

Results: [20, 35] Crossings

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

$$\begin{aligned}\mathcal{D} &= \mathcal{D}_{\text{train}} \cup \mathcal{D}_{\text{val}} \cup \mathcal{D}_{\text{test}} \\ |\mathcal{D}| &= 560,000 \text{ diagrams} \\ |\mathcal{D}_{\text{train}}| &= 448,000 \text{ diagrams} \\ |\mathcal{D}_{\text{val}}| &= |\mathcal{D}_{\text{test}}| = 56,000 \text{ diagrams.}\end{aligned}$$

Each split in \mathcal{D} included knots with n crossings where $n \in \{20, 21, \dots, 35\}$. For all values of n , splits contained an equal number of n -crossing unknot and non-trivial knot diagrams.

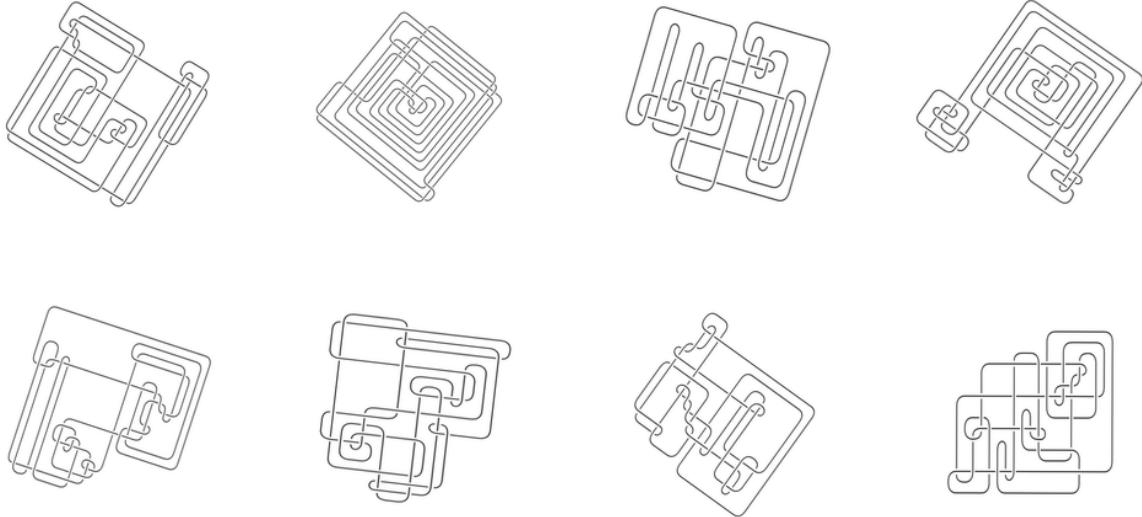


Figure 1: 35 crossing unknots (top row) and non-trivial knots (bottom row) in $\mathcal{D}_{\text{test}}$.

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

ViT Results

ViT TP: True Unknots Predicted as Unknots

ViT FN: True Unknots Predicted as Knots

ViT TN: True Knots Predicted as Knots

ViT FP: True Knots Predicted as Unknots