

THE PERFECT STORM

How IoT, 5G and AI will transform automation

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The background of the image is a close-up, high-angle shot of several blue printed circuit boards (PCBs) densely packed with electronic components. These components include various integrated circuits, capacitors, and resistors. Several multi-colored wires (red, yellow, green, blue) are connected to the boards, some using ribbon connectors. A semi-transparent grey rectangular box is centered over the image, containing the main title in white, bold, sans-serif font. In the bottom right corner, there is additional text in white, including the full name of the technology and a company identifier.

NEW IoT TECHNOLOGIES ARE ACCELERATING DATA COLLECTION

IoT - Internet of Things

ethernetics®
NL T 102289
PENDING
828



ARTIFICIAL INTELLIGENCE ACCELERATE WITH MORE DATA

THE PERFECT STORM

A circular image showing a large white industrial structure, possibly a ship's hull or a large container, with a blue and white boat in the water below. The text 'IoT' is overlaid in white.

IoT

A circular image showing two firefighters in yellow gear and helmets working on a red and white aerial platform. They are surrounded by thick black smoke. The text '5G' is overlaid in white.

5G

A circular image showing a white humanoid robot with a blue logo on its chest. A person is sitting on a blue bench in the background. The text 'AI' is overlaid in white.

AI

Dangerous air quality throughout much of Norway



Luftkvaliteten er på rødt nivå

Tært vort, biltrafikk og vind gjer at luftforurensningen i Trondheim er høg nå. Enkelte grupper av befolkningen bør vere minst mulig ute.

Miljø

Luftkvaliteten i Trondheim er på rødt nivå. Det betyr at luftforurensningen er så høg at enkelte grupper av befolkningen bør vere minst mulig ute. Luftforurensningen er på rødt nivå i Trondheim, og enkelte grupper av befolkningen bør vere minst mulig ute. Luftforurensningen er på rødt nivå i Trondheim, og enkelte grupper av befolkningen bør vere minst mulig ute.



