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Pseudo 3D unpaired domain transfer network for digital rock domain adaptation

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Analyzing the physics under the same imaging condition is hampered by the domain difference between digital rock images from micro-computed tomography (micro-CT). Different scan devices, scan conditions, and sample conditions (dry/wet samples) are frequently to blame for domain differences in micro-CT rock images. Unpaired domain transfer by Generative Adversarial Network (GAN) is a method that reduces domain differences by transferring the image style from one to another without the requirement of paired images. Herein, we develop a pseudo-3D domain transfer network, Pseudo-3D Semantic CycleGAN (3D-PSCycleGAN) that transfers the rock domains with the user-defined semantic information in a 3D manner while only requiring 2D computational resources. The 3D stacking effect that is present in 2D networks without fail is eliminated by the pseudo-3D transmission. The 3D-PSCycleGAN opens up a way to analyze digital rock images under the same condition to avoid any bias or inconsistency.

Participation

In-Person

References

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