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Software design for Smart Logistics

Lunch talk BMS Smart Industry Research Roadmap

UNIVERSITY OF TWENTE.

05-06-2018





Sebastian Piest

Current role and ambition:

- Business Development Manager at CAPE Groep
- Prospective industrial PhD candidate University Twente

Professional experience:

- 10 years industry experience in supply chain, logistics and IT
- Member of TKI Dinalog supervisory board 4C program 2020
- Involved in multiple topsector projects: 4C & Synchromodal Logistics
- Part-time lecturer at University Twente, Saxion UAS, NHTV UAS
- Initiator of the vLm round table Twente

Educational background:

- Master International Supply Chain Management
- Bachelor Business Engineering
- Bachelor Human Resource Management











Partnerships Agility Innovation





Relations









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Triple helix projects; making science actionable

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CAPEGROEP

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Human in the loop concepts for decision making in logistics

- Based on Artificial Intelligence (AI) and the Intelligent Amplification (IA):
 - IA is first proposed in 1950s and 1960s, but contrasted by AI developments
 - IA uses information technology in augmenting human intelligence
 - IA proposes a symbiotic partnership between human and AI
 - Combining AI and IA utilizes strengths of both concepts
- "Human-in-the-loop" concept:
 - Human defines strategy, oversees AI, corrects when needed
 - Al executes routine tasks according to strategy
- Fly-by-wire example





Al/IA in operational business environments

• Identify suitable AI environment:

- Repetitive tasks
- High workload
- Limited external knowledge required
- Time limits
- Access soft knowledge via IA:
 - Information available to human decision maker
 - Not every case can be included in the model, exceptions will keep occurring
 - Creativity is essential for making the "right" decisions on complex problems





Framework for Enhancing Scheduling Processes



Source: A. Dobrkovic (2016)



Learning / personalizing optimization policies



Source: A. Dobrkovic (2016)





Source: A. Dobrkovic (2016)







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Marine Traffic Real-time actuals on live map

 Image: Second second



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Synchromodal IT goal and challenges

• Increase productivity of the workforce:

- Automate manual routine tasks with AI
- Extend professional judgement & experience with IA

Change management:

- Stimulate the willingness to share individual knowledge
- Bundle individual tactics into a shared policy and goals
- Learn to trust and work with data captured by agents
- Feed the system and continously refine data quality
- Change the way of work

• Integration with 3rd party websites:

- No API to connect with
- Some require user log-in / commercial subscription
- Have their own structure / use different input values









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Real-time ETA monitoring of perishables





Daily operations - perishables

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> Truck Arrival From External Airports













Webscraper robots











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Lessons learned from Synchromodal IT

- AI will dramatically change the way we work, but is not a "silver bullet"
- Routine tasks in daily operations and decision making can be automized by AI
- Soft knowlegde of domain experts can be accessed via IA to optimize policy goals
- The "Human-in-the-loop" concept combines the best of both approaches:
 - Human defines strategy, oversees AI, corrects when needed
 - AI executes routine tasks according to strategy
- At the end of the day, complex problems and exceptions still require human intelligence



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Current research projects

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NWO DataRel: Big Data for Resilient Logistics





Smart pallet pooling / VMI











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Thank you for your attention

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