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Road Marking Detection using UAV Images and pixel to cm Mapping

CSE 541 Computer Vision
Mid-Semester Presentation

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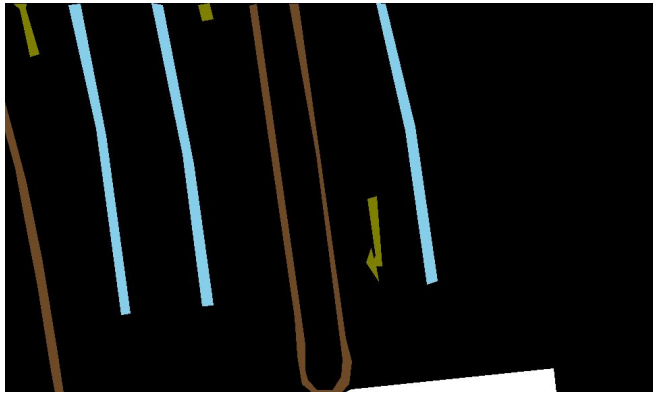
Group - 5

Problem Statement & Explanation

- Detect Road Marking using the segmentation approach.
- Pixel to ‘cm’ Mapping of the markings.
- Why to do this?
  - Optimizing traffic flow
  - Also in upcoming technology of self-driving cars.

Dataset Explanation

- AU Drone Dataset



Color	Label
	Zebra Crossing
	Lane Marking
	Lane Separator
	Divider
	Traffic Sign

Methodology Used: Image Segmentation

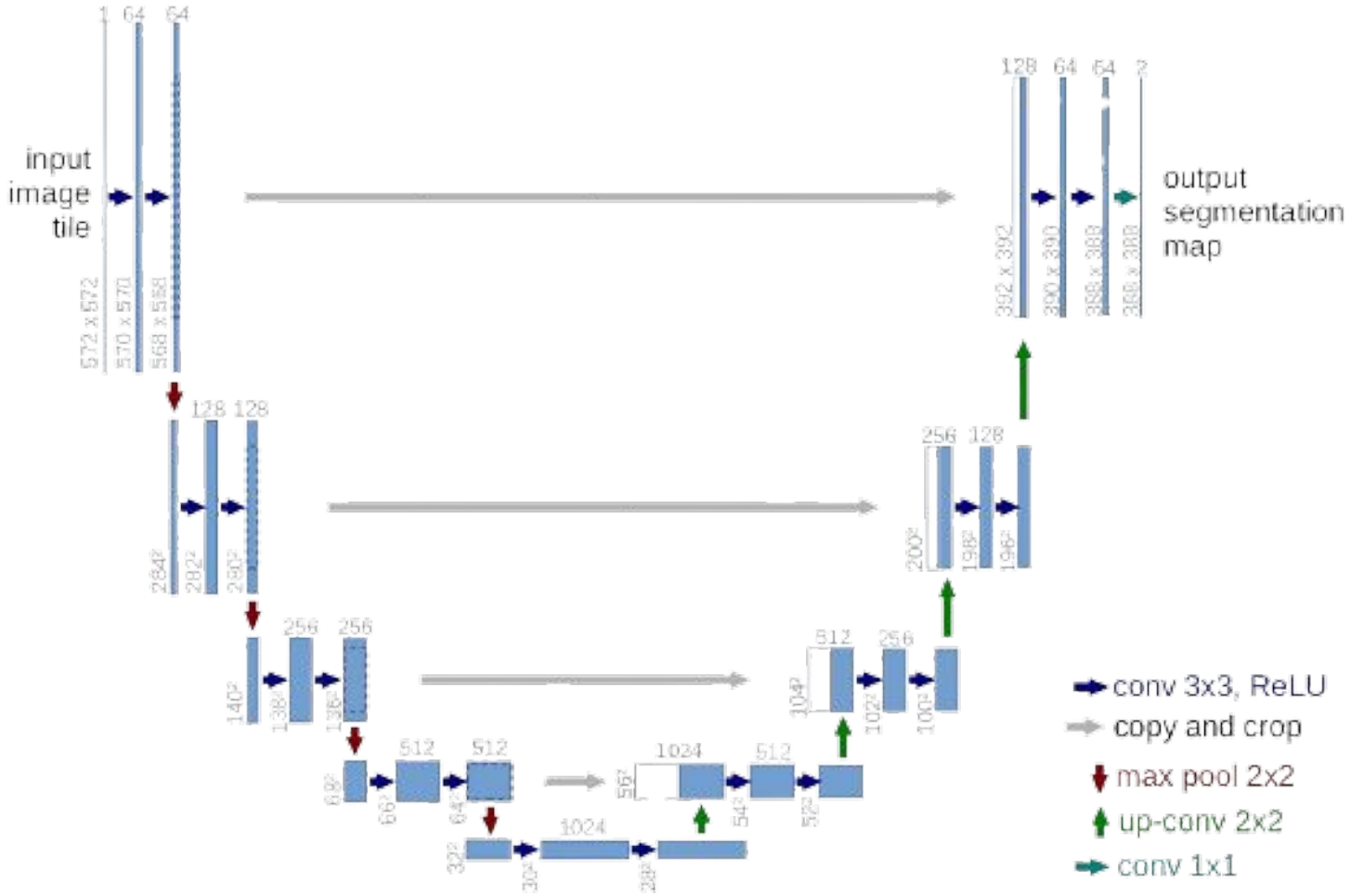
- It is an approach to divide an image into a segments based on some similarity.

