

Make radar smarter

Real-time gesture recognition with radar sensor using graph-based AI



RaGNNaR

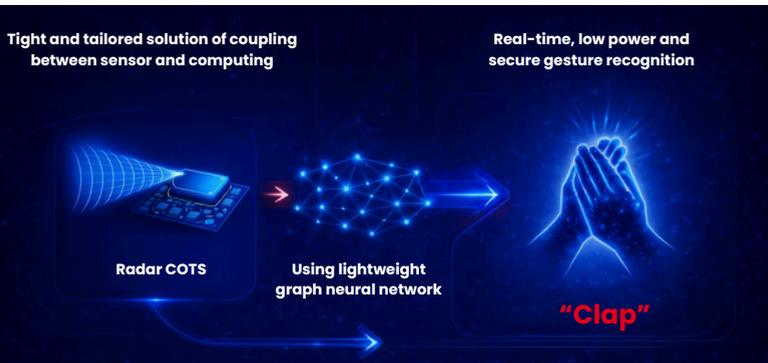
- Real-time
- Low power
- Data privacy
- Secure

Overview

Graph Neural Networks (GNNs) are a powerful emerging AI model designed to process data structured like graphs. They excel at identifying complex patterns and relationships within data, making them ideal for handling the irregular data produced by **sparse sensors** like radar, LiDAR, and event cameras.

Our **RaGNNaR demo** demonstrates how GNNs effectively process radar data for gesture recognition using standard off-the-shelf sensors. By leveraging unique data features like Doppler and intensity, GNNs perform classification tasks with remarkable efficiency and minimal computational effort.

CEA offers complete expertise in integrating GNN solutions. We provide tailored approaches from near-sensor processing to edge devices, addressing the specific challenges of sparse sensor data.



Benefits

- ✓ **Key-enabler** to integrate near-sensor computing
 - **Reduced bandwidth** (local processing)
 - **Real-time processing** (fast feedback control)
 - **Enhanced security** (raw data contained within the sensor)
- ✓ **Frugal solutions**: low computing, power and memory footprint
- ✓ **Low cost**

Key metrics vs others

Solutions/Metrics	Flops (M)	#Params (K)	Memory (MB)	Accuracy (%)
RaGNNaR	16	100	2,3	97,4
CNN-based	5000 x312	207 x2	33,5 x14	93,3 -4,1
Transformer-based	137 x9	100	3 x1,3	92,5 x4,9

Applications

Mobility



Industrial & Defense



Smart Home

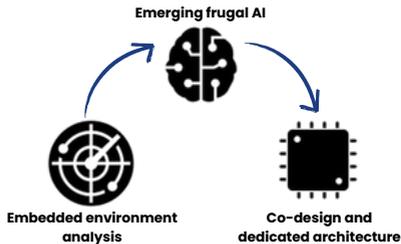


Healthcare



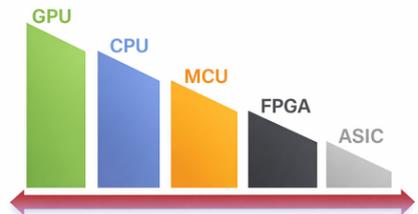
End-to-end offer

Proven expertise in coupling data, algo and HW:



Success story:
Dedicated chip embedding optimized GNN for event camera

Customized integration matching to customer needs:



Multi-sensor solutions:
Heterogeneous sensors: LiDAR, Camera, Radar and much more

For more information:
Magaly Gouttebroze
Partnership Manager
magaly.gouttebroze@cea.fr

