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(54) Title of the invention : AN IOT-ENABLED REAL-TIME EARLY WARNING HAZARD MONITORING SYSTEM FOR UNDERGROUND MINE ENVIRONMENTAL PARAMETERS

<p>(51) International classification :E21F0017180000, G08B0021180000, G01D0021020000, G01N0033000000, G06Q0050020000</p> <p>(86) International Application No :NA Filing Date :NA</p> <p>(87) International Publication No : NA</p> <p>(61) Patent of Addition to Application Number :NA Filing Date :NA</p> <p>(62) Divisional to Application Number :NA Filing Date :NA</p>	<p>(71)Name of Applicant : <b>1)National Institute of Technology Karnataka</b> Address of Applicant :Srinivasanagar PO, Surathkal, Mangaluru - 575025, Karnataka, India Mangalore -----</p> <p>Name of Applicant : NA Address of Applicant : NA</p> <p>(72)Name of Inventor : <b>1)Sandi Kumar Reddy</b> Address of Applicant :Department of Mining Engineering, NITK Surathkal, Srinivasanagar Post Surathkal, Dakshina Kannada District, Mangalore-575025,Karnataka, India Mangalore -----</p> <p><b>2)Anil S Naik</b> Address of Applicant :Department of Mining Engineering, NITK Surathkal, Srinivasanagar Post Surathkal, Dakshina Kannada District, Mangalore-575025,Karnataka, India Mangalore -----</p> <p><b>3)M Aruna</b> Address of Applicant :Department of Mining Engineering, NITK Surathkal, Srinivasanagar Post Surathkal, Dakshina Kannada District, Mangalore-575025,Karnataka, India Mangalore -----</p> <p><b>4)Mandela Govinda Raj</b> Address of Applicant :Department of Mining Engineering, NITK Surathkal, Srinivasanagar Post Surathkal, Dakshina Kannada District, Mangalore-575025,Karnataka, India Mangalore -----</p>
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(57) Abstract :

An IOT-enabled real-time early warning hazard monitoring system for underground mine environmental parameters, comprising multiple industrial gas sensors configured to detect hazardous gases and positioned in underground mine tunnels up to 1000meters below the surface, transmitting signals indicative of the detected gases; an RS485-LN converter receives the collected data from sensors through RS485 cable and prepares the data for long-distance transmission and then transmitted to LoRaWAN unit 103 wirelessly; LoRaWAN Communication unit 103 enables the transmission of data from the RS485-LN converter 102 to cloud platform for continuous real-time monitoring, and for data analysis; Data Processing and Alert unit 104 processes and analyzes the data, if any parameters such as CO2, CO, CH4, H2S, N2, NO, H2, temperature, and humidity at various tunnel exceed its predetermined safety thresholds, system generates audio alerts signal for both underground mine and surface control center, thereby ensures the safety and efficiency of mining operations. <>

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