National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Design and Development of an Instrumented Insole for Gait Profiling
Speaker	: Monisha Gowri
Supervisor	: Prof. Ravi Kant Avvari
Venue	: Seminar Room (BM)
Date and Time	: 08 Aug 2025 (4:00pm)
Abstract	: Monitoring plantar pressure and gait is crucial for mobility preservation and diagnosing foot pathologies, particularly diabetic foot conditions. This study presents the development of a wireless insole-footwear system to measure plantar pressure distribution using ten force-sensitive resistors (A301, A401, A502) strategically placed at key foot locations. Data acquisition is managed via a multiplexer and an ESP32 microcontroller with a Wi-Fi-enabled configuration. A signal conditioning circuit enhances sensor sensitivity. The device efficiently captures data at a 100 Hz sampling frequency, making it well-suited for walking analysis. Real-time data is accessible via a web application, stored, and analyzed in MATLAB (R2023b). A Butterworth filter with a cutoff frequency of 2–4 Hz is applied for noise reduction. The filtered pressure data is analyzed to compute ground reaction forces (GRF) and detect gait events such as heel strike, toe-off, and mid-stance, providing valuable insights for gait assessment and abnormality detection. Keywords: Gait; Plantar pressure; Ground reaction force; Force-sensitive resistors.