AI and drone-based interventions

Country	Germany
Institution/Organisation	Deggendorf Institute of Technology, European Campus Rottal-Inn (ECRI)
Type of setting	Research university with a focus on smart healthcare and IoT solutions
National Context	In Germany, especially in rural regions, delayed emergency response due to distance and limited AED availability remains a pressing concern. This project targets such areas by integrating AI and real-time health monitoring to trigger immediate drone-based interventions.

The system integrates wearable heart monitoring (Fitbit), AI-based drone navigation using Gemini, and 5G communication infrastructure. It consists of a User Interaction Layer, a Data Layer, and an AI Layer (obstacle detection and navigation).

Implementation Process

- **Steps Taken**: Fitbit health monitoring was integrated with a backend server, a drone navigation system was developed, and 5G networks were used to conduct real-world test flights at ECRI Pfarrkirchen.
- **Stakeholders Involved**: Patients in rural areas, healthcare professionals, emergency responders, and drone operators.

Impact and Results

- **Quantitative Results**: The mission time was 6 minutes and 38 seconds over a distance of 400 meters. Obstacle detection rates were 100%, 75%, and 80% across three cases, and collision avoidance reached 100% under simulated conditions.
- **Qualitative Outcomes**: Student engagement and feedback were enhanced, learning paths became more personalized and adaptive, and understanding of ethical AI use in healthcare analytics increased.

Success Factors

- Seamless integration of health monitoring and drone response.
- Use of advanced AI (Gemini) for real-time obstacle navigation.
- Robust 5G infrastructure for low-latency communication.
- Modular and secure data architecture.

Challenges and Barriers

- Limited drone battery life and payload.
- Environmental factors like wind/rain impacting flight.
- Real-time AI inference speed and accuracy.
- Privacy concerns in wearable health monitoring.

Key Lessons Learned

- Integrating wearable data can trigger actionable emergency responses.
- Real-time cloud AI enhances obstacle handling in complex environments.
- On-campus 5G networks are crucial for operational efficiency.
- User-centric design in alerts ensures patient trust.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Co-funded by the European Union