advanced convolutional neural networks: q3 2019

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overview (arxiv)

- **satnet (1905.12149)**

- **astronet v2 (1903.10507)**

- **jasper/novograd (1904.03288, 1905.11286)**

- **simple (1903.00374)**

- **mixnet (1907.09595)**

satnet

Figure 3. An example visual Sudoku image input, i.e. an image of a Sudoku board constructed with MNIST digits. Cells filled with the numbers 1-9 are fixed, and zeros represent unknowns.
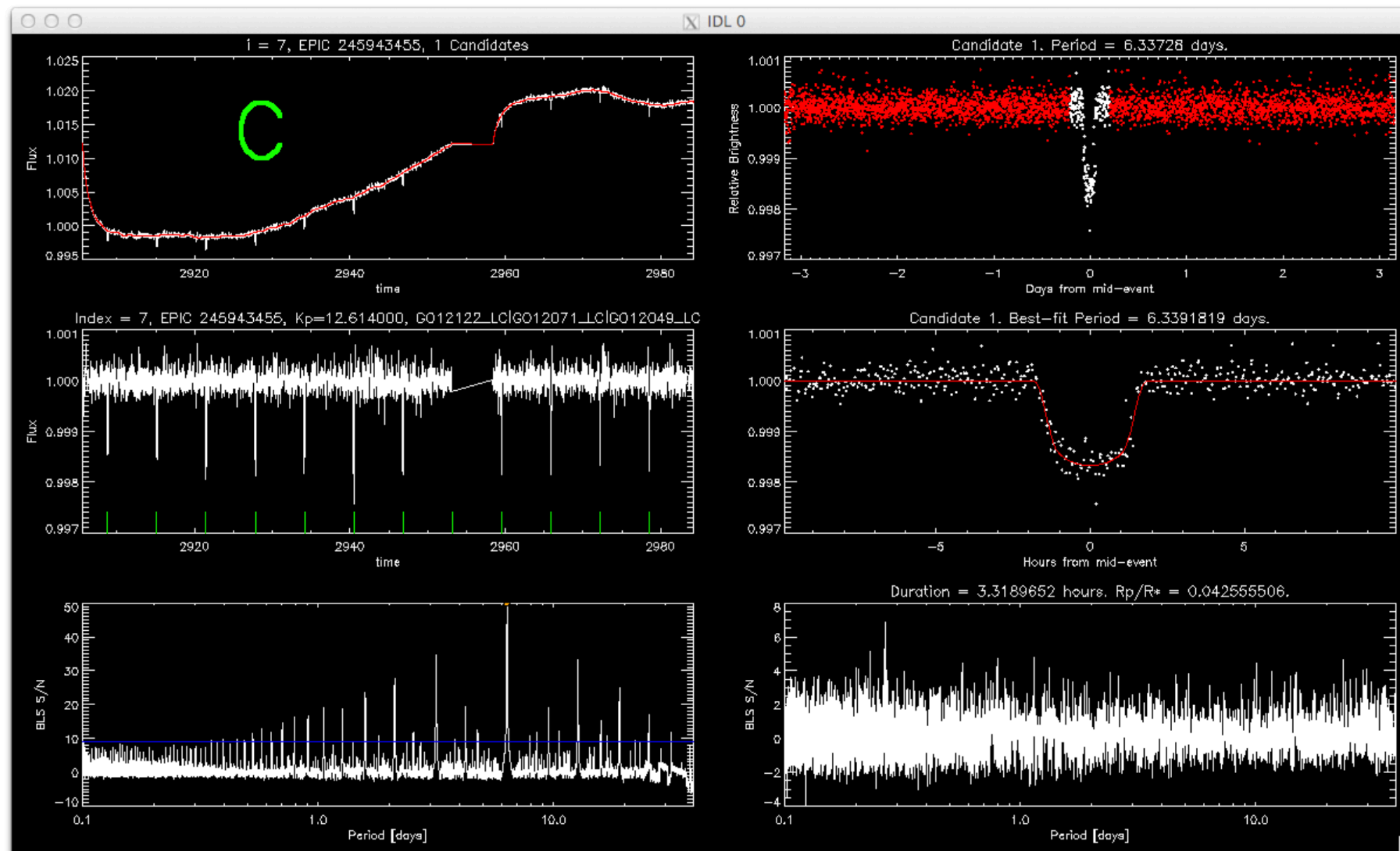
astronet v2

