

Brightsite

Transforming industry

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HSE Management in the Age of Artificial Intelligence

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Agenda



1. Introduction Brightsite
2. Challenges for the chemical industry
3. Towards the next era of HSE management
4. HSE management powered by AI
5. Examples
6. The way ahead

27-10-2020

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1. Introduction Brightsite

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Partners in Brightsite
Working together in living lab Chemelot

Partners

sitech
services

TNO innovation for life

Maastricht University

Brightlands
Knowledge crossing borders




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2. Challenges for the chemical industry

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Brightsite HSE Challenges in the chemical industry

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- › Inadequate management system performance
as incident investigations continue to identify
- › Current risk assessment methods rather static
as current approaches fail to capture variation of risks as deviations or changes in the process and plant take place
- › Emerging risks related to:
 - › New technology (chemical recycling, pyrolysis, gasification, plasma)
 - › Energy transition (electrolysis, solar, wind)
 - › Digitalization (complexity, opacity)
 - ›



Created by Eucalyp
from Noun Project

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3. Towards the next era of HSE management

- How to identify emerging ('unknown') hazards?
- How to deal with VUCA: volatility, uncertainty, complexity, ambiguity?
- How to deal with societal impact and acceptance?

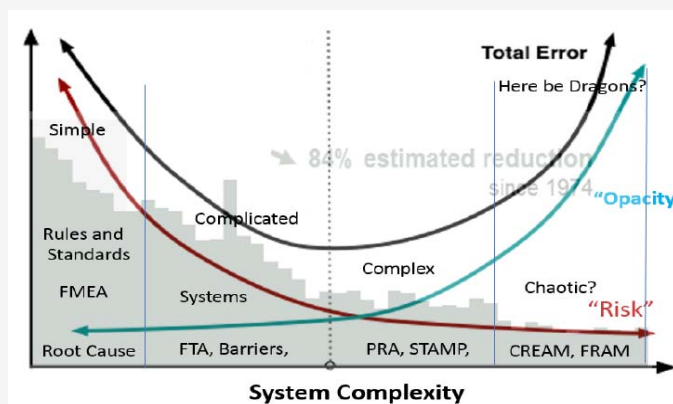
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Towards the next era of HSE management: complexity



[Source] Safety and Complexity, David Slater, July 2020
<https://www.researchgate.net/publication/342639150>

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- Enhanced risk assessment of complex systems
- How to identify emerging ('unknown') hazards?

To what extent are traditional process safety systems adequate for risk assessment of complex systems?

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4. HSE Management powered by AI

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Brightsite HSE management powered by AI

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“What is at stake as AI systems and machines are integrated into workplaces and have competences that allow decision making and prediction much faster and more accurately than humans?”

Dr Phoebe V. Moore, 2019. Prepared for European Agency for Safety and Health at Work (EU-OSHA)
“OSH and Future of Work: Benefits and Risks to Safety and Health related to AI applications and tools in workplaces.”

