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Annotation of Calibration Patterns for RGB-LiDAR Evaluations using Segmentation Models

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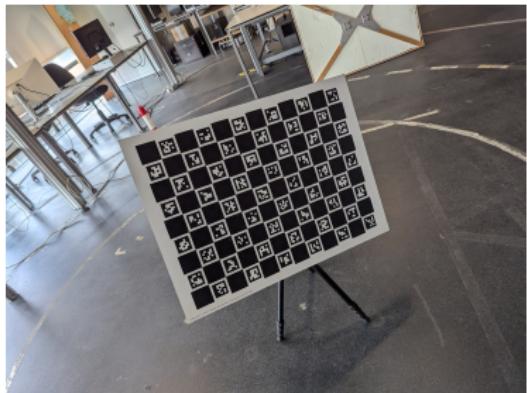
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1. Introdução

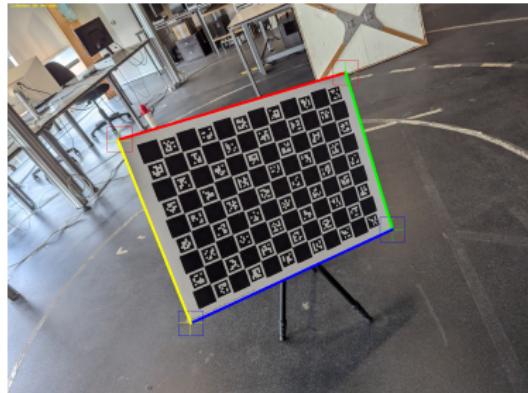
2. Abordagens

3. Conclusion

Definição do problema



Input image



Desired Output Image

Escolha do tipo de rede

Modelos de Segmentação

- Número de cantos variável visíveis na imagem;
- Possíveis obstruções parciais do padrão;
- Solução CNN + FC inviável por tamanho do output variável;
- Rede de segmentação evita todos os possíveis os edge cases.

Escolha do tipo de rede

Modelos de Segmentação

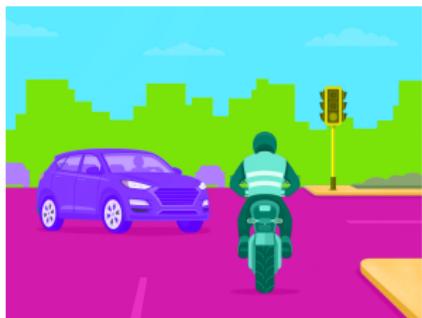
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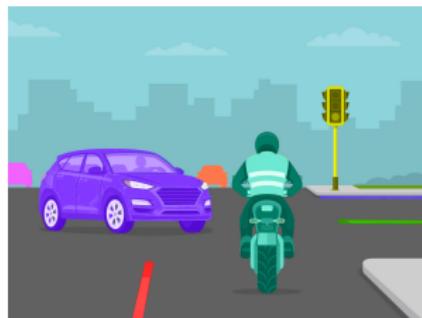
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Tipos de redes de segmentação



Semântica

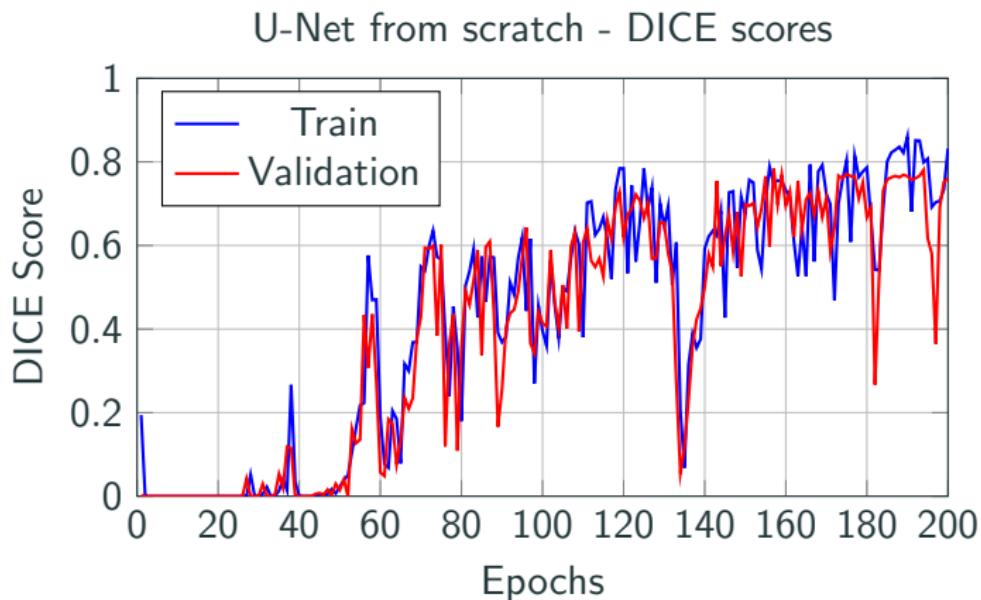


De instâncias



Panóptica

Teste



DeepLabV3

Com backbone Resnet50

- 41M Total Parameters
- 17M Trainable Parameters
- Model did not converge
- Complications with training

U-net

Treinada do raíz

-
-



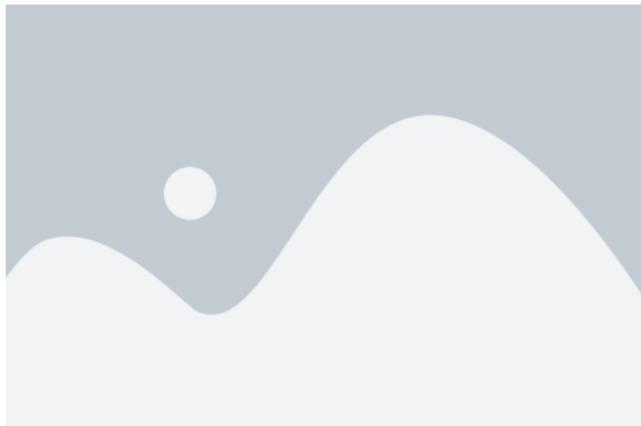
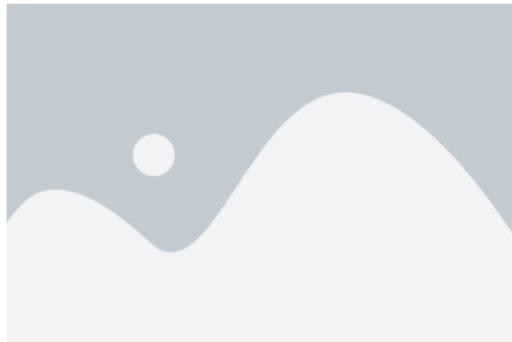
U-net

Com Resnet50 Backbone

-
-



Performance Comparisons



Conclusion

- The segmentation mask approach effectively overcomes the challenges of variable outputs and occluded corners in calibration pattern detection.
- A U-Net model with a pretrained ResNet50 backbone delivered superior performance compared to more complex transfer learning models like DeepLabV3.
- This method streamlines the calibration evaluation process, reducing manual effort and improving overall usability.

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