DEEPHEALTH

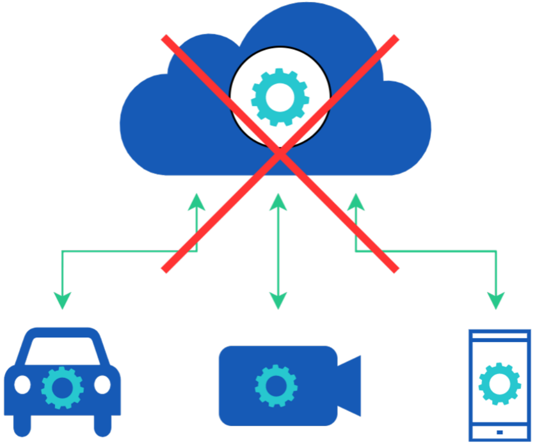
Efficiencing deep learning with pruning

Reconfigurable Architectures support in EDDL

January 27 2022

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 825111.

Neural networks on embedded devices



Inferences are performed locally.

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Advantages

Connectivity

Low latency

Privacy

Costs

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Problems

Battery

Computing power

Storage

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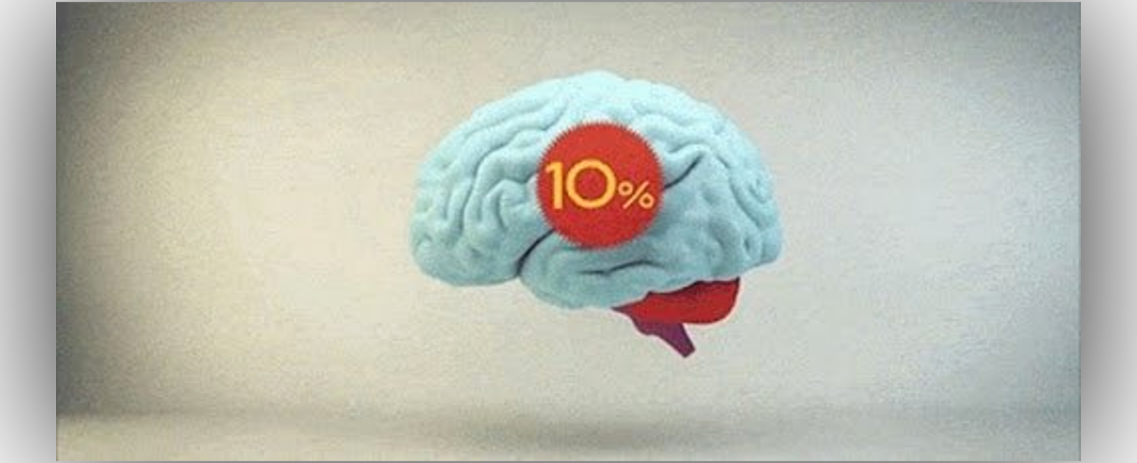

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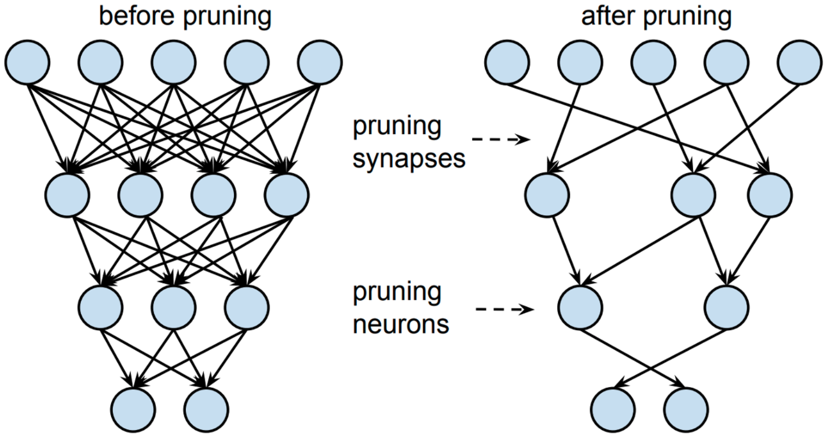
Neural network pruning