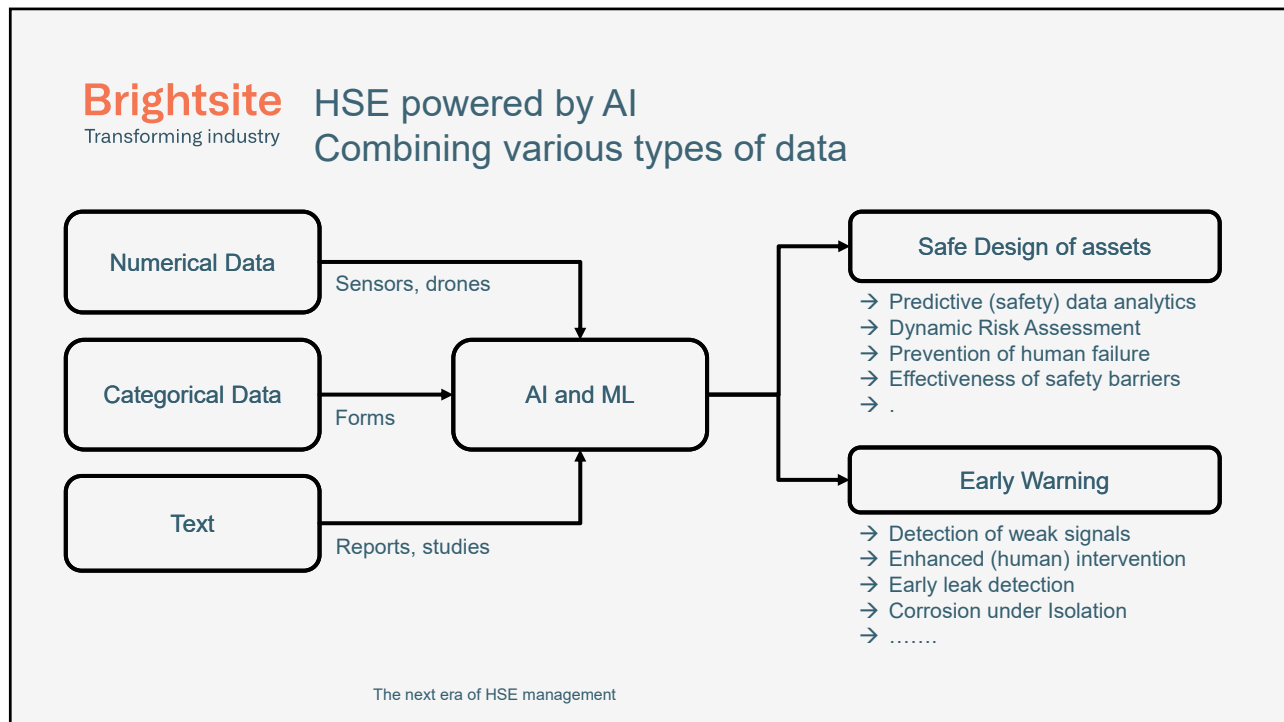
“Accidents do not occur in a chaotic fashion. Underlying patterns and trends do exist and can be captured.”

Sarkar et al. 2019.
“Application of optimized machine learning techniques for prediction of occupational accidents”.
Computers and Operations Research 106 (2019) 210–224



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5. Examples

- Data visualisation
- Text mining and Natural Language Processing (NLP):
 - Demonstrator: the TNO "Safety Stethoscope"
 - Sentiment analyses
 - Categorisation of incidents
- Incident prediction
- Advanced Learning from Incidents (LFI)

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Brightsite Data Visualisation

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Brightsite Data Visualisation – Text Mining and NLP

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Text Mining
and Natural
Language
Processing

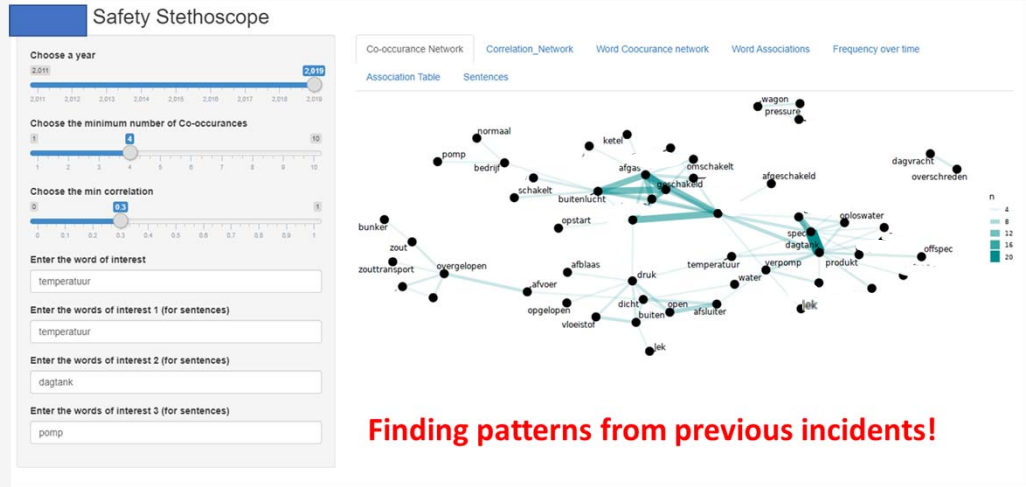
Gaining insights from unstructured data

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Brightsite Data visualisation – platform “Safety Stethoscope”