Fig. 1.— View of program used to initially classify targets in the triage stage (Section 2.2.1). Top Left: unflattened light curve with classification label. Top Right: phase-folded light curve with transit event highlighted in white. Mid Left: Flattened light curve with transit events marked. Mid Right: a zoom-in on the transit event from the panel above. Bottom Left: BLS Periodigram of the signals found in the original light curve, shown in the top left panel. Bottom Right: BLS Periodigram after removal of the signal.
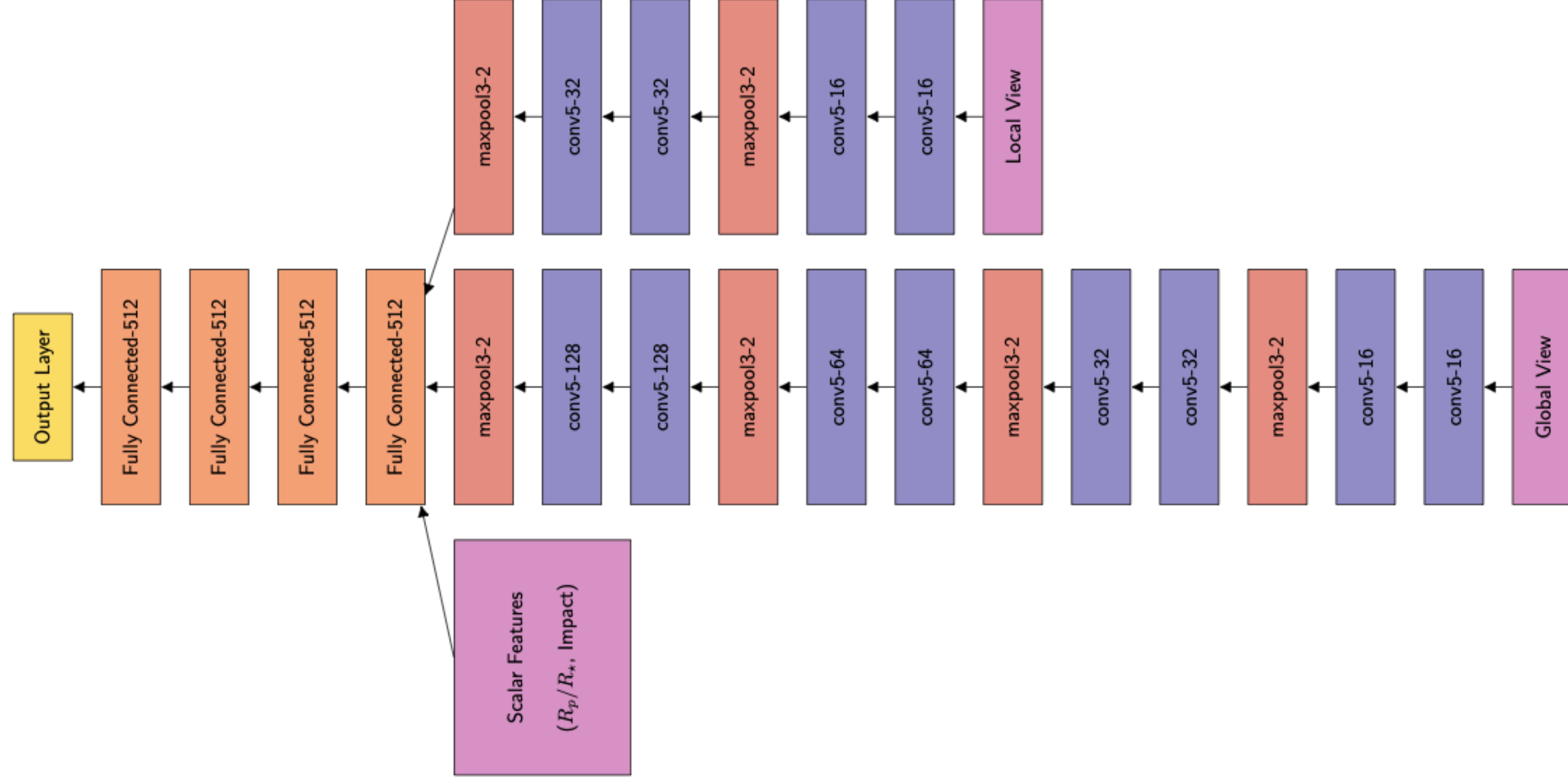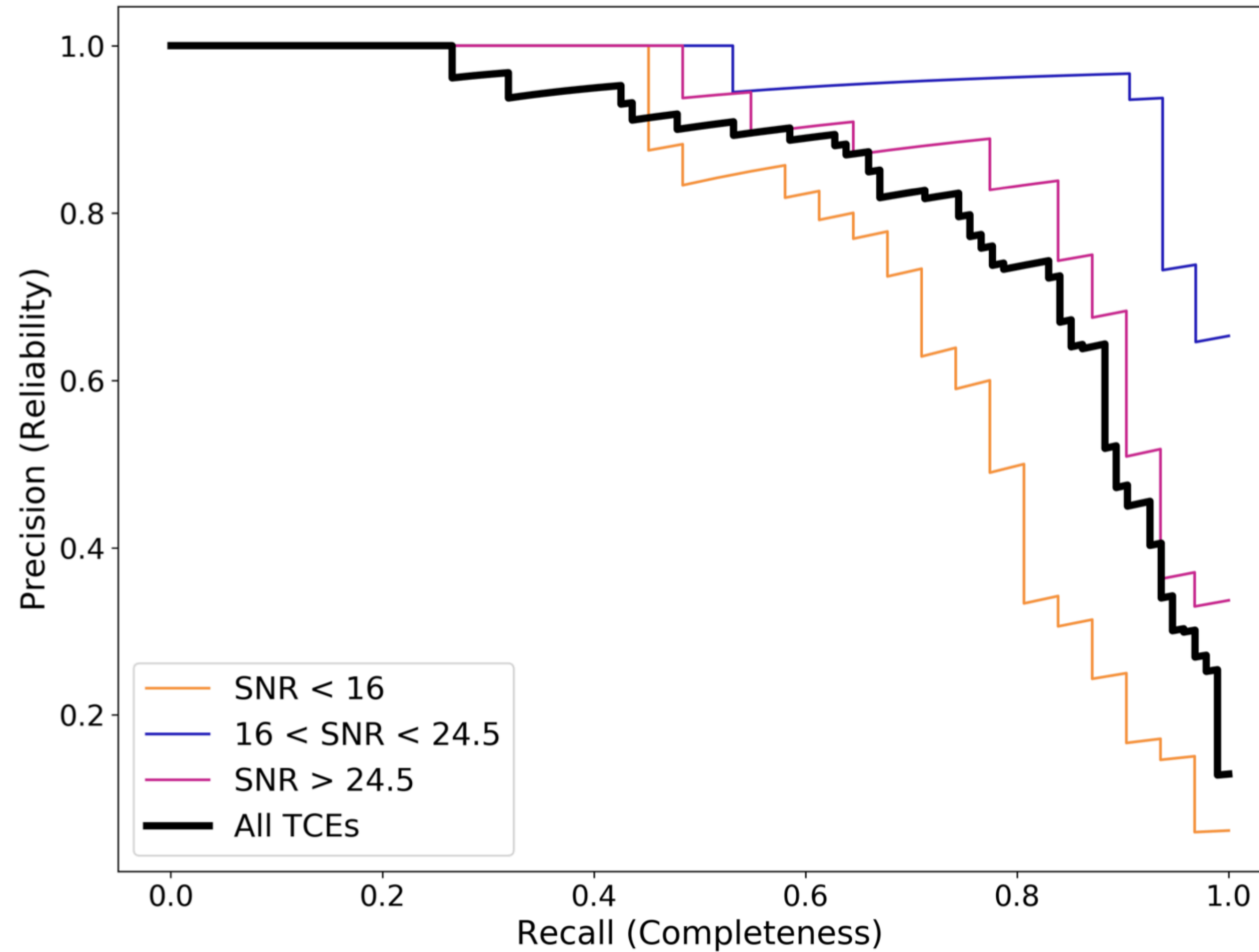
astronet v2

