Applying the METRo model for road-condition forecasting in Norway

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AutonoWeather: Enabling autonomous driving in winter conditions through optimized road weather interpretation and forecast

Fig.1 In-situ estimates

Estimates the road conditions directly under the car

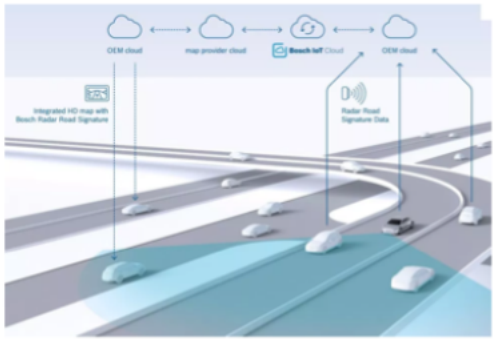


Fig.2 Next-mile predictions

Estimates the road conditions for the upcoming mile

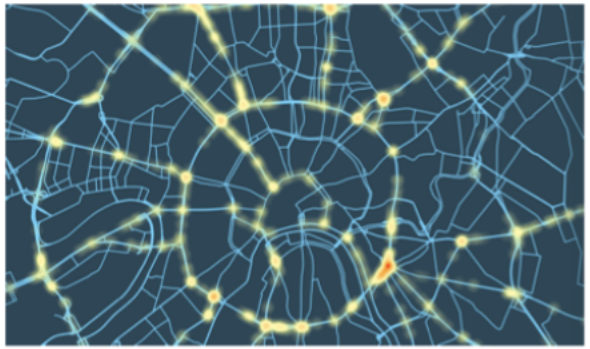


Fig.3 Global predictions

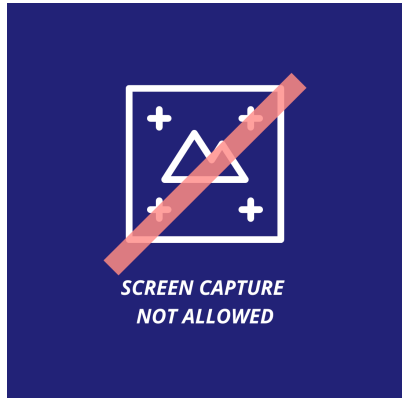
Cloud-based estimates allow for route planning optimisation

Focus: next-mile predictions

- A single car uses the forecast at its current location as proxy for the road ahead.
- A network of cars which share their forecasts could provide actual next-mile predictions.

Goal - develop a solution to forecast road conditions in Norway by applying the ***METRo model***

- Forecast the road condition for a given pair of latitude, longitude and time
- How: initialize METRo with data from the closest road weather station and post-processed weather forecast (MET Norway's FROST & THREDDS service)
- Status: develop algorithms to obtain the data from these services, process them to match the METRo model input requirements and send them to METRo's pre-processing algorithms, which combine observations and forecast data to initialize the model.
- What's next: compare short-term METRo forecasts with observations obtained by road weather stations and with observations retrieved by car-mounted environmental sensors (e.g., road surface temperature).



Road weather stations in Norway

- **395 road weather stations.** Precipitation, air temperature and wind speed are available at almost every station, but:
  - only 30 stations measure surface temperature
  - and only 12 stations measure subsurface temperature at 40 cm depth

- Missing surface temperatures are estimated as the 1-hour average of the 2-m air temperature.
- Missing subsurface temperatures are estimated as surface temperature – 2 K (Isaksen et al., 2000).