Recurrent GlimpseNet

CS231N Final Presentation

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Spring Quarter 2022

Contents

- Problem Statement & Related Work
- Summary of Findings
- Model Experiments
- Model Inspections

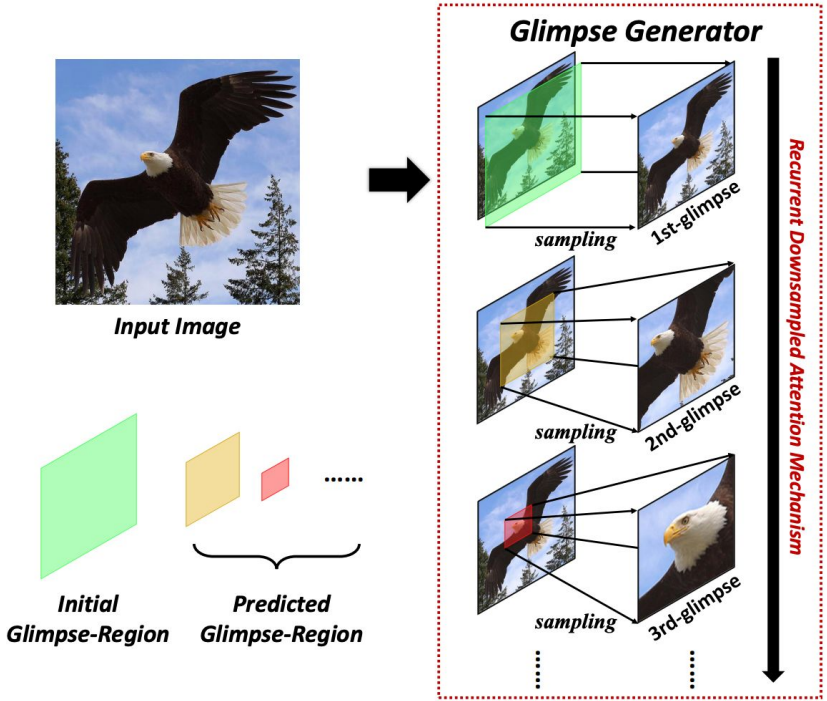
Related Work

GlimpseNet - Hang et al.

- Previous CS231N project
- Trained the glimpse generator on ground truth salience labels

MultiGlimpse Network

- Recurrent architecture
- End-to-end training



Tan et al. Illustration of Recurrent Downsampled Attention

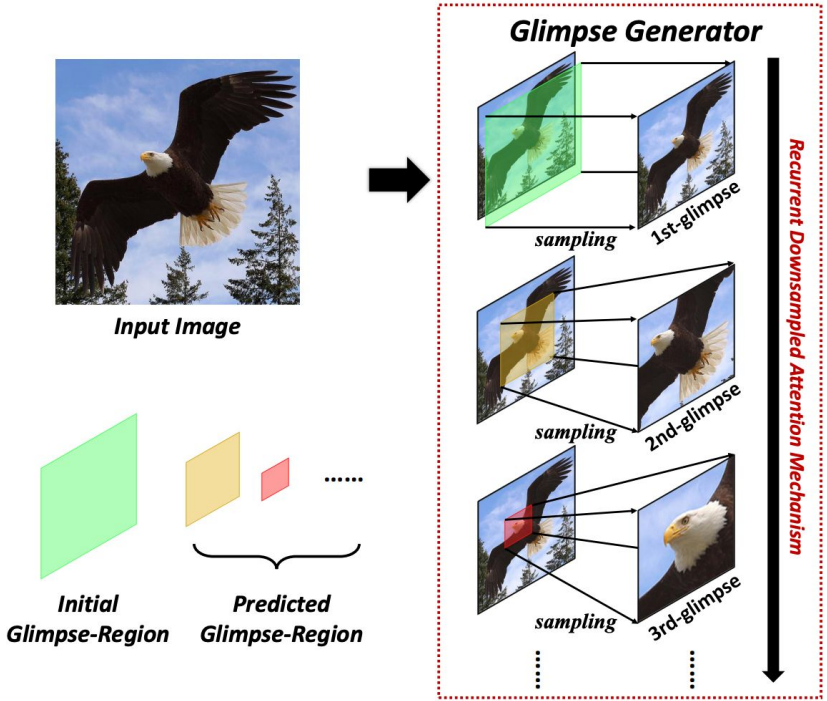
Related Work

GlimpseNet - Hang et al.