Fig. 5.— The architecture of our best performing neural network model. Convolutional layers are denoted conv⟨kernel size⟩-⟨number of feature maps⟩, max pooling layers are denoted maxpool⟨window length⟩-⟨stride length⟩, and fully connected layers are denoted FC-⟨number of units⟩.
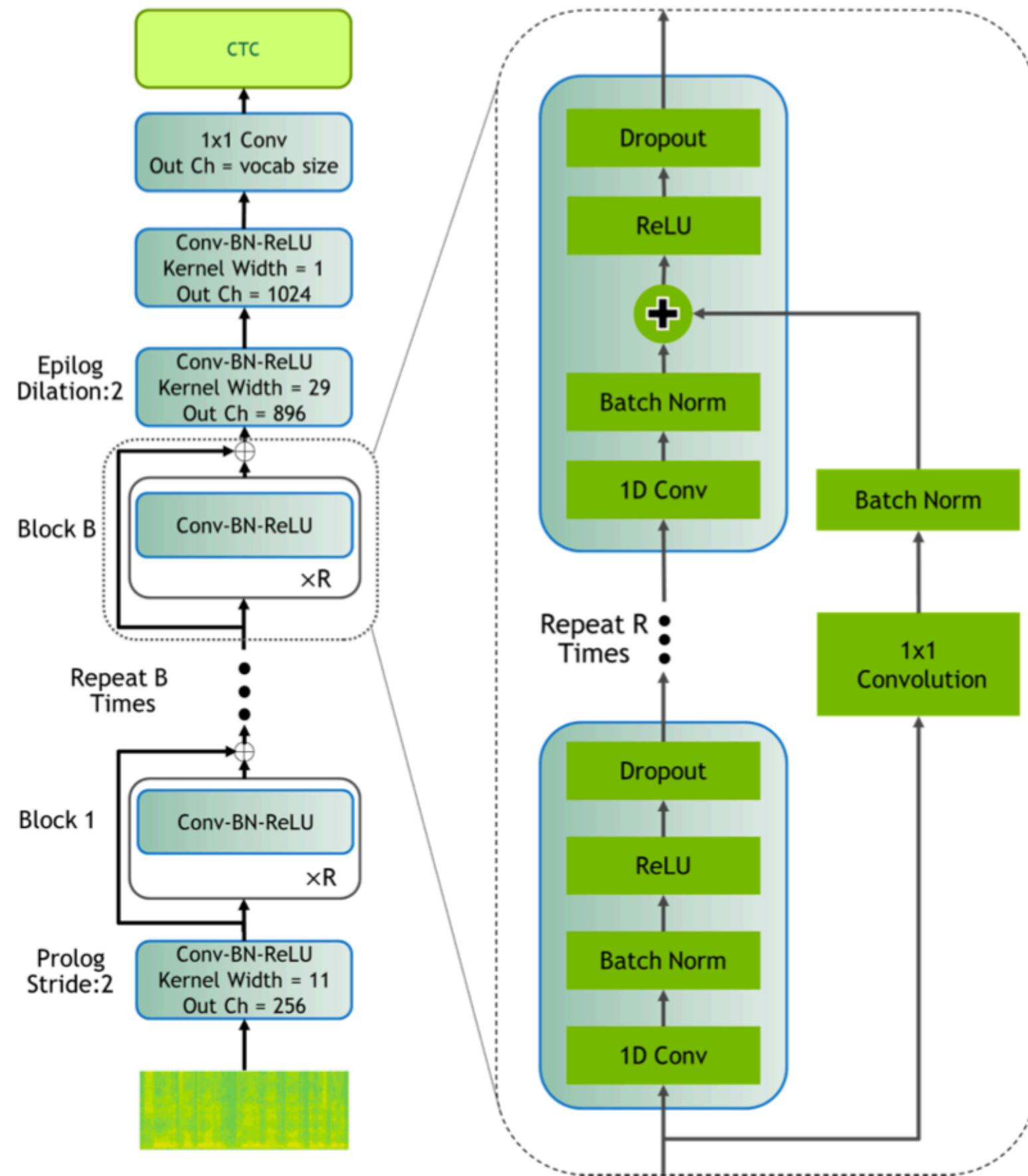
astronet v2

