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(51) International classification :B01L0003000000, G01N0033500000, A61K0048000000, H04W0088020000, C12Q0001682700 (86) International Application No :NA Filing Date :NA (87) International Publication No : NA (61) Patent of Addition to Application Number :NA Filing Date :NA (62) Divisional to Application Number :NA Filing Date :NA		(71)Name of Applicant : 1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD Address of Applicant :Dhanbad - 826004, Jharkhand, India Dhanbad ----- ----- Name of Applicant : NA Address of Applicant : NA (72)Name of Inventor : 1)Tanmoy Maity Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 2)Mayank Sharma Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad ----- 3)Soumyadip Banerjee Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad -----
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(57) Abstract :

The present invention relates to a portable enhanced gas hazard prediction system for underground coal mines using Dempster-Shafer Evidence Theory (DSET) filter (1) and Deep Convolutional Neural Network (1D CNN) classifier (2) using edge machine learning (EML) technology. The DSETF (1) holds the raw data from five sensor nodes (N1, N2, ..., N5) and the filtered data is transmitted to the 1D CNN (2) from the DSETF (1). The IB of 1D CNN (1) stores the filtered data of 1 minute period. After completing 1 minute, the 1D CNN estimates the hazard class and level and stores the estimates at the output buffer. These estimation from the OB are then utilized to generate alarm signals. The innovative aspect of this research lies in integrating DSETF with 1D CNN to enhance hazard prediction accuracy in UCMs, even when some sensors are faulty. The proposed system achieves an excellent hazard classification accuracy, outperforming traditional methods, particularly in scenarios involving faulty sensors. [figure 2]

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