quality research work to *InJET-InDev*. Together, we can continue to strengthen scholarly discourse and promote innovation and sustainable development in engineering and infrastructure sectors.

Thank you for being part of this academic journey and for helping us achieve this important milestone.

Warm regards,



Prof. Dr. Surendra Bahadur Tamrakar

Editor-in-Chief, InJET-InDev
Principal, Lalitpur Engineering College

Message from Collaborative Partners

Message from Safe & Sustainable Travel Nepal (SSTN)

We are delighted to be a part of continued effort in creating platforms for researchers to share their work. It has been a pleasure for me and my team to work with the diverse team and collaborating partners for this volume of the International Journal of Engineering Technology and Infrastructure Development (InJET-InDev). The growing collaboration and engagement from the industry strengthens the core objective of the conference and journal publication and further encourages researchers and practitioners to engage in constructive knowledge generation and sharing. Huge congratulations to the entire LEC team on achieving this progress.

We are thankful to the LEC team for trusting us as a collaborating partner. SSTN has been supporting young researchers on various avenues through grants and technical guidance. I can see some of the research works being published with LEC which keeps us motivated to further broaden our support and work.

We would like to congratulate all the paper authors. We sincerely hope that aspiring young researchers and institutions are encouraged towards quality research and knowledge generation. The publication adds a brick to the wall supporting the scholars, academia, professionals, practitioners and policy makers.

We look forward to continued collaboration and support for future publications as well.

Vibek Gupta

Vibek Gupta

Chairman

Safe and Sustainable Travel Nepal



Message from the Society of Transport Engineers Nepal (SOTEN)

I extend my heartfelt congratulations on the publication of the second edition of the Journal of Engineering Technology and Infrastructure Development (InJET-InDev). On behalf of Society of Transport Engineers Nepal (SoTEN), I am delighted to convey our continued support and appreciation for this valuable initiative that promotes research, innovation and professional discourse in engineering and infrastructure development.

The successful publication of the second edition reflects the growing commitment of the editorial team, researchers, and academicians toward advancing knowledge and research-based solutions for development needs.

As a collaborative partner, SoTEN firmly believes that exchange of knowledge and experiences among professional is essential for building efficient and sustainable infrastructure systems. This journal serves as an important forum for disseminating innovative ideas and research findings that can contribute to Nepal's infrastructure development.

This is very encouraging that quality and diversity of contributions featured in this edition is enhanced which will inspire students, researchers and engineers alike.

I extend my sincere appreciation to the editorial board, authors, reviewers and college management for their dedication and hard works in bringing this edition. SoTEN remains committed to supporting initiatives that enhances professional capacity, encourage innovation and contribute to the advancement of transport engineering and infrastructure development in Nepal.

My best wishes to the InJET-InDev continued success and wider recognition in the years ahead.

Hare Ram Shrestha

Hare Ram Shrestha, Ph.D.

President,

Society of Transport Engineers Nepal (SOTEN)



Table of Contents

S. N.	Title of Paper	Page No.
1	A Machine Learning Approach to Detect Depression from Student Mental Health Surveys	1-7
2	K-Means Clustering and Prophet-Based AQI Pattern Mining and Short-Term Forecasting for Asian Countries (2022–2025)	8-17
3	Rainfall Prediction in Kathmandu City Using Machine Learning and Deep Learning Techniques	18-25
4	Signature Verification using ResNet-based Custom CNN, Advanced Augmentation, and Explainable AIs	26-36
5	Multi-Label Toxic Comment Detection Using BERT-Based NLP and Machine Learning	37-45
6	Applicability of CHIRPS Satellite Precipitation in Hydrological Modeling of the Poorly Gauged Himalayan Basin: A Case Study of Sunkoshi Basin, Nepal	46-61
7	Fine-Tuning DialoGPT on Common Diseases in Rural Nepal for Medical Conversations	62-71
8	Modelling Safety Performance Functions and Assessing Highway Safety Manual (HSM) Prediction Models for Four-Lane Undivided Arterials – A Case Study of Kathmandu District	72-90
9	Crash Reconstruction of Mixed-Vehicle Collision Using PC-Crash	91-98
10	Performance Evaluation of Exclusive Bus Lane System using Simulation-based Analysis - A Case Study of a Section in Kathmandu-Bhaktapur Route during Morning Peak Hour	99-112
11	Physics-Informed Data Augmentation for Sediment Concentration Prediction in Data-Scarce Himalayan Rivers	113-123
12	Hydraulic Performance Evaluation of Approach Flow Using CFD: A Case Study of Budhi Gandaki Hydroelectric Project (341 MW)	124-137
13	Electronic Voting System Based on Blockchain Technology	138-149
14	Hard-Exclusion Bidirectional A*: Constraint-Safe, Real-Time Pathfinding for Dynamic Urban Networks	150-161
15	SugarCheck Insights: A Diabetes Prediction and Risk Profiling System Using Machine Learning	162-170

S. N.	Title of Paper	Page No.
16	Empirical Comparison of Negamax with Alpha-Beta Pruning and Monte Carlo Tree Search for Mobile Chess AI on Flutter	171-179
17	AI for Road Safety in Nepal: Predicting High-Risk Accident Zones Using Traffic, Weather, and Road Condition Data	180-196
18	A Study on Bidding Trend and Performance of Construction Projects: A Case Study of Water Supply Projects in Koshi Province, Nepal	197-211
19	Numerical Analysis of Deep Basement Excavation in Soft Soils of Kathmandu Valley	212-225
20	Bridge Failures in Nepal: Systematic Review and Quantitative Characterization of Causal Mechanisms	226-237
21	Cloud-Integrated Automated Dosing System for pH and Nutrient Control in NFT Hydroponics Using ThingSpeak	238-249
22	Flow-Dependent Transport of Glyphosate, Dioxins, and Lead in an Urban River: A Scenario-Based HEC-RAS Numerical Study of Sungai Perai, Malaysia	250-258