- Previous CS231N project
- Trained the glimpse generator on ground truth salience labels

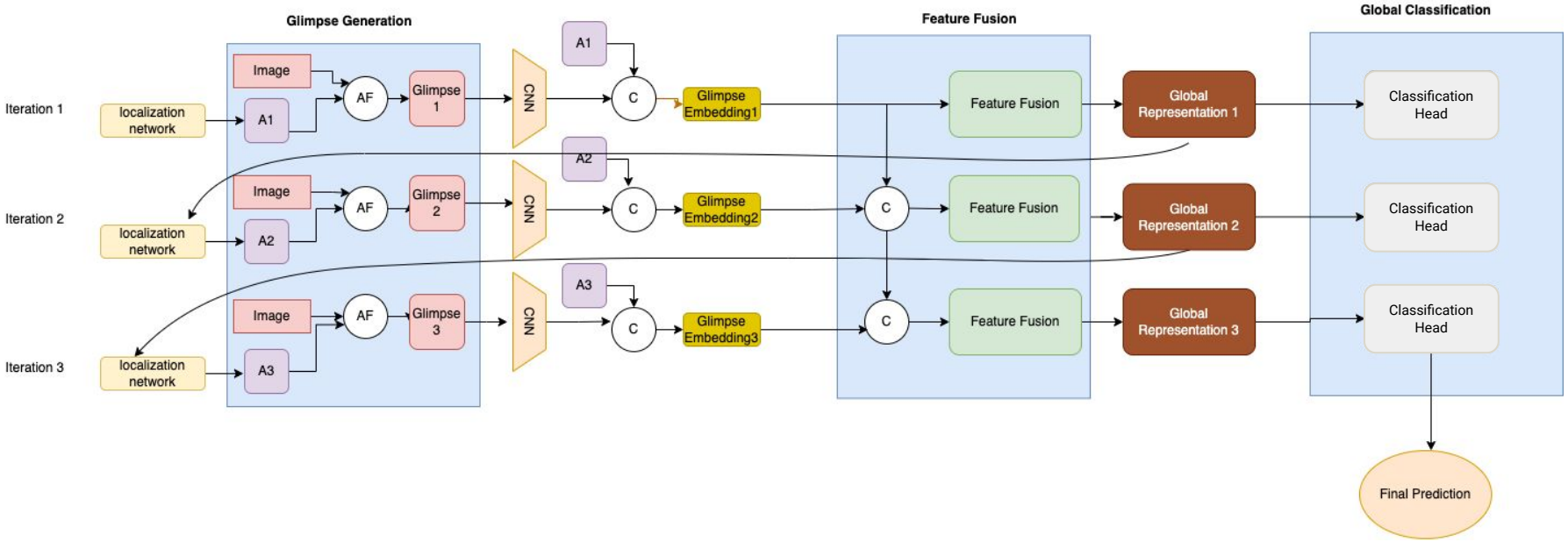
MultiGlimpse Network

- Recurrent architecture
- End-to-end training
- **Slow to train**



Tan et al. Illustration of Recurrent Downsampled Attention

Related Work



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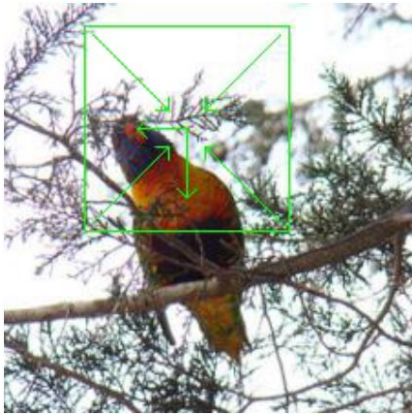
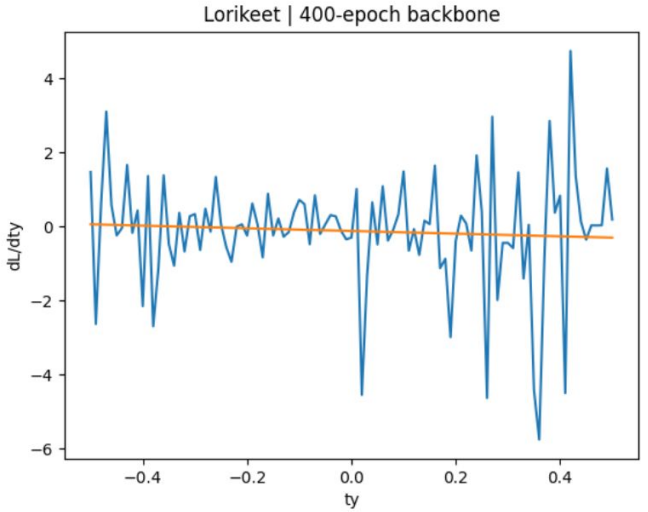
Findings

- Our experiments replicated the training instability of the Localization Network reported by Tan et al.
- Model inspections show that the gradient signal to the Localization Network is extremely unstable.
- Model experiments show no benefit to increasing the capacity of the Localization Network, consistent with the finding that its learning signal is unreliable





