

# Results: [20, 35] Crossings

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The CNN (88M params) and the ViT (86M params) were fine-tuned on a new dataset  $\mathcal{D}$  where:

$$\begin{aligned}\mathcal{D} &= \mathcal{D}_{\text{train}} \cup \mathcal{D}_{\text{val}} \cup \mathcal{D}_{\text{test}}, \\ |\mathcal{D}| &= 560,000 \text{ diagrams}, \\ |\mathcal{D}_{\text{train}}| &= 448,000 \text{ diagrams}, \\ |\mathcal{D}_{\text{val}}| &= |\mathcal{D}_{\text{test}}| = 56,000 \text{ diagrams}, \\ \forall x \in \{\mathcal{D}_{\text{train}}, \mathcal{D}_{\text{val}}, \mathcal{D}_{\text{test}}\}, \quad x \in \mathcal{U} \cup \mathcal{K} \quad \text{and} \quad |\mathcal{U}| &= |\mathcal{K}|,\end{aligned}$$

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

## Learning Curves

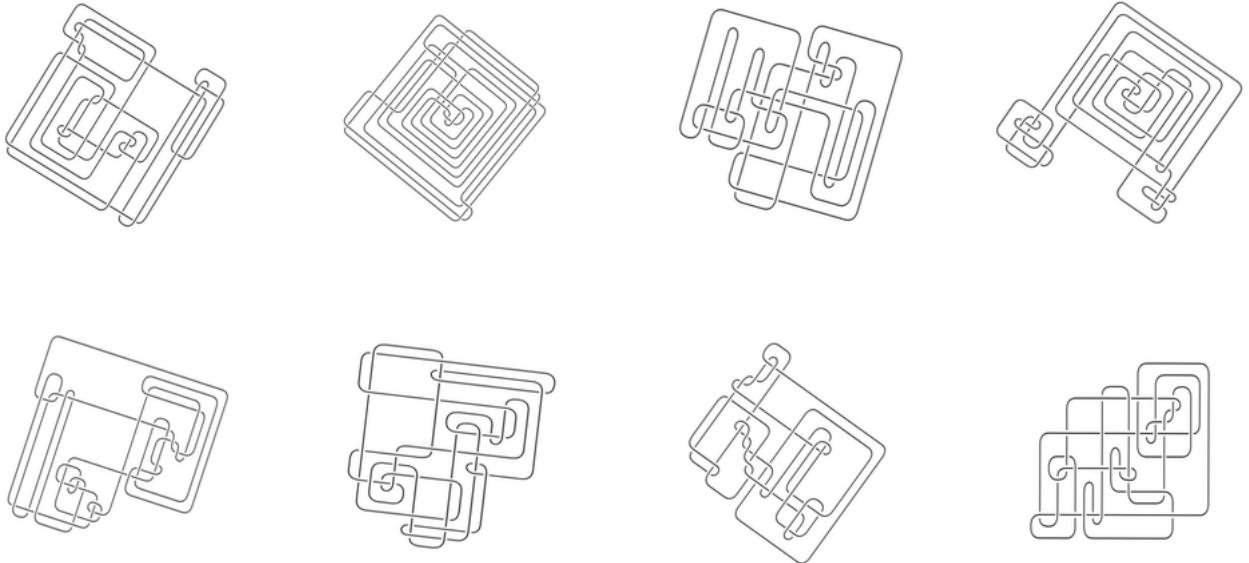


Figure 1: 35 crossing unknots (top row) and non-trivial knots (bottom row) in  $\mathcal{D}_{\text{test}}$ .

## CNN Saliency Maps

Saliency maps for knots in  $\mathcal{D}_{test}$  from the CNN that performed the best on  $\mathcal{D}_{test}$ .

**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 Saliency Maps

Saliency maps for knots in  $\mathcal{D}_{test}$  from the ViT that performed the best on  $\mathcal{D}_{test}$ .

**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