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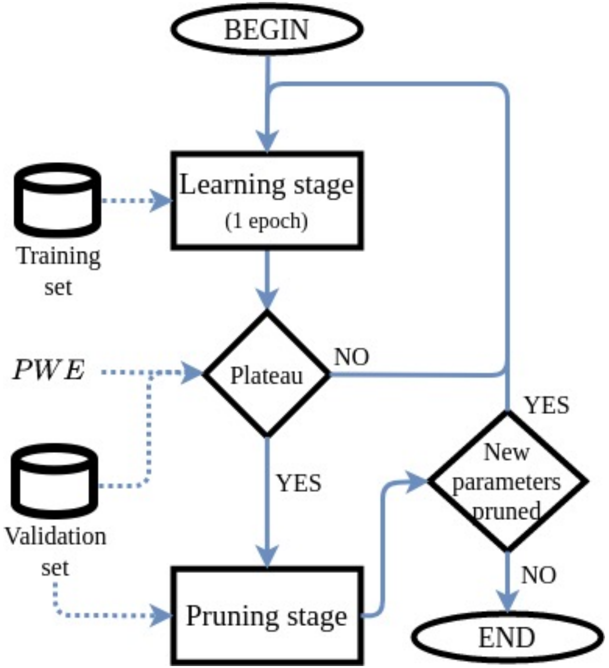
Iterative pruning strategy



PWE= **patience on the epochs before pruning**

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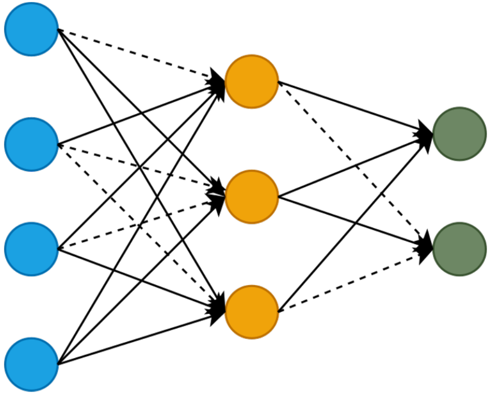
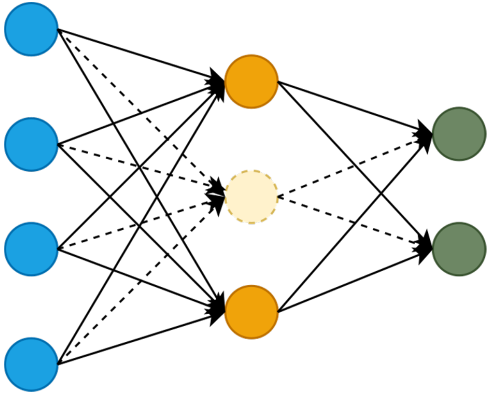
Unstructured vs structured pruning





Unstructured

Removes many parameters from the network.

Can highly reduce the compressed model size.

Structured

Removes entire neurons in the network.

Reduces the number of operations.

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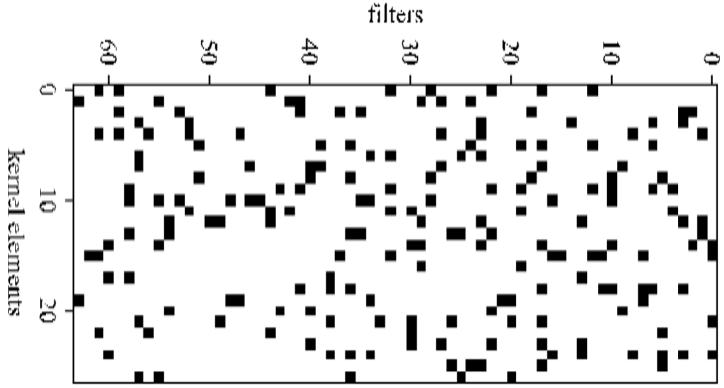
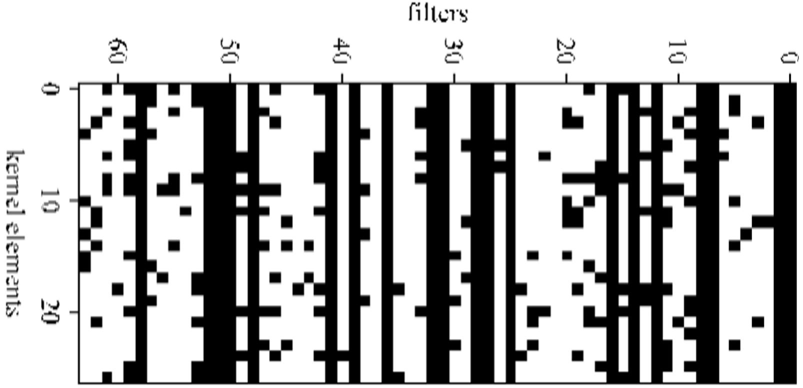
Unstructured vs structured pruning



