UNIVERSITY OF MANNHEIM
Business School

CHAIR OF SERVICE
OPERATIONS MANAGEMENT
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Master Thesis Proposal

How can AI help in Managing Crowds and Traffic?

AI can significantly aid in managing traffic and crowds. Examples include

- **Traffic Flow Management:** AI algorithms can analyze real-time traffic data from various sources such as cameras, sensors, and GPS devices to predict, model and optimize traffic flows. This can involve dynamically adjusting traffic signal timings, rerouting vehicles to less congested routes, and managing traffic incidents more efficiently.
- **Crowd Monitoring and Control:** AI-powered video analytics systems can monitor crowds in public spaces such as airports, train stations, and stadiums. By analyzing video feeds, AI can detect crowd density, identify congestion points, and alert authorities to potential safety hazards or security threats. This information can be used to implement crowd control measures and ensure a smooth flow of people.
- **Queue Management:** AI can optimize queue management in places such as retail stores, banks, and amusement parks. By analyzing historical data and real-time queue lengths, AI can predict future demand, allocate resources efficiently, and optimize queue configurations to minimize wait times and enhance the overall customer experience.
- **Social Distancing Monitoring:** In response to public health concerns such as the COVID-19 pandemic, AI-powered systems can monitor adherence to social distancing guidelines in crowded spaces. By analyzing video feeds or sensor data, AI can detect violations of social distancing rules and provide real-time alerts to authorities or facility managers, enabling proactive interventions to maintain safety and prevent overcrowding.

Overall, AI can play a transformative role in operations management by enabling data-driven decision-making, automation of routine tasks, and optimization of processes across the entire value chain.

The objectives of the master thesis are to

- broadly review and classify the application areas of AI in Operations Management based on a literature review and based on company cases;
- select a specific domain/industry and discuss applications and underlying methods in detail;
- discuss how AI might impact existing and create new business models in the future.

Requirements

- OPM 7xx
- Good knowledge in Operations Management
- Analytical skills

Administrative information for writing a master thesis at the Chair of Service Operations Management can be found [here](#).

Selected Literature Recommendations

De Giovanni, L., Lancia, C., & Lulli, G. (2024). Data-driven optimization for Air Traffic Flow Management with trajectory preferences. Transportation Science.

Haase, K., Al Abideen, H. Z., Al-Bosta, S., Kasper, M., Koch, M., Müller, S., & Helbing, D. (2016). Improving pilgrim safety during the hajj: an analytical and operational research approach. Interfaces, 46(1), 74-90.

Iansiti, M., & Lakhani, K. R. (2020). Competing in the age of AI: Strategy and leadership when algorithms and networks run the world. Harvard Business Press.

https://unleashlive.com/