

# Best of Last Week—human evolutionary dead ends, AI forecasts weather in seconds, faces that are more real than real

November 20 2023, by Bob Yirka

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Model schematic.(A) The input weather state(s) are defined on a  $0.25^\circ$  latitude-longitude grid comprising a total of  $721 \times 1440 = 1,038,240$  points. Yellow layers in the closeup pop-out window represent the 5 surface variables, and blue layers represent the 6 atmospheric variables that are repeated at 37 pressure levels ( $5 + 6 \times 37 = 227$  variables per point in total), resulting in a state representation of 235,680,480 values. (B) GraphCast predicts the next state of the weather on the grid. (C) A forecast is made by iteratively applying GraphCast to each previous predicted state, to produce a sequence of states

which represent the weather at successive lead times. (D) The Encoder component of the GraphCast architecture maps local regions of the input (green boxes) into nodes of the multi-mesh graph representation (green, upward arrows which terminate in the green-blue node). (E) The Processor component updates each multi-mesh node using learned message-passing (heavy blue arrows that terminate at a node). (F) The Decoder component maps the processed multi-mesh features (purple nodes) back onto the grid representation (red, downward arrows which terminate at a red box). (G) The multi-mesh is derived from icosahedral meshes of increasing resolution, from the base mesh (M0, 12 nodes) to the finest resolution (M6, 40,962 nodes), which has uniform resolution across the globe. It contains the set of nodes from M6 and all the edges from M0 to M6. The learned message-passing over the different meshes' edges happens simultaneously, so that each node is updated by all of its incoming edges. Credit: *Science* (2023). DOI: 10.1126/science.adi2336

It was a good week for human behavior research as a team of evolutionary anthropologists led by a group at Cambridge University found evidence that suggests young children may be psychologically wired to flourish with [high levels of "sensitive care"](#) and personal attention, based on studies of hunter-gatherer societies. Also, a team of Earth scientists and economists at Stockholm University's Stockholm Resilience Centre created [a map of 14 potential evolutionary dead ends for humanity](#), including global warming, disease and pollution, and suggested ways to avoid them. And a team of forensic scientists at Cranfield University's Recovery and Identification of Conflict Casualties team working with colleagues from the U.S. Defense Prisoner of War/Missing in Action Accounting Agency, [located the remains of a World War II bomber pilot](#) eight decades after he was shot down.

In technology news, a combined team from Carnegie Mellon University and Google DeepMind developed [RoboTool](#), an AI system that allows robots to use tools in new ways by leveraging large language models.

And a team of electric engineers at EPFL's School of Engineering, developed [the first 2D semiconductor with 1,000 transistors](#)—they claim it redefines energy efficiency in data processing. Also, a team at Google's DeepMind project developed an AI-based tool that makes [10-day weather forecasts in just 60 seconds](#). They assert it is more accurate than current systems. And a team of engineers at Nanjing University developed and built integrated circuits based on [2D semiconductors operating at GHz frequencies](#).

In other news, a team of medical researchers at the University of Montreal discovered an antibody that [stimulates the immune system into eliminating cancer cells](#) by promoting phagocytosis. And a team with members from France, Ireland and Australia found evidence that plants might be able to [absorb more CO<sub>2</sub> from human activities](#) than previously thought. And finally, a small international team of psychologists conducted a study showing that AI applications are now capable of [creating images of human faces](#) that look more real than actual pictures of people.

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