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Improving precipitation nowcasting using deep generative models: a case-study and experiences in R2O

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Precipitation nowcasting is essential for weather-dependent decision-making. The combination of radar data and deep learning methods has opened new avenues for research. Deep learning approaches have demonstrated equal or better performance than optical flow methods for low-intensity precipitation, but nowcasting high-intensity events remains a challenge. We use radar data from the Royal Netherlands Meteorological Institute (KNMI) and explore various extensions of deep learning architectures (i.e. loss function, additional inputs) to improve nowcasting of heavy precipitation intensities. Our model outperforms other state-of-the-art models and benchmarks and is skilful at nowcasting precipitation for high rainfall intensities, up to 60-min lead time.

Transferring research to operations is difficult for many meteorological institutes, particularly for new applications that use AI/ML methods. We discuss some of these challenges that KNMI is facing in this domain.