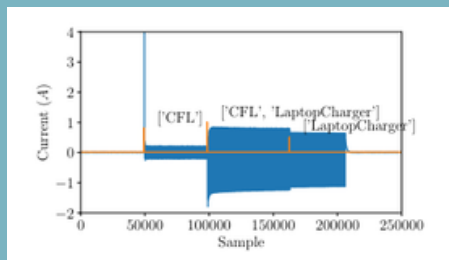


Appliance signature recognition

Motivation:

signature recognition in an electrical signal

Detected whether a device is turned on or off.
And if it is on know if it is in use or not. And this even when several devices are turned on



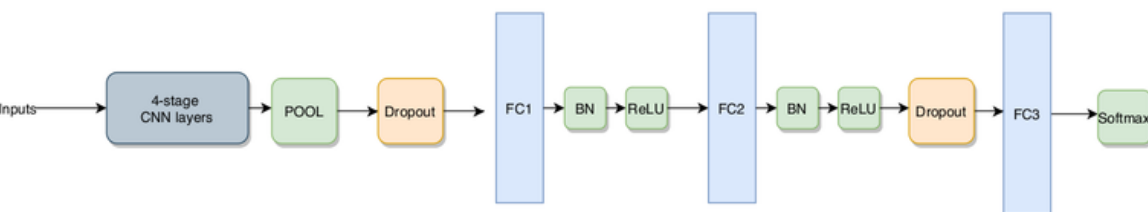
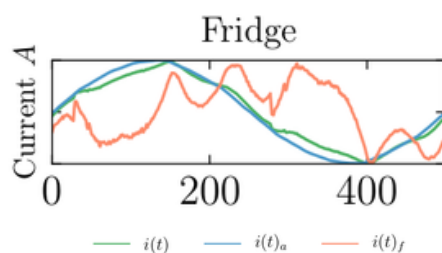
superposition of appliance's current

Method:

Decomposing Current with Fryze's theory to capture more complexity:

$$i(t) = i(t)_a + i(t)_f$$

with $i_a(t) = \frac{p_a}{v_{rms}^2} v(t)$ and $i(t)_f = i(t) - i(t)_a$

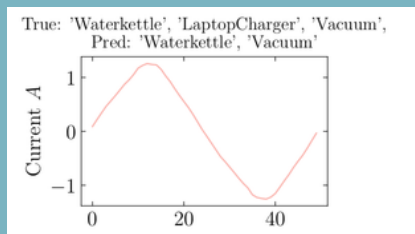


convolutional neural network (CNN)

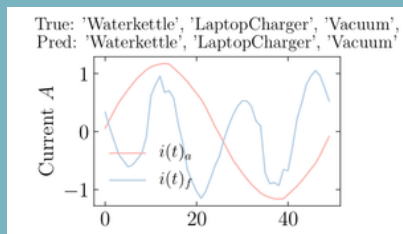
A CNN is chosen because its filters are designed to detect specific local patterns in a restricted area of the data.

Results:

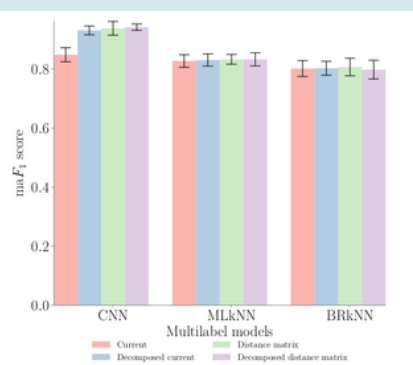
Fryze decomposition allows for better recognition of device signatures



prediction with the classic current



prediction with Fryze decomposition



CNN obtains better performances than the other models on the mAF1 criteria.

CNN achieves better performance even with less training data.