jasper

Figure 1: *Jasper BxR model: B - number of blocks, R - number of sub-blocks.*
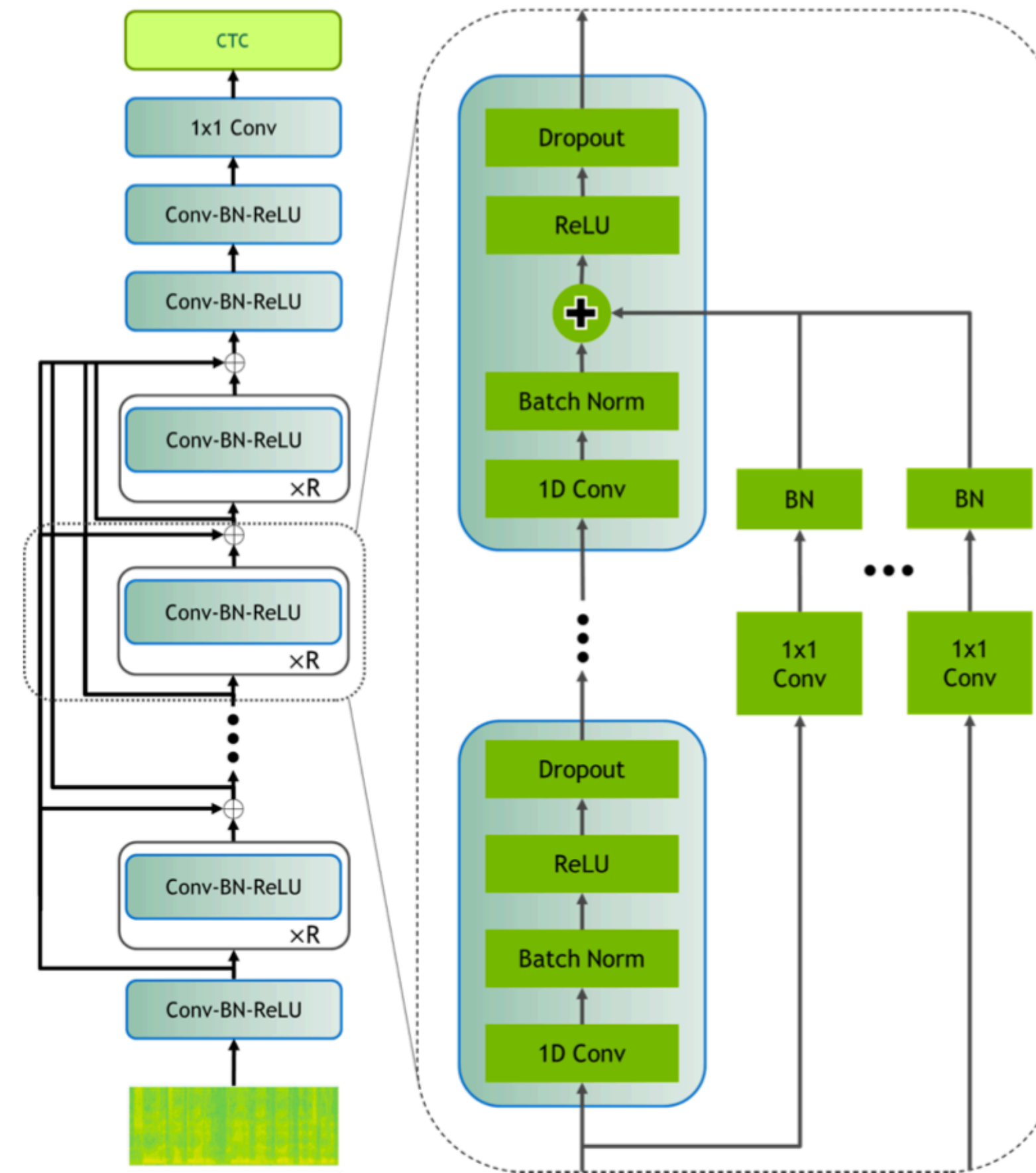
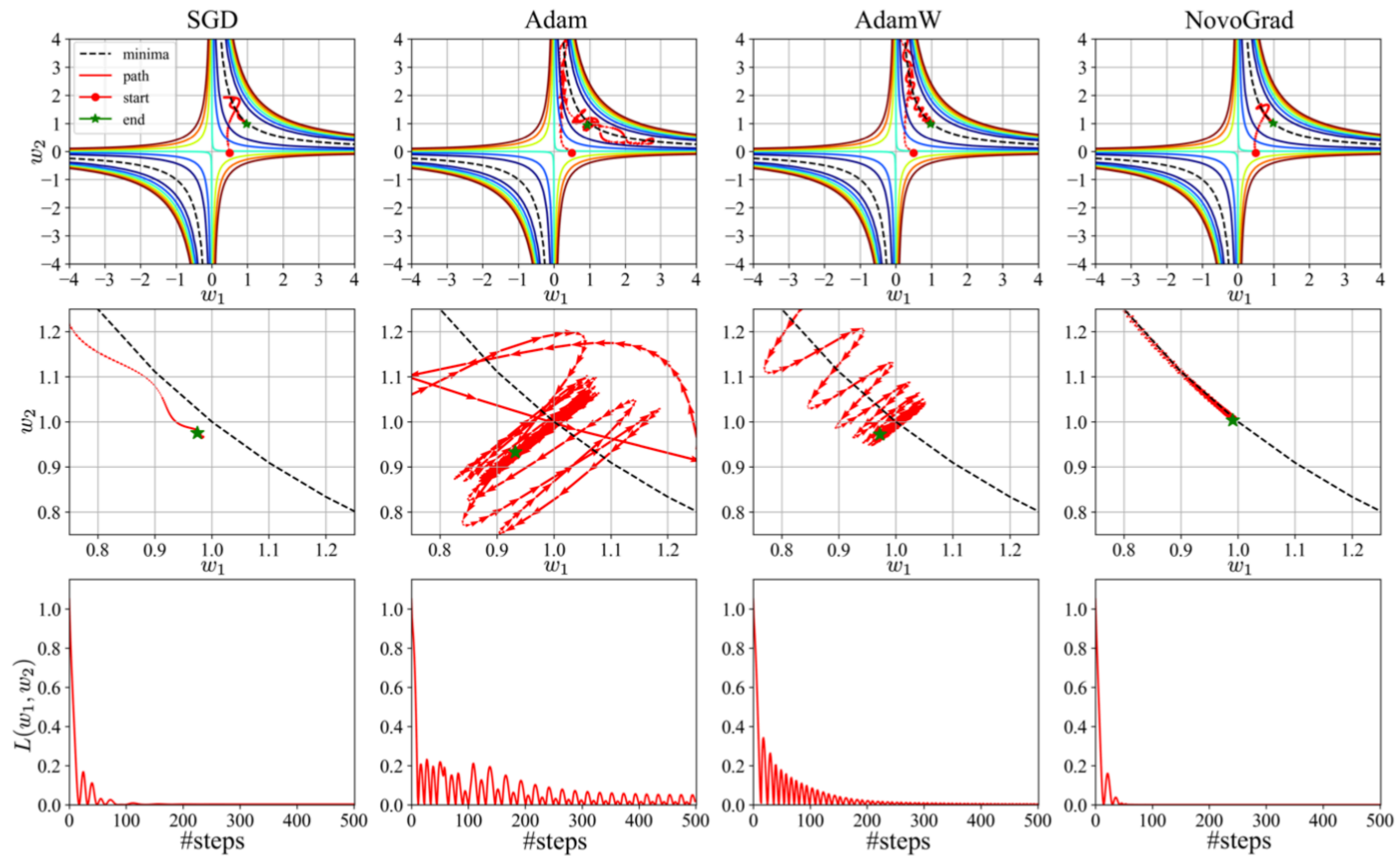Figure 