

IIT-H develops low power chip for AI-enabled devices



HYDERABAD: With the advent of artificial intelligence devices in day to day life, researchers at the Indian Institute of Technology, Hyderabad (IIT-H) have developed low power chips that can perform high level computation with constraint power consumption.

Currently, many modern systems using speech and face recognition transmits large computational data which requires a lot of power. To cater the growing demand in processing and storing big data arising, the need for high performance computing data centers is rapidly growing.

Using nanomagnets, the IIT-H have developed Magnetic quantum-dot cellular automata based low power chip that can perform computation on the AI devices with limited power supply. The chip is energy efficient and consumes ultra-low power.

"In the present silicon system, the data is first transmitted to the cloud for processing and then the final outcome is delivered on the device. Such heavy computation is power-hungry. We envisioned of developing a chip which does the computation by itself in limited power resources," said Santhosh Sivasubramani, research scholar, Advanced Embedded Systems and IC Design Laboratory, department of electrical engineering, IIT-H.

The researchers have used AI computing on edge with approximate nanomagnetic logic. "Approximate nanomagnetic computing means that the application can compromise on accuracy a little bit but with less power consumption. Even if the final results are not 100 per cent, the computing has to be power efficient," added Sivasubramani.

The low power chip developed by IIT-H researchers can be used in autonomous driving vehicles, drones used in agricultural fields, sensory data, remote surveillance, human monitoring, ECG where data generation is very high.

"Our work targets devices, where there is a significant investment in the research towards making it low power without compromising on accuracy too much. Performing AI computing on edge with approximate nanomagnetic logic deployed on the magnetic ICs is an attempt towards the futuristic computations," said Amit Acharyya, associate professor, department of electrical engineering, IIT-H.

The research has been published in peer-reviewed journal by Nanotechnology (Prestigious journal of Institute of Physics).

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