  How does Segmentation works?

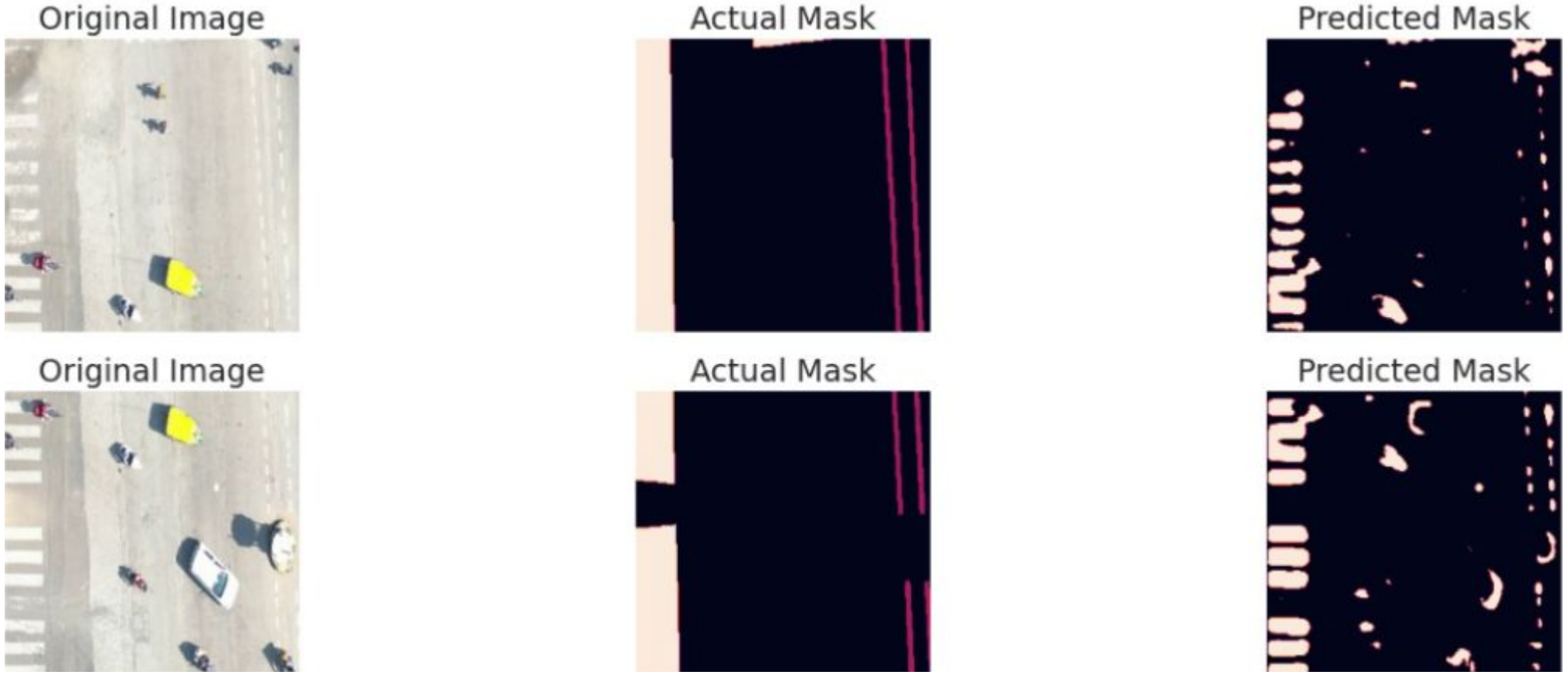
- It does Pixel-level comparison on adjacent points, to classify pixels into a categories.
- The masks are created for each class.

https://viso.ai/wp-content/uploads/2021/03/image-segmentation-example-1060x397.jpg

