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SIEMENS

	Green transition, public transport as a mobility solution
	Product
✓	
✓	IT & Software sector, (Cyber) security, public transport sector
	Latest breakthrough technology, customer demand
	Lack of testing facilities and data, availability of information (data)
✓	Internal and external technology experts, involvement of internal and customers' experts for data privacy & data security
✓	Buildings, public spaces...
?	Depending on EU AI legislation – forbidding AI based emotion detection would prevent commercialization within the EU

Safer with AI

Artificial Intelligence (AI) opens up possibilities not only in the Business-to-Consumer area, but also in the Business-to-Business domain. Industrial AI applications present great opportunities that can contribute to resolving major challenges facing our society. For example, Industrial AI can make significant improvements and enhance and augment (not replace) human capacities in the power and mobility sectors, and in industrial manufacturing, critical infrastructure and building automation. Within those areas, we see many applications where trustworthy industrial AI and data are the means – instruments or tools – to achieve the twin digital and green transition of society and industry, towards a more sustainable and truly circular economy.

To name but a few examples, AI applications in the industrial domain can cover a very broad variety of tasks with many grades of complexity and autonomy. These range from visualising existing data or recognising patterns or objects in data, to data-based predictions on future states/ events and even recommending actions to human operators. And indeed, AI can also autonomously control and operate an end-to-end decision process (e.g. collaborative robots, autonomous driving...). The areas where industrial AI can enable important innovations or support the twin digital & green transformation of industry and society are nearly infinite – often with direct benefits beyond the industry introducing them. Using

AI in transportation can also increase asset utilisation and thus reduce carbon emissions.

In our example, Siemens was approached by public transport providers in Germany with an innovation challenge to help make public transport safer and more convenient. The goal was to increase the attractiveness of taking the train, tram or metro vis-à-vis car rides – also supporting the de-congestion of city centres and increasing social equality by providing safe mobility for everyone.

AI can make public transport safer, more secure[1] and more convenient

How can this be achieved? By building AI into established solutions: a conventional closed-circuit television (CCTV) system on a train or tram can be equipped with AI-Edge technology and multi-sensor systems that can automatically pre-process and analyse visual sensor data (video analytics).

Several types of relevant live information can be extracted by processing CCTV video streams with AI. AI can direct passengers to vacant seats, wheelchair spaces or less crowded carriages when trains are arriving at the platform. And to increase security, AI can alert staff in the control room to events of aggression, as it detects aggressive movement patters – enabling faster human decisions to provide help.

1 We talk about safety and security as two distinct characteristics: While safety is dealing with unintended failure of the system, security is comprising the intended corruption of the system for example sabotage, intrusion etc.

| | Solution for wider challenges | | Type of innovation | | Part of an EU / national initiative | | Cross-sectoral innovation | | Trigger |

The application was developed in a step-by step approach, together with a network of internal and external technology experts in Computer Vision, AI and Train-IT hardware and software. Right from the onset, we involved experts for data privacy & data security from internal units and from our customers, given how important these aspects are for such applications.

For new applications we generally follow a four-step approach: We start with a technological innovation idea, followed by a technical feasibility assessment by experts in computer vision and AI. The next step is the prioritisation of use cases for product development. Once successful, we test the application in real operation. When we are satisfied, we present the added value of this innovation to potential customers.

We financed these developments mostly from the own R&D budget, partly co-financed through national and regional public funding programs.

A major challenge, especially in the development and implementation phase, was to find sufficient training and test data for these AI-based systems, also due to data protection rules. In the early stages, we worked around this constraint, by hiring actors to artificially create the data sets we needed.

As of now, a first train operator in Germany has decided to buy and use our AI-based aggression detection (iCCTV) for their new trains, whilst other operators are also showing interest.

Are Europe's policymakers ready for AI-based innovation?

The European Commission understands that legislation must be designed in a way that creates the best possible conditions for innovation to flourish, as underlined by its own Innovation Principle. But are EU policymakers ready to stick to this principle when it comes to AI? The answer to this question is not yet clear but will have considerable implications on our ability to innovate in this field and remain competitive.

AI is an emerging technology that will be part of our future. It offers huge innovation potential. It is also a truly global technology. We cannot call ourselves an innovation-friendly economy, if we stifle innovation in Europe's AI capabilities through overregulation and disproportionate administrative burden, losing sight of the very real benefits this technology can bring.

Looking at the AI Act as an example – what traps does the EU need to avoid in order to remain an agile innovator?

First, do not neglect evolution over time: review clauses are key, as they enable to re-assess the impact of legislation on innovation and competitiveness of EU industry and set a timetable for making necessary adjustments.

Second, do not lose sight of the purpose of rules: rules that are designed to protect consumers (for example their personal data and privacy) should not be blindly copy-pasted to a Business-to-Business (B2B) environment (where what matters are industrial / machine data).

Third, a legislation does more harm than good if it adopts a horizontal "one-size-fits-all" solution for a wide range of applications in very diverse industries. In our example, a blanket or horizontal ban on the use of AI to recognise aggression without even looking at the criticality of the application itself, would prohibit the use of such innovation on trains and trams in Europe – and probably all similar attempts to make public spaces safer.