TinyML Application: CNN Sensor Analytics for Structural Health Monitoring

CNN-regression model
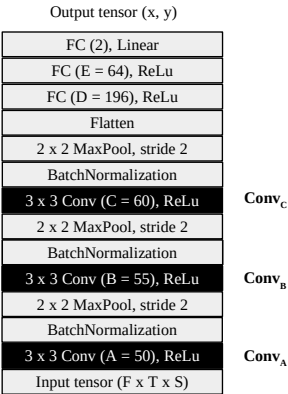
Output tensor (x, y)

FC (2), Linear
FC (E = 64), ReLu
FC (D = 196), ReLu
Flatten
2 x 2 MaxPool, stride 2
BatchNormalization
3 x 3 Conv (C = 60), ReLu
2 x 2 MaxPool, stride 2
BatchNormalization
3 x 3 Conv (B = 55), ReLu
2 x 2 MaxPool, stride 2
BatchNormalization
3 x 3 Conv (A = 50), ReLu
Input tensor (F x T x S)

$Conv_C$ — 3 x 3 Conv (C = 60), ReLu

$Conv_B$ — 3 x 3 Conv (B = 55), ReLu

$Conv_A$ — 3 x 3 Conv (A = 50), ReLu

TensorFlow Lite

Experimental setup:

Sensor and noise positions

Training dataset

Testing dataset

Model architecture