Deep Learning model used: U-Net

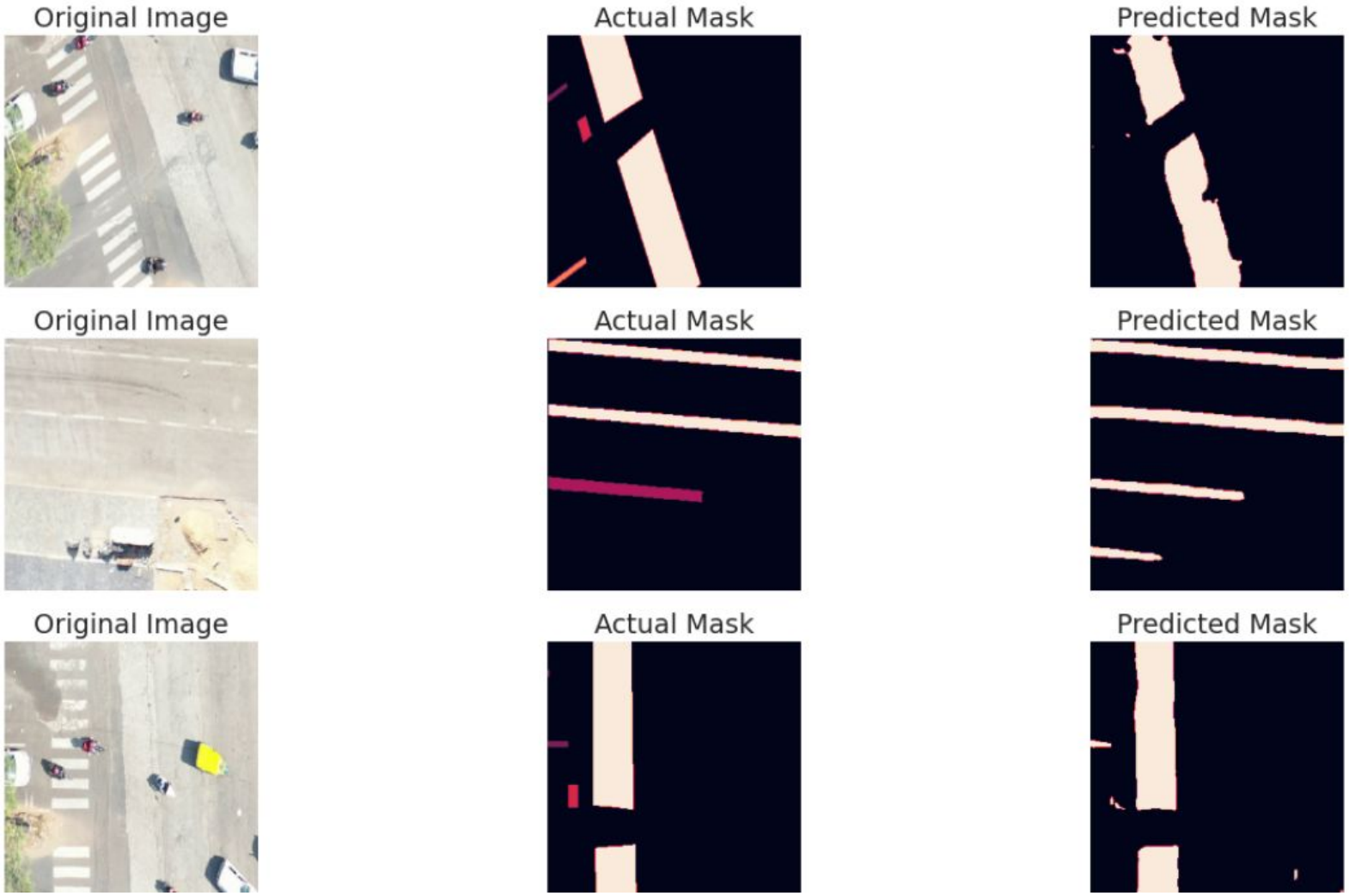


Results (1/2)



Early Stopping Criteria: loss

Results(2/2)



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Early Stopping Criteria: IOU_Coef

Future Approach

- To fine-tune the used U-Net Architecture.
- Multi-classification for segmentation
- Model used in other paper and to cull the model with better accuracy
- Pixel to ‘cm’ Mapping with help of GSD (Ground Sampling Distance)

References

- Ronneberger, O., Fischer, P., & Brox, T. (2015, May 18). U-NET: Convolutional Networks for Biomedical Image Segmentation. arXiv.org. https://arxiv.org/abs/1505.04597

- Guan, H., Lei, X., Yu, Y., Zhao, H., Peng, D., Marcato, J., & Li, J. (2022). Road marking extraction in UAV imagery using attentive capsule feature pyramid network. International Journal of Applied Earth Observation and Geoinformation, 107, 102677. https://doi.org/10.1016/j.jag.2022.102677

Thank You