Kingston University London

EG5016B – Exploring Engineering Project Management

BEng/MEng Mechanical Engineering
BEng/MEng Mechanical Engineering (Automotive)
BEng/MEng Electrical and Electronics Engineering

INDUSTRY LIVE BRIEF

1. **Organisation / Contact Details**
   - Organisation name : Jaguar Land Rover
   - Your name : Aditi Rahegaonkar
   - Job Title / Role : CAD & AVA Engineer
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   - **LinkedIn Profile (optional)**: Aditi Rahegaonkar | LinkedIn

2. Title of the Challenge:
   Designing an AI-Guided Adaptive Car Seat for Enhanced Comfort

3. Summary of the Brief:

   This project invites students to explore how automotive seating can be improved using basic AI logic and sensor data. The challenge is to design a car seat concept that adjusts its support zones (e.g., lumbar, thigh) based on posture and pressure data collected from the occupant. The aim is to enhance comfort and reduce fatigue during long drives.

   Students will investigate existing smart seat technologies, propose a simplified concept using embedded pressure sensors, and develop basic rule-based logic (e.g., "if pressure is high in one area, increase support") to guide seat adjustments. The focus will be on conceptual design, CAD modeling, and understanding how AI can be used in mechanical systems without requiring advanced programming.

   This challenge is grounded in real-world trends in automotive innovation and offers scope for future development into CAD, FEA, and ergonomic testing in Teaching Block 2.

4. Background or Motivation:

   Modern vehicles are increasingly integrating intelligent systems to improve user experience. Poor posture and static seating positions contribute to driver discomfort and fatigue. Automotive companies like FORVIA and Hyundai Transys are exploring adaptive seating technologies using AI and sensor data. This brief introduces students to these emerging trends and encourages them to think about how mechanical design can interact with digital intelligence.

5. Constraints/Special Considerations:

- Design must be feasible for prototyping using CAD tools.
- Consider ergonomic principles and basic sensor integration.
- Focus on simplicity—no advanced electronics or coding required.
- Sustainability and manufacturability should be considered.
- Must be suitable for development by a group of 6–7 students over 8 weeks.

6. Presentation and Acknowledgement: Yes
Do you consent for the student work on this brief to be presented at our Future Skills Day (December 2025) or shared internally within the University (with appropriate credit to you/your organisation)?

☒Yes
☐Yes, but internal use only
☐No

7. Are you planning to attend the Future Skills Day on the 10th of December between 10am – 2pm at the Townhouse, Penrhyn Road Campus, Kingston University London? :
☐Yes
☒Maybe
☐No

References and Supporting Research:

1. Smart Car Seat for Drowsiness Detection
This study presents a smart seat design that uses pressure distribution data to detect driver fatigue and drowsiness. It proposes a non-intrusive sensing system embedded in the seat and seatbelt to monitor physiological signals like heart rate and respiration.
🔗 Read the full paper

2. Review of Smart Seat Sensors for Real-Time Postural Analysis
A comprehensive academic review of smart seat sensors used for posture monitoring in vehicles. It discusses sensor types, machine learning models, and the shift from driver-centric to passenger-centric monitoring in autonomous vehicles.
🔗 Read the SpringerLink paper

3. FORVIA Intelligent Seating Comfort System
FORVIA has developed an advanced seating system with embedded sensors that monitor posture and trigger corrective actions like massage or seat adjustments. Their All-in-One

sensing solution is based on orthopedic research and real-time data analysis.

🔗 Explore FORVIA's technology

4. Hyundai Transys Adaptive Seat Technology

Hyundai Transys is designing intelligent seats that learn from user data to optimize comfort. These seats adjust automatically based on posture and body shape, and integrate AI to enhance safety and personalization in autonomous vehicles.

🔗 Learn more from Hyundai Transys