IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 5, Issue 5, June 2025
Impact Factor: 7.67

Pain-Sense: Deep Learning-Based Pain Level Detection and Unconsciousness Alert System

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Abstract: *Pain detection and unconsciousness monitoring are critical for ensuring timely medical intervention and enhancing patient safety. However, the lack of immediate assistance in public areas and home environments often leads to severe health complications or fatalities. To address this, PainSense: Deep Learning-Based Pain Level Detection and Unconsciousness Alert System is developed to provide real-time monitoring and emergency alerts. The system utilizes deep learning models, combining Convolutional Neural Networks (CNN) for image-based pain level classification and Long Short-Term Memory (LSTM) networks for detecting unconsciousness through sequential body language analysis. It processes facial expressions, body language, and audio cues to detect low, Moderate, or Severe pain levels. If severe pain or unconsciousness is identified, the system triggers an immediate alert. In public areas, the system notifies nearby hospitals for timely medical intervention. When deployed as an IoT-based home solution, it monitors elderly individuals and sends alerts to family members or caregivers, ensuring continuous safety monitoring. The system's integration with cameras and IoT devices enables proactive healthcare monitoring, reducing fatalities caused by delayed assistance. Pain-Sense offers a scalable, automated solution for real-time pain detection and unconsciousness monitoring, making it ideal for healthcare facilities, public safety, and home environments. By enhancing early intervention capabilities, it aims to improve patient outcomes, reduce medical emergencies, and contribute to better public health management.*

Keywords: Pain Detection, Deep Learning, Computer Vision, Medical Diagnostics, Patient Monitoring, AI in Healthcare