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**CSE 541: Computer vision**

**WEEKLY REPORT 5**

**[Group: 7]**

**SECTION – 1**

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Weekly report:

The Dafne Model that we considered earlier as our base model did not work on our system as the model uses mxnet as base model of the architecture. We talked about this to Yagnik sir and they told us to follow another model which does not uses any model as base of their architecture. So we found one model name BBAVectors. Which has complete architecture from scratch on python torch. So we are setup the model on our local device and run the model for test set to check the model accuracy.

BBAVectors Model:

The text delves into the unique challenges of aerial object detection and introduces a novel methodology that leverages the CenterNet neural network. Unlike current methods that rely on horizontal bounding boxes, this network directly regresses width and height, thereby addressing the issues of diverse textures, scales, and object orientations. However, it still grapples with learning parameters for arbitrarily oriented objects, a challenge we aim to overcome.

Our proposed methodology uses a pre-trained ResNet101 as the backbone for feature extraction. An up-sampling process follows this to retain finer details and refinement through convolutional layers. The output features are then divided into four branches, each serving a specific purpose: heat maps for object centre point detection, offset maps for precise localization, box parameters for boundary-aware vectors, and orientation classification to handle different bounding box types.

The results of our research are promising, indicating that the proposed method achieves a significant 72.32% accuracy in object detection. This accuracy further improves to 75.36% with a larger training batch size. Importantly, our approach demonstrates robustness in capturing objects even in densely populated scenarios, highlighting its practical application in real-world aerial object detection. In conclusion, CenterNet offers a potential breakthrough in handling oriented objects effectively, a crucial aspect of aerial object detection.

Future Work:

* Application of this particular model for Local Dataset
* Addition of Layer for correctly identifying oriented objects without Anchor Boxes