2: *Jasper Dense Residual*
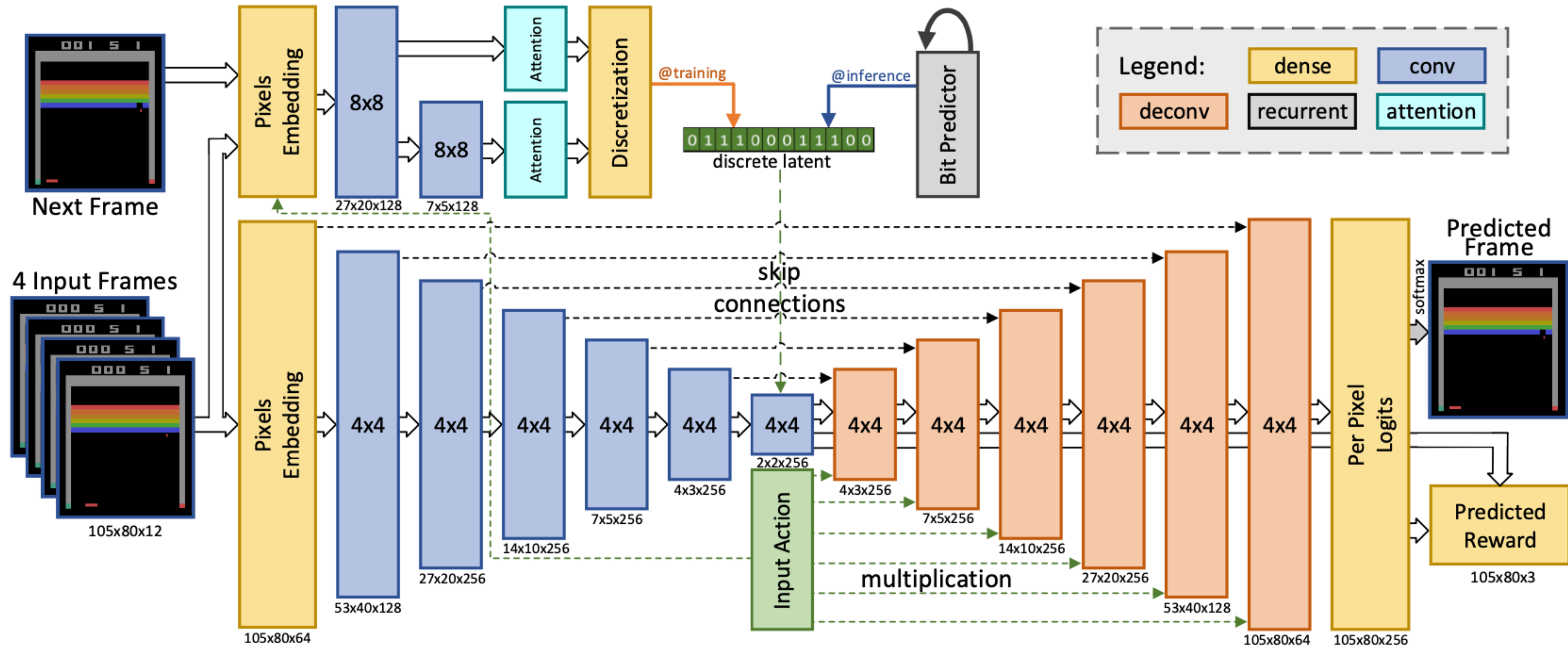
novograd