Høy luftforurensning av svevestøv i Lillehammer



the Oslo rush hour. Photo: Håkon Mosvold Larsen / SCANPIX

IoT PIPELINE FOR AIR QUALITY



**Air quality sensor
NB-IoT**



**LTE/4G
NB-IoT**



**«Horde»
integration**

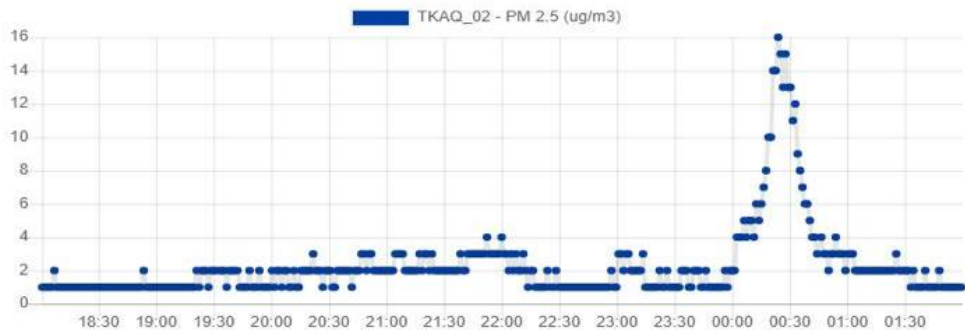


**Data and analytics
platform**

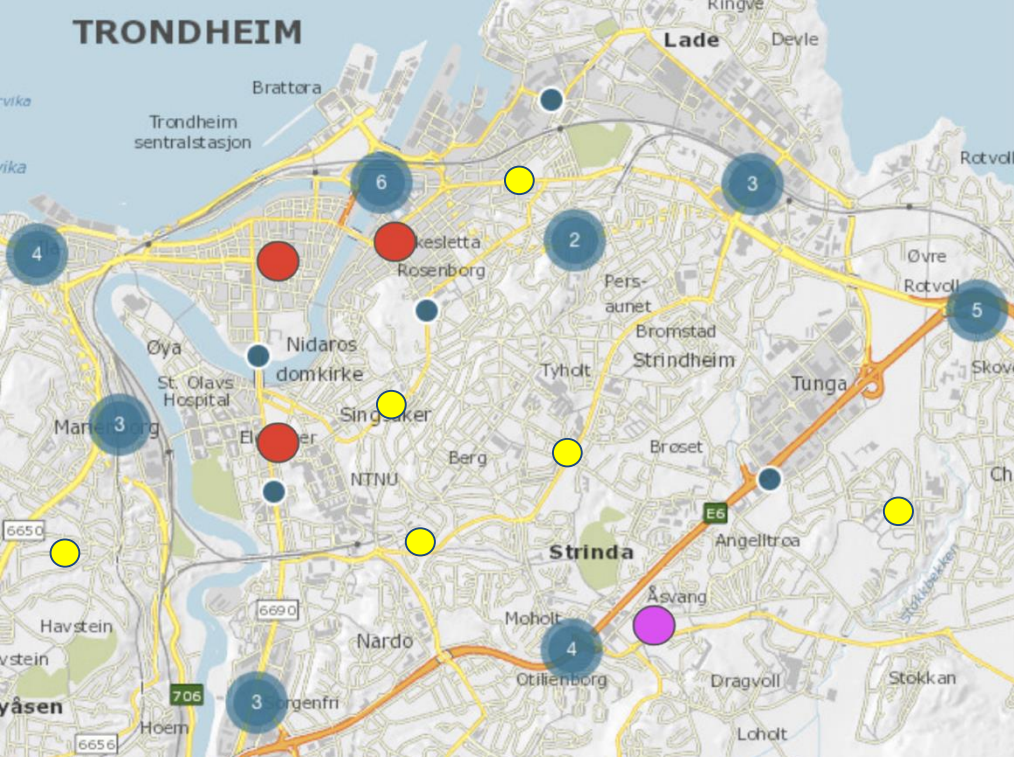


Application

PM 2.5 (ug/m3)



DELETE VISUALIZATION



Air quality measured at fixed locations



Weather data



Air quality measured by sensors (on cars)

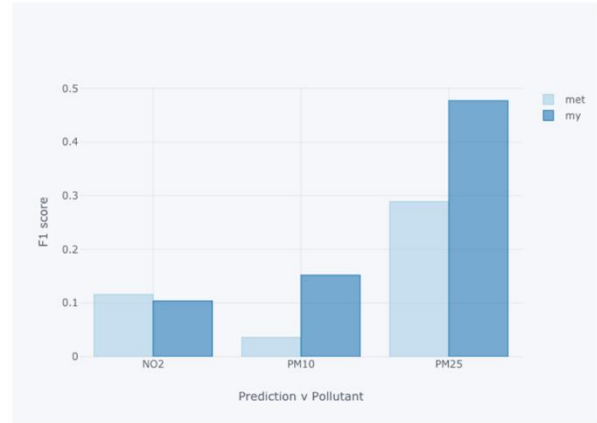


TRONDHEIM
KOMMUNE

Traffic data, fire ovens

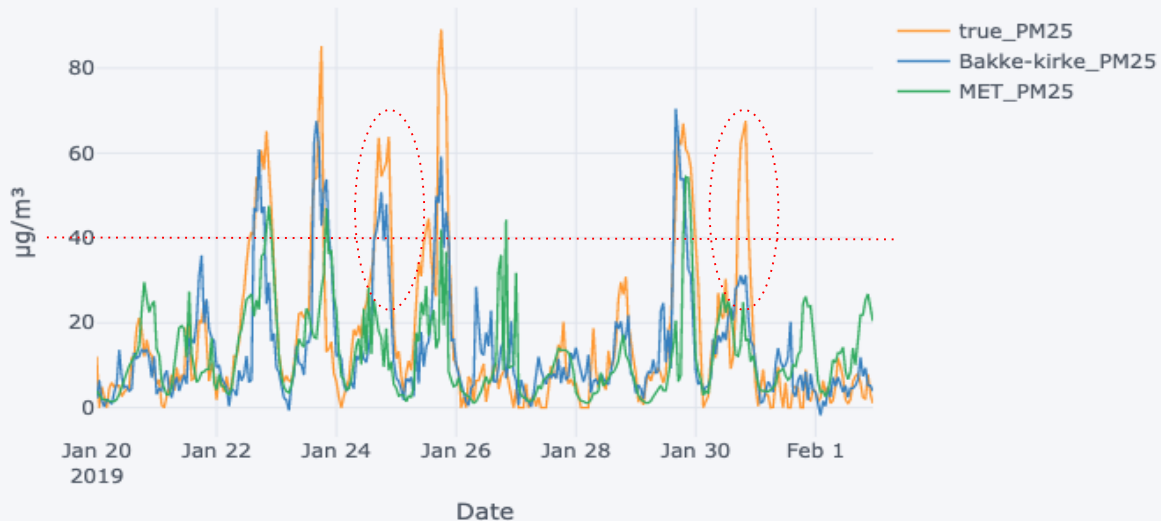
Deep models (RNNs with LSTM and GRU cells) perform best

Catch near-time trends more precisely and predict spikes of high pollution better than official models



(c) Results of anomaly prediction grouped by pollutant type.

PM25 at Bakke Kirke - 24 hours Predictions



Work done by Master student Andreas Jacobsen Lepperød



THE KEY PROBLEMS TO SOLVE FOR AI4IoT

1

Time series
prediction

2

Anomaly
detection

3

Data
reliability

4

Model
explainability



THANK YOU!