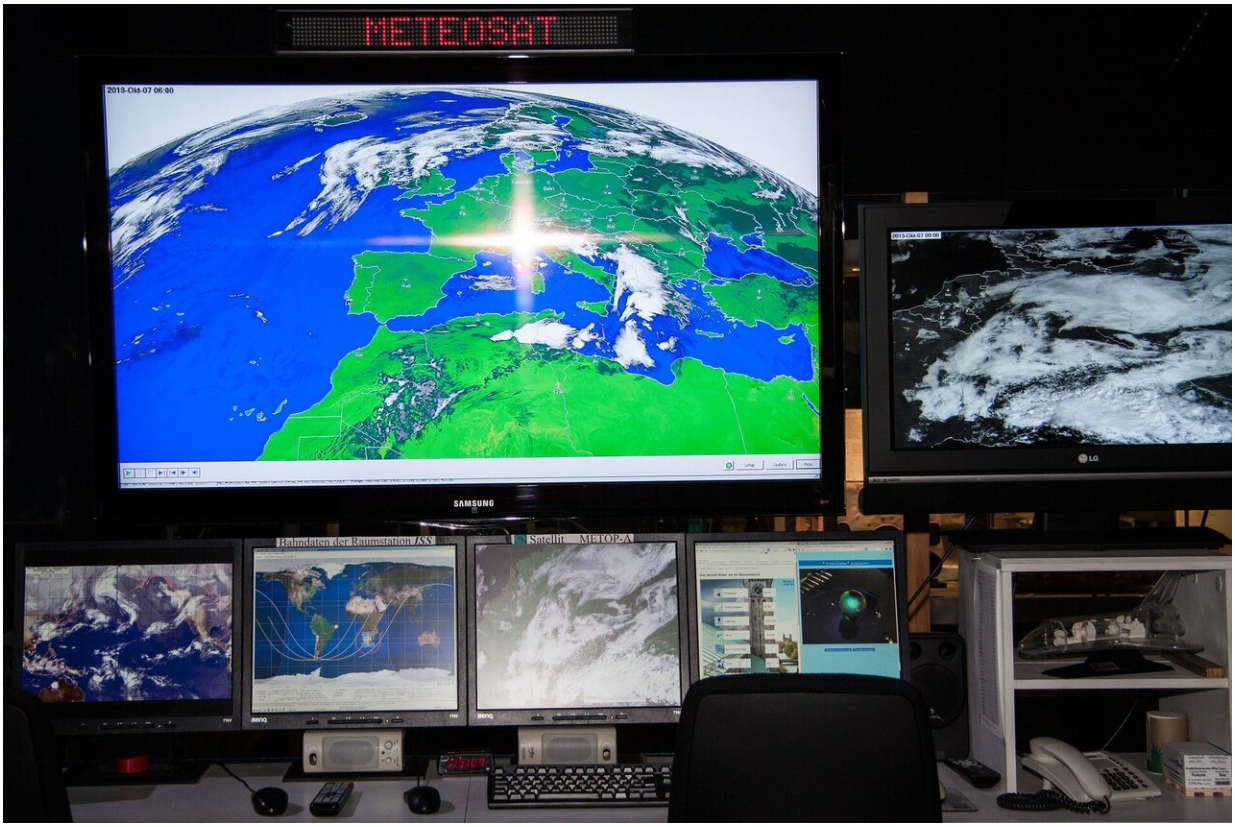
Google claims its 'nowcast' short-term weather predictions are more accurate than advanced models

January 15 2020, by Bob Yirka



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A team of researchers working at Google's Mountain View research center has developed a deep-learning-based weather forecasting tool for

predicting short-term weather events. They have written a paper describing their "nowcasting tool," and have uploaded it to the arXiv preprint server. They have also published a news piece describing their work on the Google AI Blog.

Despite centuries of effort, predicting the weather is still an inexact science. The current approach involves collecting data from a variety of sources and analyzing it with supercomputers that take hours to deliver predictions. While modern weather predictions are far more accurate than those in the past, they still leave a lot to be desired—especially locally and in the short term. In this new effort, the team at Google has taken a different approach to short-term forecasting—instead of using physics, they use recent radar maps to make educated guesses about the near future.

Google's new tool makes use of machine learning—a convolutional neural network (CNN) is trained to recognize weather patterns and then makes predictions based on current weather conditions. The resulting tool provides what Google describes as "precipitation nowcasting"—locally based, nearly instantaneous, short-term weather predictions.

The type of CNN Google used is called a U-Net—a system that works by sorting data into layers that are arranged by encoding phase to increase processing speed—iteration is used to decrease image resolution and then decoding is used to restore the images back to their original resolution. The system analyzes radar data from the past N hours to predict weather events in the coming N hours—where N ranges between zero and six hours. The entire process takes just a few minutes. The system is able to return answers more quickly than conventional forecasting systems because it ignores the physics involved—instead, it relies on image processing.

The researchers tested their tool by comparing it with three widely used forecasting models. They claim their forecasts were more accurate in the short term than all three models, but were less accurate in the long term.

More information: Machine Learning for Precipitation Nowcasting from Radar Images, arXiv:1912.12132 [cs.CV]
arxiv.org/abs/1912.12132