GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION NO. 2145
TO BE ANSWERED ON WEDNESDAY, 12TH MARCH, 2025

AI USE FOR WEATHER FORECAST

2145. SHRI RAJA A:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether artificial intelligence and machine learning research is being used in the field of meteorological research in the country to improve weather forecasting;
(b) the details of programmes undertaken by the Government in collaboration of artificial intelligence during the last three years;
(c) the achievements and outcomes of artificial intelligence and machine learning research and development in terms of enhancing the understanding and prediction of weather; and
(d) the details of steps taken by the Government to accelerate the pace of artificial intelligence and machine learning research for giving precise data on the predictions on cities and towns specific?

ANSWER
THE MINISTER OF STATE (INDEPENDENT CHARGE) FOR
MINISTRY OF SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. JITENDRA SINGH)

(a) Yes.

(b) The Ministry of Earth Sciences (MoES) explores integrating Artificial Intelligence (AI) technologies into weather forecasting systems in addition to physics-based numerical models. This initiative is part of a broader strategy to enhance the accuracy and efficiency of meteorological predictions, which are crucial for various sectors, including agriculture, disaster management, and urban planning. The key initiatives, future plans, and innovative projects are as follows:

Collaborative Research Across Institutes: Institutions under the MoES are actively working to incorporate AI/Machine Learning (ML) methodologies into their research activities and operational frameworks. This collaborative approach ensures a comprehensive application of AI technologies across Earth Sciences.

(c) Achievements and outcomes of AI and ML in the research and development of weather prediction are provided below:

- Improved the short-range precipitation forecast in 1-day, 2-day, and 3-day lead times with a reduction in bias.

- Developed high-resolution (300 meters) urban gridded meteorological datasets for temperature and precipitation.
- Developed the time-varying Normalized Difference Urbanization Index with a spatial resolution of 30 meters from 1992-2023.
- Developed very high-resolution precipitation datasets for verification purposes.
- To monitor and predict Tropical Cyclone Heat Potential (TCHP) using AI/ML methodologies.
- The AI/ML is used to correct the bias of the NWP model products.

(d) The Ministry has established a dedicated virtual center on AI/ML/Deep Learning (DL) at the Indian Institute of Tropical Meteorology (IITM) in Pune. This center focuses on leveraging AI, ML, and DL techniques for advancements in Earth Sciences. It has already developed several AI/ML-based applications tailored for localized predictions and the analysis of weather and climate patterns.

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