

CenterNet applied to multi-digit detection based on the MNIST Detection dataset

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Introduction

This presentation is about how to get 85% Average Accuracy on a CenterNet multi-digit detection implementation

What is CenterNet

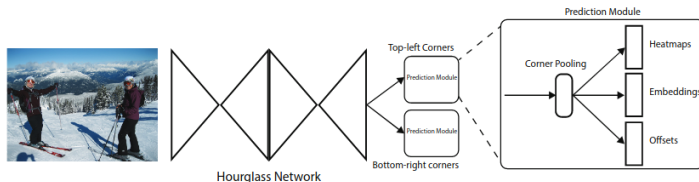


Fig. 4 Overview of CornerNet. The backbone network is followed by two prediction modules, one for the top-left corners and the other for the bottom-right corners. Using the predictions from both modules, we locate and group the corners.



Figure: Architecture & result of CornerNet

What is CenterNet

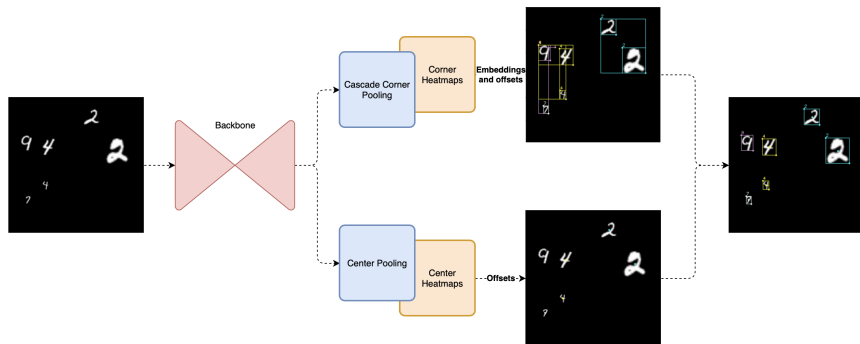


Figure: Architecture of CenterNet

CenterNet Architecture & Implementation

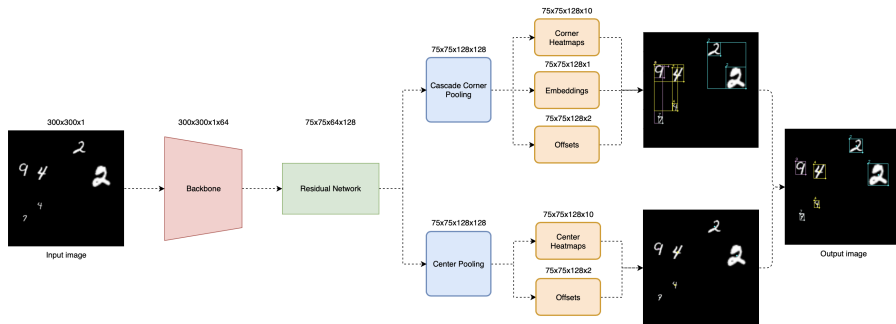


Figure: Implemented CenterNet Architecture

Problems encountered

- 1 Understanding of the code
- 2 Implementation of the Cascade corner pooling and Center pooling
- 3 Understanding the loss

Metrics – mIoU, Average Accuracy & False Discovery

- 1 Average Intersection over Union (mIoU)
- 2 Average Accuracy (AA)
- 3 False Discovery (FD)

Metrics – How the metrics work

- 1 $[AA/FD]_5$
- 2 $[AA/FD]_{50}$
- 3 $[AA/FD]_{75}$
- 4 $[AA/FD]_{95}$

Results - Average Accuracy & mIoU

	Train	Test	Concealing
<i>mIoU</i>	0.9129	0.8568	0.828
<i>AA</i> ₀₅	99.16%	85.09%	79.7%
<i>AA</i> ₅₀	98.75%	82.34%	76.2%
<i>AA</i> ₇₅	96.79%	78.56%	70.4%
<i>AA</i> ₉₅	31.29%	19.63%	14%

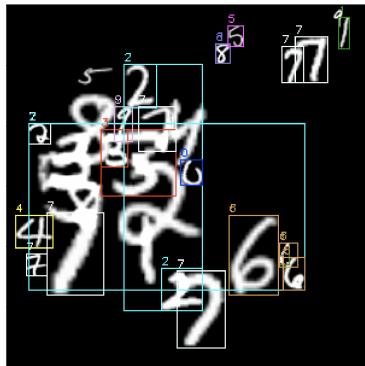
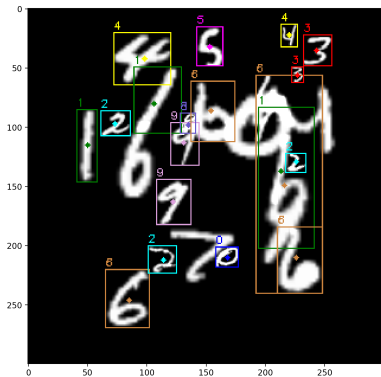
Table: Average IoU (mIoU) and Average Accuracy (AA) table on both training and testing sets

Results - False Discoveries

	Train	Test	Concealing
FD_{05}	0.48%	4.88%	4.5%
FD_{50}	1.71%	8.17%	8.6%
FD_{75}	3.76%	12.65%	15.7%
FD_{95}	68.90%	78.10%	83.4%

Table: False Detection (FD) table on both training and testing sets

Drawbacks: Concealed digits



Conclusion

Thank you for your attention !