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Brightsite Data visualisation – sentiment analyses

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There is a **leakage** in the number x.
 Could lead to a **fire**.
 Machine x is **noisy**.
 Pump y does **not function** properly.
 The stairs are **broken**. Workers can **fall**.
 There is a **sharp** edge in the room. Can cause **injury**.

Prevention of incidents by immediate detection of warning reports!

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Brightsite Data visualisation – classification of incidents

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- Automatic categorization of incidents
- Based on the standard SHE incident classifications or categories
- Tailored to clients' requirements

Incident	Category
Incident report 1	Fall
Incident report 2	Fire
Incident report 3	Explosion
Incident report 4	Emission

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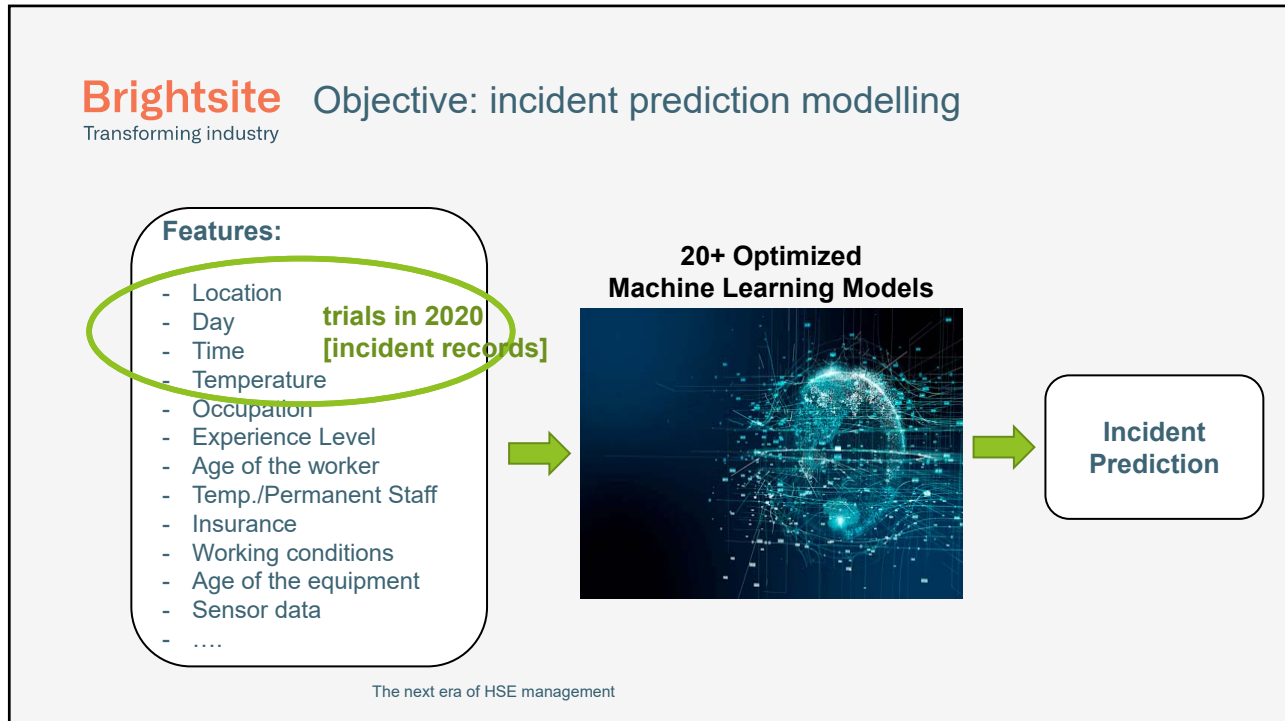
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6. The way ahead

