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(57) Abstract :
The present invention relates to an Railway Track Crack Detection System is an autonomous, real-time monitoring solution designed to enhance railway safety by detecting cracks and defects in tracks using ultrasonic non-destructive testing (NDT). Mounted on a mobile robotic unit, the system scans the track with ultrasonic sensors and identifies discontinuities based on reflected wave signals. GPS modules pinpoint the location of any detected crack, while GSM modules transmit this data to nearby railway stations for prompt maintenance action. A PIR sensor is included to detect living beings on or near the track, further ensuring safety. The integration of wireless sensor networks (WSNs) allows scalable and cost-effective deployment across extensive railway networks. This system minimizes the risk of derailments, reduces the need for manual inspections, and supports preventive maintenance, contributing to more reliable and efficient railway operations.

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