Figure 2: Deep Linear Network with two layers: training with SGD, Adam, and NovoGrad
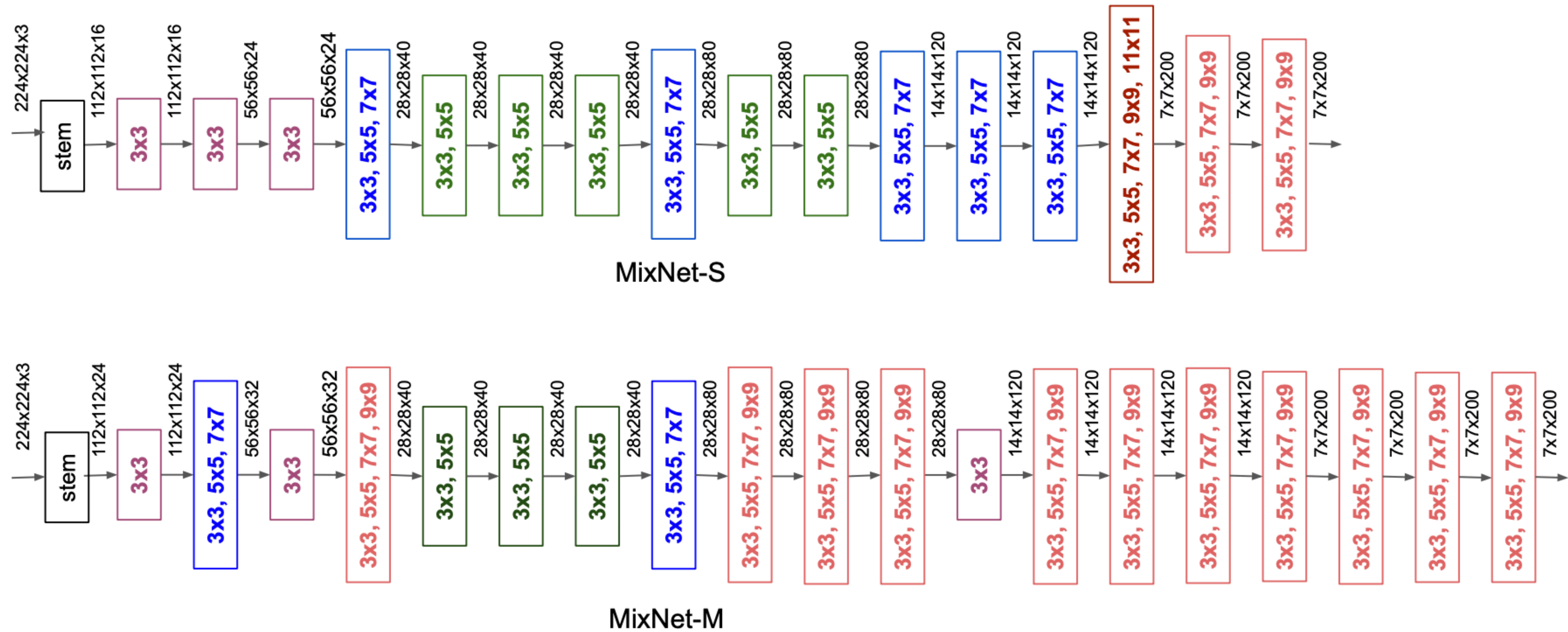
simple/atari

mixnet

Figure 8: **MixNet architectures** – `MixNet-S` and `MixNet-M` are from Table 2. We mainly highlight MixConv kernel size (e.g. {3x3, 5x5}) and input/output tensor shape.