

# Edge AI (Artificial Intelligence)

By Tata Elxsi | Category: Implemented Innovations

In order to unleash the true potential of Artificial Intelligence (AI) on small devices, there is a growing need for embedded devices to carry out the complex computations involved in AI based algorithms. Tata Elxsi has made this possible by creating a solution that can successfully run AI algorithms like neural networks on a conventional chip. Edge AI solution bridges the gap between AI algorithms and embedded devices by facilitating the execution of AI algorithms on low memory and low processing power embedded devices.



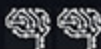
## The Context



There was a growing gap between AI capabilities and practical implementation. With advances in the field of AI defying Moore's law, a solution to accommodate high computations on smaller form factor devices became paramount.



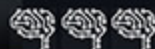
AI algorithms performed well with astonishing results on high-end devices but, seldom on low cost devices. Thus the idea of combining AI and embedded devices was conceived.



## The Innovation

AI algorithms give us results that were once imaginary with human-like traits in machines. This is achieved with the help of millions of computations running on powerful machines at the back-end. This solution implements a noble way of converting a Deep Neural Network (DNN) model into a light weight C implementable format compatible to port on embedded devices which have constrained resources. Tata Elxsi's Edge AI solution converts offline, pre-trained AI algorithms to binaries that run on embedded devices. This helps data to be processed from sources like sensors, vision and sound, logs and reports and analyses them to generate real-time insights. Tata Elxsi's Edge AI solution translates AI algorithms to platform independent executables, which can be directly ported on embedded devices, which have much lower memory and computing capabilities as compared to Graphical Processing Units (GPU's) or high end cloud servers.

**ADVANTAGES:** Real time decision making on the edge | Doesn't need Internet connectivity | Low cost devices | Low latency | Local decision making | Secure as data is not stored or transmitted to the cloud



## Overcoming Challenges

### Challenge #1

Fitting the algorithm into memory (RAM, ROM), achieving the desired performance and computation time (ms) and accommodating version changes in framework and periodic evolution of new architectures.

### Challenge #2

Memory optimization was achieved by identifying commonalities, redundant nodes and strategically deciding optimization techniques. Past experience in compiler designs helped in designing flexible and generic architectures to accommodate changes in the technology and accelerating code generation on the fly.

## Impact of the Innovation

Increase in revenue

# \$80,000

This solution has been converted into a product and made available commercially driving the smart factory initiatives undertaken by a leading Japanese Semiconductor major.