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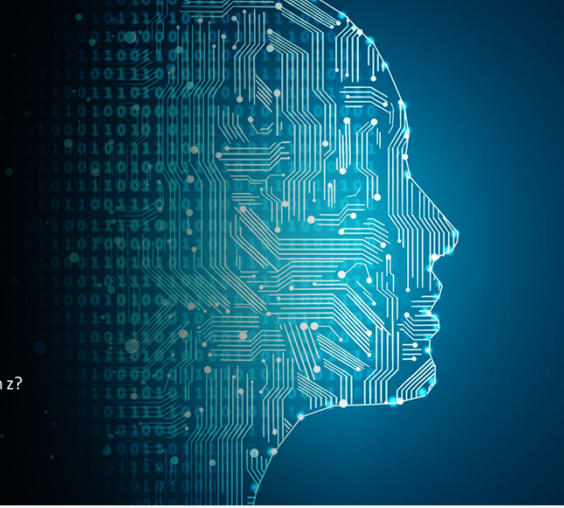


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Brightsite Transforming industry Our next product – what?

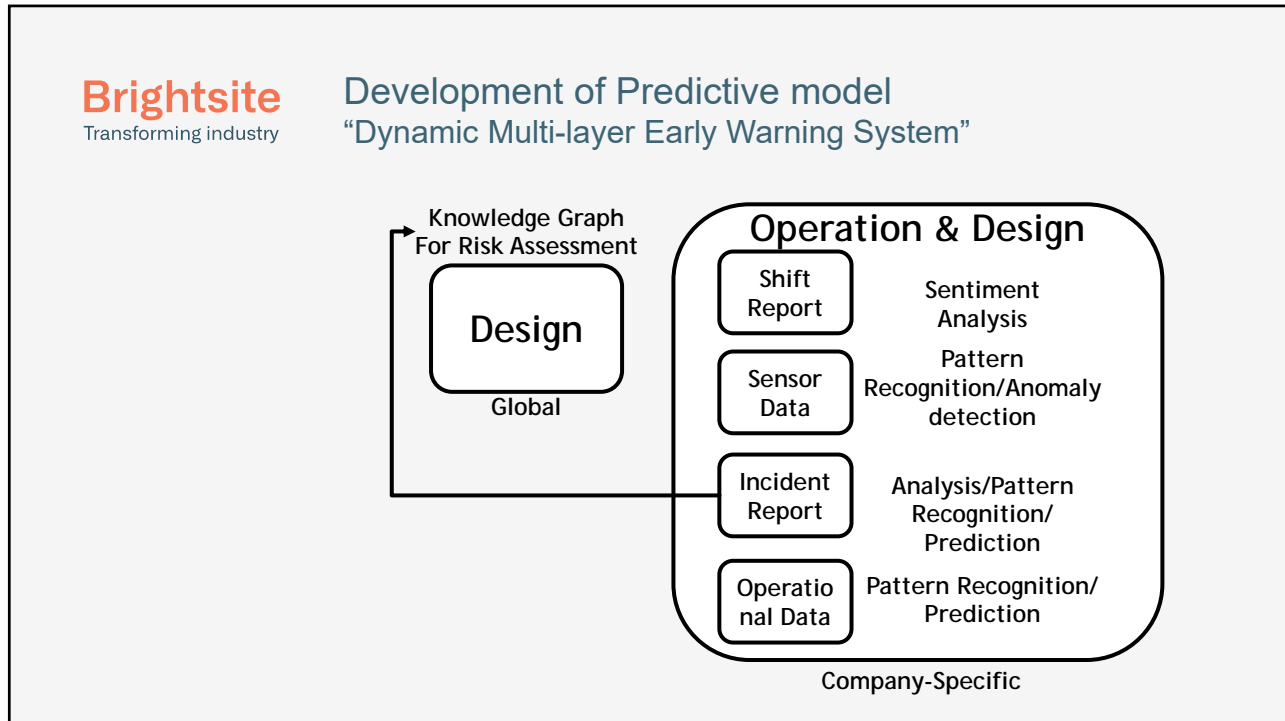
Our next product

- What are the risks associated with process x and material y in condition z?
- What are the risks related to new technologies?

