



TNCHE Asia 2025 Conference
" Accelerating Industrial Decarbonization:
Digital-AI and Energy Transformation "
Presenter's Biodata & Abstract



Full Name : Saai Arjun N
Organization : IRESC Global
Current Position : Consultant

Portrait (face)
photo of
Presenter;
and
Company
Logo, if
available

Title of Presentation : AI-Enabled HAZOP: Automating Hazard Scenario Development and
Risk Classification

Presentation Abstract:

This paper explores the application of artificial intelligence (AI), natural language processing (NLP) and machine learning (ML) techniques to enhance Hazard and Operability (HAZOP) studies. The methodology employs advanced natural language processing techniques including semantic similarity analysis and generative models to generate potential consequences based on identified causes. Furthermore, it utilizes NLP, feature engineering techniques, and vector embeddings for binary classification to predict consequence categories. Finally, NLP, feature engineering with vector extraction, and multi-label classification are used to predict severity based on consequence and likelihood based on cause. This approach aims to streamline HAZOP processes, speed up HAZOP analysis sessions, and improve risk assessment consistency in process plants with similar construction.