

## LOAD MONITORING

**Neural net guesses appliances***Energies* **11**, 2460 (2018)

Analysing aggregate load data to arrive at patterns of appliance use will be important as homes and devices become smarter and interactive management of load becomes more commonplace. Device-use patterns also allow improvement in the load-prediction methodologies crucial for management of demand and supply in a grid. To speed up classification of appliance use, Dário Baptista and colleagues in Portugal design a convolutional neural network (CNN) and implement it on hardware, allowing identification of devices at the point where the load data is collected.

Neural networks identify images by splitting them into pixels, taking all the pixel data and passing it through a neuron that determines the weighting to be applied to the input pixel value, resulting in an output from the neuron. Using input data (image; for example, in handwriting recognition, a picture of a handwritten alphabet) and output data (category to be guessed; for example, in handwriting recognition, the alphabet), the weightings are determined iteratively, training neural nets to produce a certain output for a given input with high accuracy. CNNs are particularly good at image identification, and the CNN that the researchers develop is trained using the distinct visual signature of voltage and current trajectories to identify appliance use. The CNN not only shows better prediction of appliance use than found previously, but the hardware implementation paves the way for local application of such systems.

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