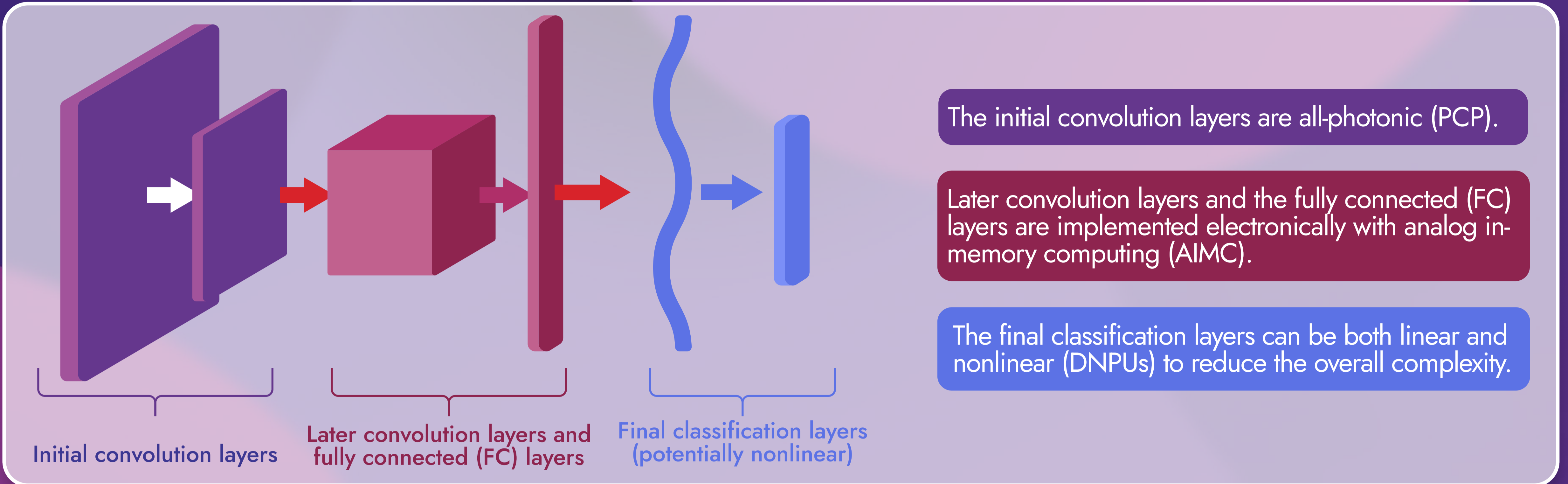


Electronic-photonic Architectures for Brain-inspired Computing

Learn more about the project!



To realise a photonic convolution processor (PCP) for ultralow-latency feature extraction.

To interface the PCP with AIMC

To interface the PCP and AIMC with DNPUs for nonlinear classification.

To demonstrate ultra-low latency AI edge inference applications based on a hybrid electronic-photonic brain-inspired architecture.

Photonic Convolution Processor (PCP):

R. Xu, et al. Nano Letters (expected publication 2024)

Our innovative silicon ion implantation solution precisely trims and tunes mode conversion in MDM directional couplers, unlocking the full potential of photonic convolutional processors' performance.

Linear Classifier:

J. Büchel et al., IEEE Journal on Emerging and Selected Topics in Circuits and Systems 13, 1052 (2023)

M. Le Gallo et al., APL Mach. Learn. 1, 041102 (2023)

D. J. Kösters et al., APL Mach. Learn. 1, 016101 (2023)

Nonlinear Classifier:

M. Zolfagharinejad, et al., Eur. Phys. J. B 97, 70 (2024)

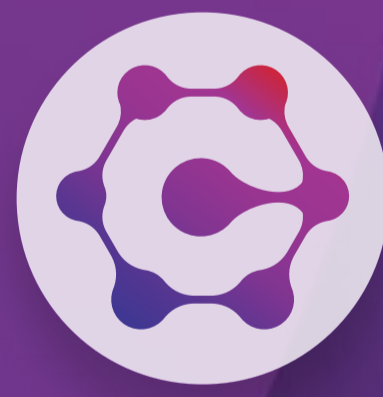
H. Jaeger, et al., Nat. Commun. 14, 4911 (2023)

S. Kinge, et al., European patent application EP23198378

System integration for low-latency inference:

W. Zhou et al., Nat. Commun. 14, 2887 (2023)

Key Exploitable Results



Analog Hardware Acceleration Kit for enhancing AI experiments and drive AI advances.



Specialised surrogate models, in the form of a software framework - brainspy package - for implementing deep-learning neural networks and studying dopant-network processing units.



Python package for designing photonic integrated circuits on semiconductor development processes.



Method for automatic speech recognition.

Project coordinator

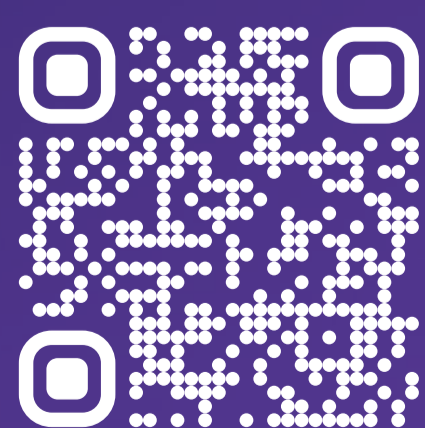
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