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Information & Communications Technology
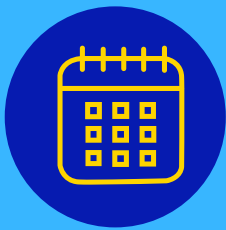Special Interest Group (ICTSIG),IEM

Webinar Talk on "Modelling Brain-Inspired Learning"

The Historical Development of Neural Networks into Deep Learning Models

BEM Approved CPD Hours : 2.0 Applying Ref No. : IEM25/HQ/268/T (w)

TALK DETAILS

Speaker

Date
22nd July 2025,
(Tuesday)

Time
3.00pm - 5.00pm

Venue
Virtual -
Zoom Platform

Prof. Dr. Raveendran Paramesran

IEM STUDENTS: FOC
IEM MEMBERS: RM15
NON IEM MEMBERS: RM70

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Synopsis

This talk traces how early ambitions to use artificial neurons modelled after biological neurons evolved into today's powerful deep learning systems. The developments throughout this journey offer insights into both the scientific motivations and technological innovations that continue to drive AI forward.

This historical journey traces the key milestones in the development of brain-inspired artificial intelligence, beginning with the foundational work of McCulloch and Pitts in 1943. Their binary neuron model proposed a computational framework that laid the groundwork for neural networks. This evolved into the perceptron model, which, despite its limitations, marked an early step toward machine learning.

The architecture later advanced into fully connected networks, where each neuron in one layer connects to every neuron in the next, mimicking biological signal transmission. For decades, a major challenge was determining optimal connection weights to enable learning. This was overcome in 1986 by Rumelhart et al., who introduced the backpropagation algorithm, allowing networks to learn from data through gradient-based optimization.

A significant leap occurred in the 1990s when Yann LeCun applied backpropagation to develop Convolutional Neural Networks (CNNs), demonstrating their real-world utility in digit recognition for postal code automation. In 2012, Geoffrey Hinton's team introduced AlexNet, a deep CNN that dramatically outperformed rivals in the ImageNet challenge, propelling deep learning into the AI mainstream.

Speaker's Biodata

He is currently an Honorary Professor in the Department of Electrical Engineering, Universiti Malaya. He served as a Professor at the School of Information Technology, Monash University Malaysia, from 2023 to 2025. He obtained both his Bachelor's and Master's degrees in Electrical Engineering from South Dakota State University, USA, in 1984 and 1985, respectively. Following this, he worked briefly as a System Designer at Daktronics, South Dakota, before joining Universiti Malaya as a lecturer in 1986.

In 1992, he received a Ph.D. fellowship from Japan and was awarded the Doctor of Engineering degree in 1994 from the University of Tokushima for his research in image processing and neural networks. He was promoted to Professor in 2003 and achieved the highest academic grade in 2014. Upon his retirement in 2018, he was appointed as an Honorary Professor at UM.

His research and teaching interests include image and video analysis, EEG signal processing, machine learning algorithms, and soft computing. He has published extensively in top-tier journals, presented at prestigious international conferences, and collaborated globally to advance research frontiers.