

PSSformer: A Persistent Scatters Selection Method for SAR Interferometry based on Temporal-Spatial Vision Transformers.



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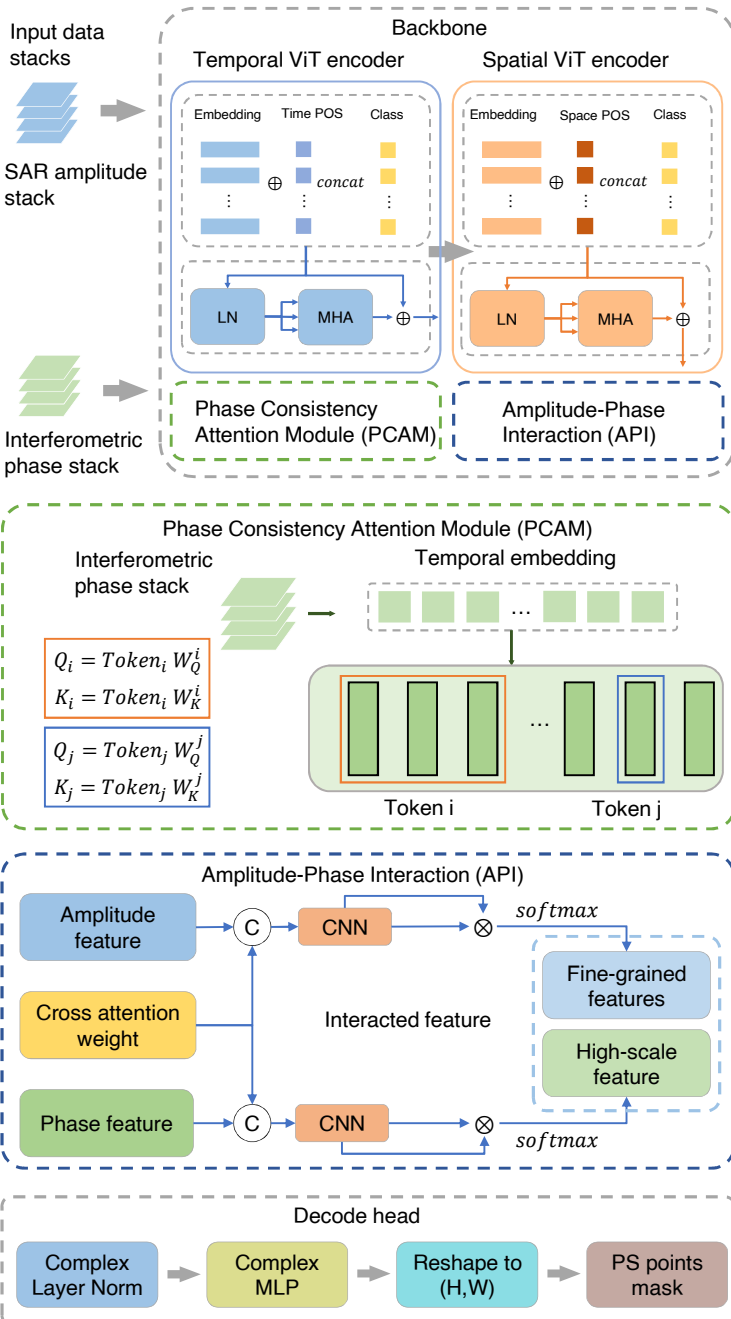
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1 Introduction

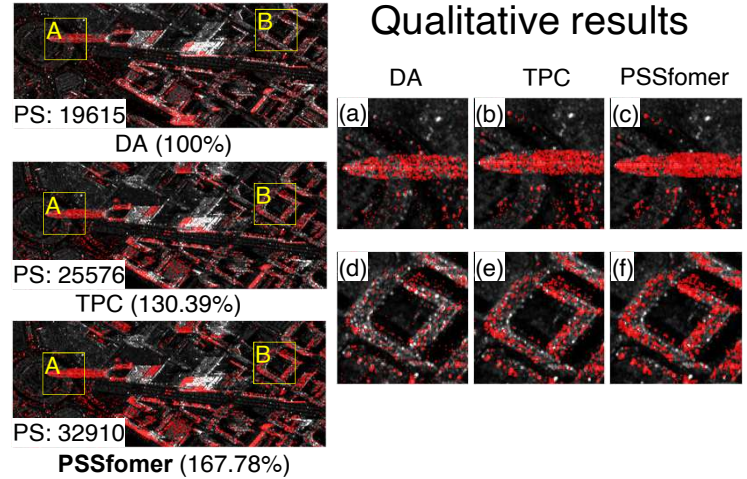
Multi-temporal synthetic aperture radar interferometry (SAR, MT-InSAR) has been widely recognized as an effective technique for monitoring surface deformation and marking a significant advancement in satellite geodesy to millimeter-level precision. As one of the most representative MT-InSAR methods, persistent scatters interferometry (PS, PSI) focuses on the most elite pixels over the temporal and spatial scales of SAR images. The selection of PS candidates is the cornerstone of the excellent performance of PSI, directly influencing the accuracy and density of surface deformation products.

2 Methodology

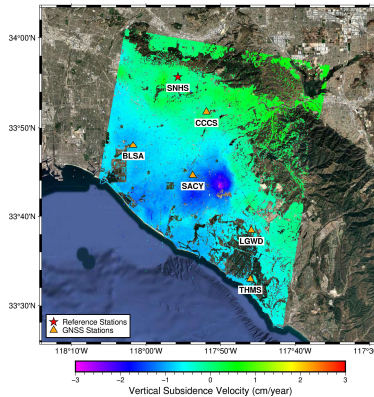
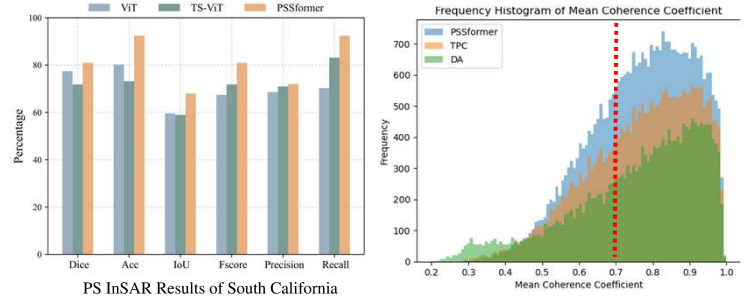


3 Result

The proposed model was trained on a dataset containing time-series SAR images and interferometric phase stacks of Barcelona, acquired by TerraSAR-X between 2009 and 2011. The experiment shows that our method achieves good results in urban areas with the presence of tall buildings.



Quantitative results



Compared to other deep learning methods, the mIoU and mDice improved up to 9.1% and 8.43% respectively. Compared to the most widely used method, the new method extracts 67.78% more points with high spatial coherence. The model results were validated by large-scale experiments in Southern California.

4 Conclusion

Our method integrates contextual features in both temporal and spatial scales to achieve automatic and fast selection of PS points in InSAR. We have firstly achieved PS selection by cross-sensor training and inference process.