

From cars to km-scale forecasts: crowdsourcing temperature data

Summary

To improve short-term forecasts of localised weather such as thunderstorms or fog, detailed weather models and equally comprehensive real-time observations are required. Crowdsourced car air-temperature data can assist as a novel input to producing a more skilful prediction. This pilot study investigated the quality control of vehicle temperature data, compared these observations with forecast temperatures and showed them to be a promising opportunistic dataset.

Why?

The DARE project is pioneering the use of novel observations to complement the existing network of meteorological instruments. Many vehicles have temperature sensors whose measurements can be accessed via the on-board diagnostics. These existing data streams have the potential to be a low-cost source of temperature information which is frequent and spatially dense, especially in urban areas.

How?

For two months in 2018, 31 Met Office volunteers across the UK used a smartphone app which reported air temperature from their vehicles, amassing 70,000 readings. The DARE team developed careful quality control to address a range of issues including GPS location and lack of sensor ventilation. Their comparison of the quality-checked vehicle observations with the modelled weather forecast temperatures was significantly impacted by sunshine and rain.

What now?

Including vehicle-based observations in weather models is in its infancy but this work shows this opportunistic dataset could be a useful additional input for fine-scale weather forecasting models of localised weather. The UK Met Office plan to use the protocols and recommendations from this DARE work to realise their future wider use.

References

Bell, Z.; Dance, S. L.; Waller, J. A.; O'Boyle, K. (2021) Quality-control of vehicle-based temperature observations and future recommendations, Forecasting Research Technical Report No. 644, Met Office, Exeter.
https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/weather-science/frtr_644_2021p.pdf

Zackary Bell, Sarah L. Dance and Joanne A. Waller. Exploring the characteristics of a vehicle-based temperature dataset for convection-permitting numerical weather prediction. [arXiv:2105.12526v1](https://arxiv.org/abs/2105.12526v1)



Picture: Pixabay

The DARE project aims to produce a step-change in the skill of forecasts of urban natural hazards by combining novel observations with data from state-of-the-art computer models.

Our work investigates the best way to include observations in the forecasting process.

This is one of a series of accessible summaries translating DARE projects to a wider audience, enabling the take-up and real-world application of the UK's world-leading research. See more at <https://research.reading.ac.uk/dare/whywhatnow/>



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Further information

On using unconventional weather observations [see Zak's blog](#) and for more on crowdsourcing for other applications [see this blog](#).

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