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Model Experiments

- Even very significant increases in Localization Network capacity do not improve glimpse quality
- Substantially increasing the image scaling factor does not encourage the network to learn useful glimpses.
- Minor performance improvement by using 2d positional encoding to describe glimpse location.

Method	ImageNet 100
	Accuracy
baseline	83.99
2d-spatial-clue	84.16
2d-spatial-loc	83.81
2d-spatial-loc-s7	62.00
2d-spatial-loc-s7-no-aux	67.45
multihead-attention	83.72
pretrained	85.14
pretrained-frozen	84.75

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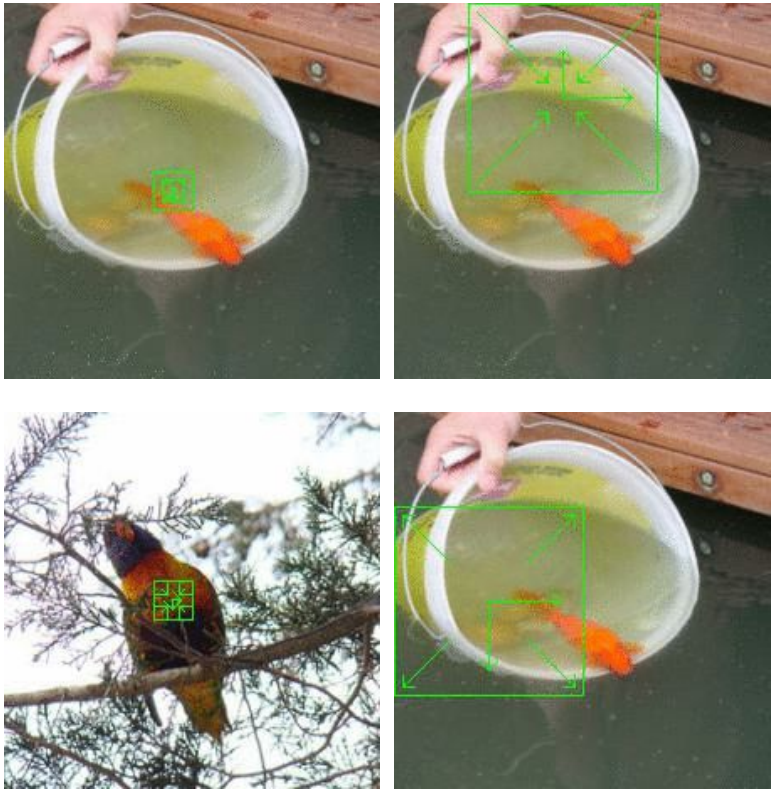
Model Inspections

- Glimpse parameter sweeps clearly demonstrate the unstable gradient signal to the Localization Network



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