

CNN Results: 20-35 Crossings

Jake Weatherhead

November 7, 2025

The same CNN and ViT used in the initial study were fine-tuned on a new dataset \mathcal{D} , where:

$$\mathcal{D} = \mathcal{D}_{\text{train}} \cup \mathcal{D}_{\text{val}} \cup \mathcal{D}_{\text{test}},$$

$$|\mathcal{D}| = 560,000 \text{ diagrams},$$

$$|\mathcal{D}_{\text{train}}| = 448,000 \text{ diagrams},$$

$$|\mathcal{D}_{\text{val}}| = |\mathcal{D}_{\text{test}}| = 56,000 \text{ diagrams}.$$

All splits contained knots with n crossings where $n \in N$ and $N = \{20, 21, \dots, 35\}$. Each crossing count n contributed equally to a split. Each split contained an equal number of unknots and non-trivial knots with n crossings.

CNN Results

CNN TP: True Unknots Predicted as Unknots

CNN FN: True Unknots Predicted as Knots

CNN TN: True Knots Predicted as Knots

CNN FP: True Knots Predicted as Unknots