

A deep learning approach for efficient multi-temporal interferometric synthetic aperture radar (MT-InSAR) processing

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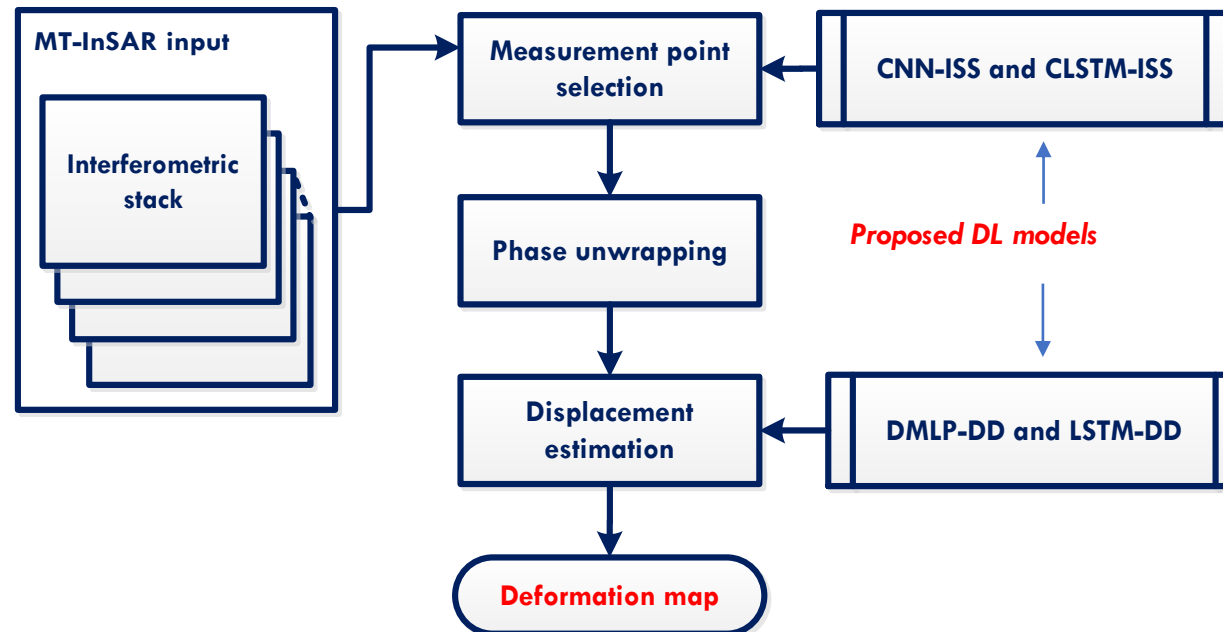


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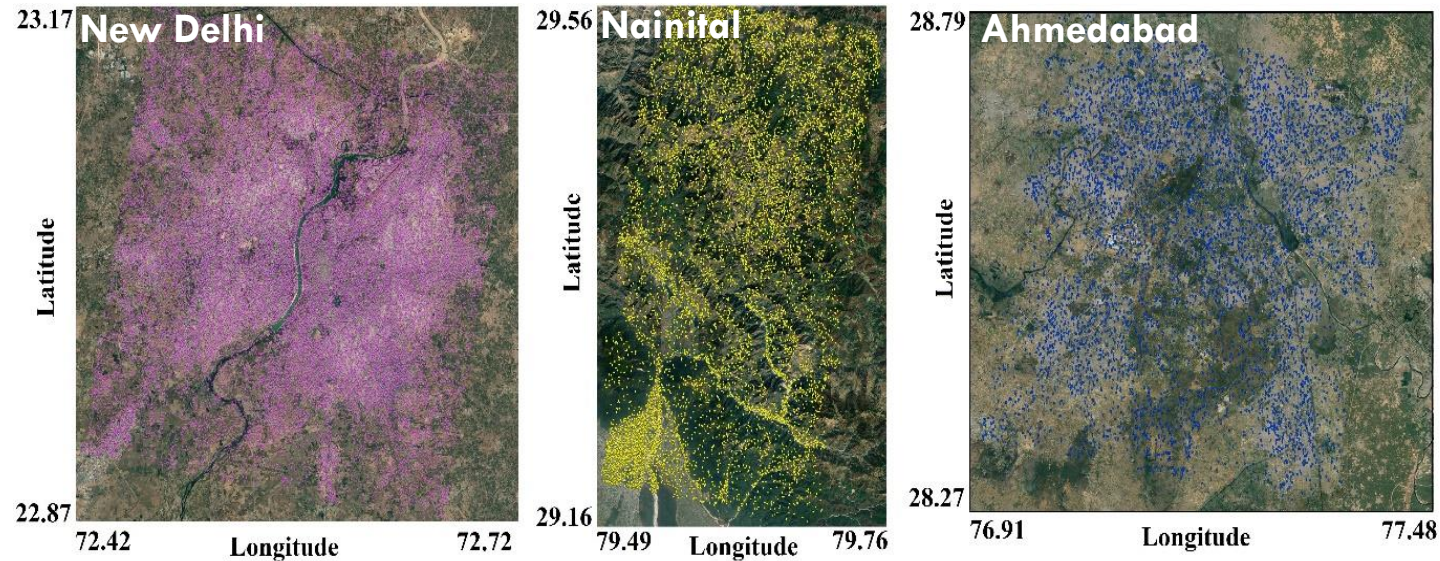
Introduction

