

Applying INNs to retinal imaging

OVERVIEW

Implicit neural networks (INNs) are a fascinating concept gaining traction in various fields, including computer vision. They offer a promising approach for segmentation tasks by providing direct, end-to-end, and flexible solutions for capturing complex patterns and representations in image data.

One of the key advantages of INNs is their inherent ability to handle scale invariance, a critical aspect of segmentation tasks. This is particularly relevant in scenarios where the size and scale of objects can vary significantly within and across images. By learning representations invariant to scale transformations, INNs can effectively segment objects of different sizes without explicit scale normalisation or preprocessing, showcasing their practical benefits and potential.

GOALS

Analysing the feasibility of using INNs with retinal images for segmentation tasks and whether they could be adapted to solve superresolution problems.

SPECIFICATIONS

1. Literature overview of the use of INNs for segmentation tasks
2. Picking an existing implementation and adapting it to some segmentation task. Possible datasets to consider:
 - **RAVIR (SLO)** - <https://ravir.grand-challenge.org/> - 23+19 (train+test) SLO 2D images acquired with Spectralis
 - Task: Vessel segmentation and artery/vein separation.
 - Very strong SOTA.
 - **IOSTAR (RC-SLO)**. 30 RC-SLO images with a resolution of 1024×1024 pixels.
 - Vessel, A/V, optic disc segmentation.
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3. How could we adapt them to superresolution segmentation?

RESOURCES

- <https://github.com/vsitzmann/awesome-implicit-representations>
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