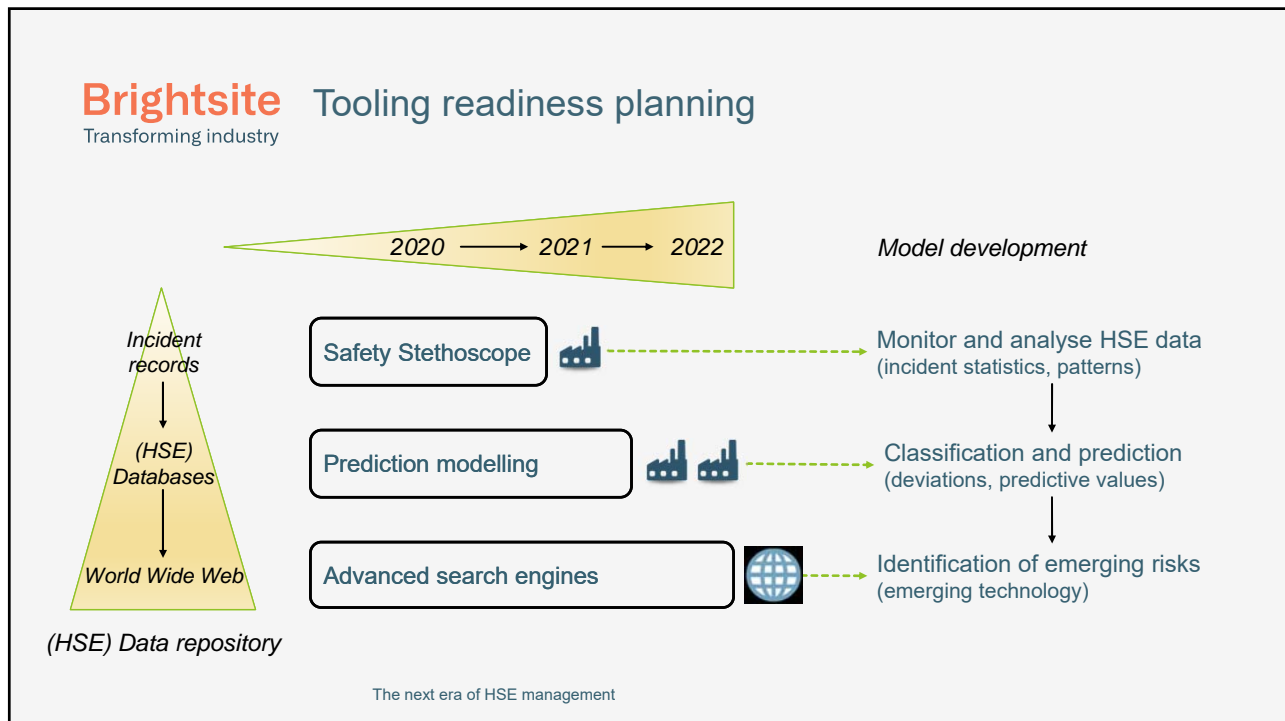


11-08-2020
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Brightsite Brightsite partners

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Model/techniques development, testing in commercial plants and demonstrating added value.

In Brightsite:

- Advanced AI/ML techniques in the complex operational environment of a chemical plant
- Added value results
 - Predicting safer operations
 - Providing options for pro active actions



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Brightsite Future partners

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Potential Brightsite partners:

- Chemical industry in NL
- Safety Delta Netherlands
- (Technical) Universities
- Chemical/Process Safety Associations (EU/World)
- you?



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Sitech Services

TNO

Maastricht University

Brightlands Chemelot Campus

www.brightsitecenter.com

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