UNSTRUCTURED sparsity



STRUCTURED sparsity

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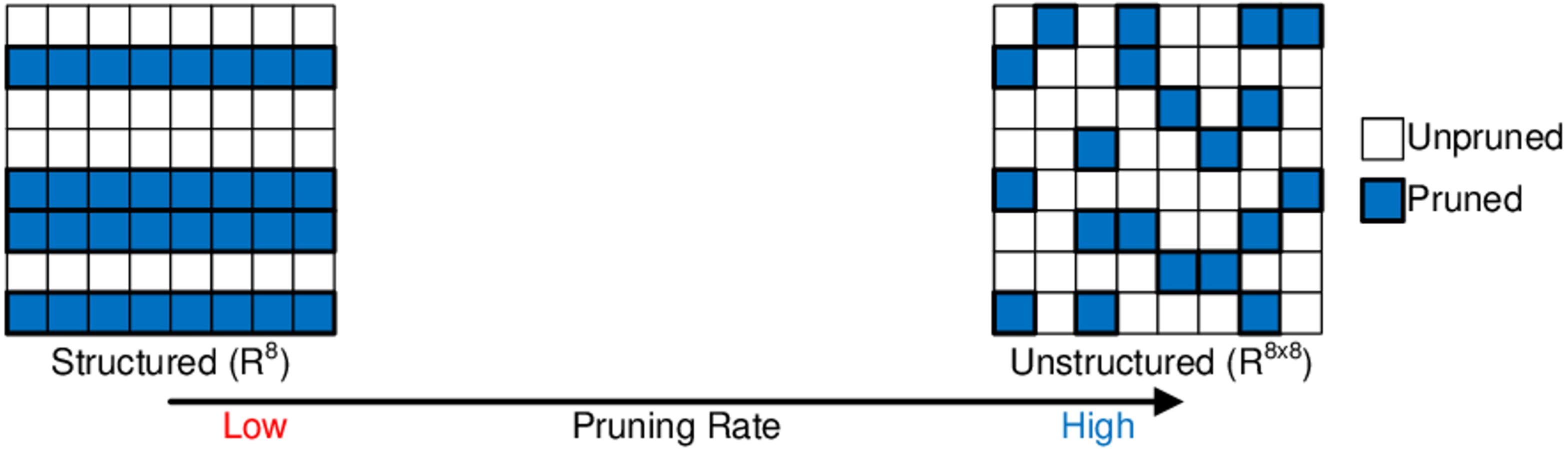
Unstructured vs structured pruning



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Pruning alone is not enough!

- Need for a real removal of the neurons/channels
- SIMPLIFY, available at https://github.com/EIDOSlab/simplify, does that!
- Paper with description in detail available at https://reader.elsevier.com/reader/sd/pii/S2352711021001576?token=8C19E9E2A04C913B545980F7567737F387925763A5A15B994AA9E2BC3D0A67D3B301B42C4791FC7F0113B420874CCF63&originRegion=eu-west-1&originCreation=20220120212108

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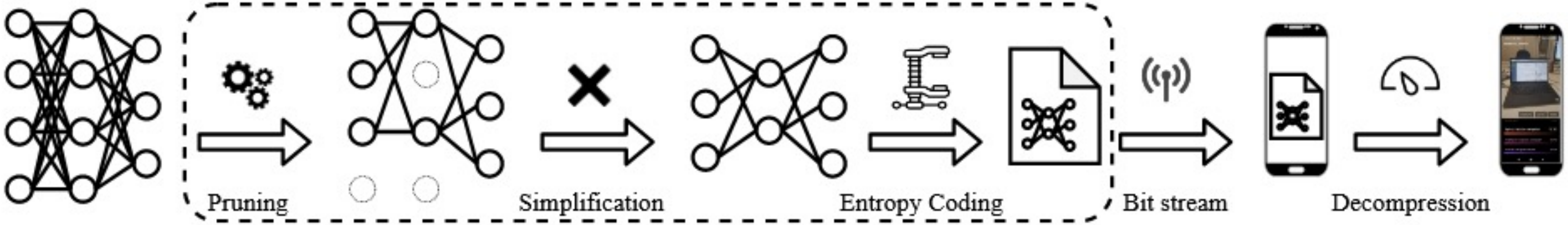
The pruning pipeline for compression



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