- Multi-temporal interferometric synthetic aperture radar (MT-InSAR) technique effectively used for deformation monitoring.
- Processing steps: (i) **pixel selection**, (ii) **phase unwrapping** and (iii) **displacement estimation**.
- Deep learning (DL) models proposed for automated MT-InSAR processing to reduce time computations and improve displacement estimation.

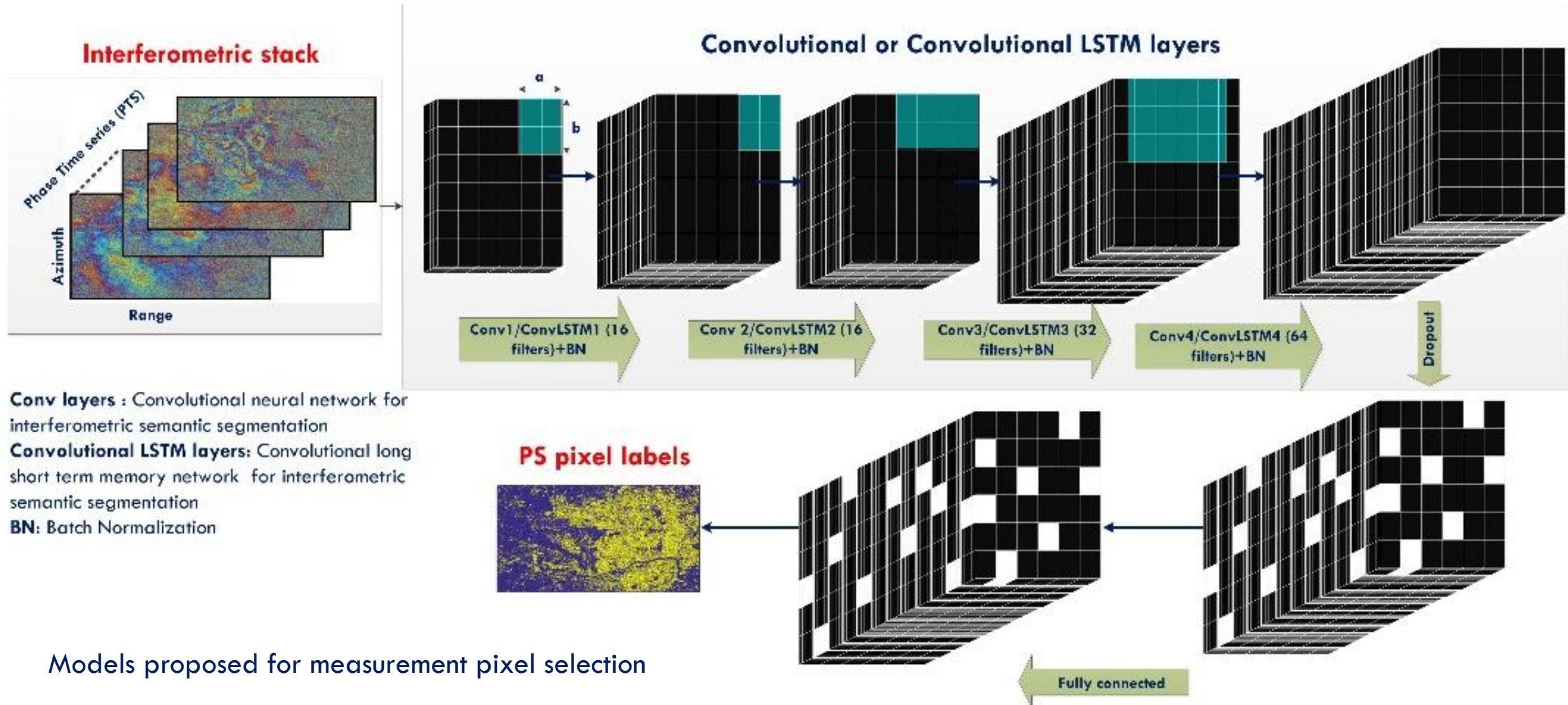


Training datasets

- **Training:** $\sim 10,000$ images belonging to sites with different characteristics.
- Accuracy, f1-score, precision and recall used to deal class imbalance. Kathmandu (unseen) dataset (unknown) used for testing.

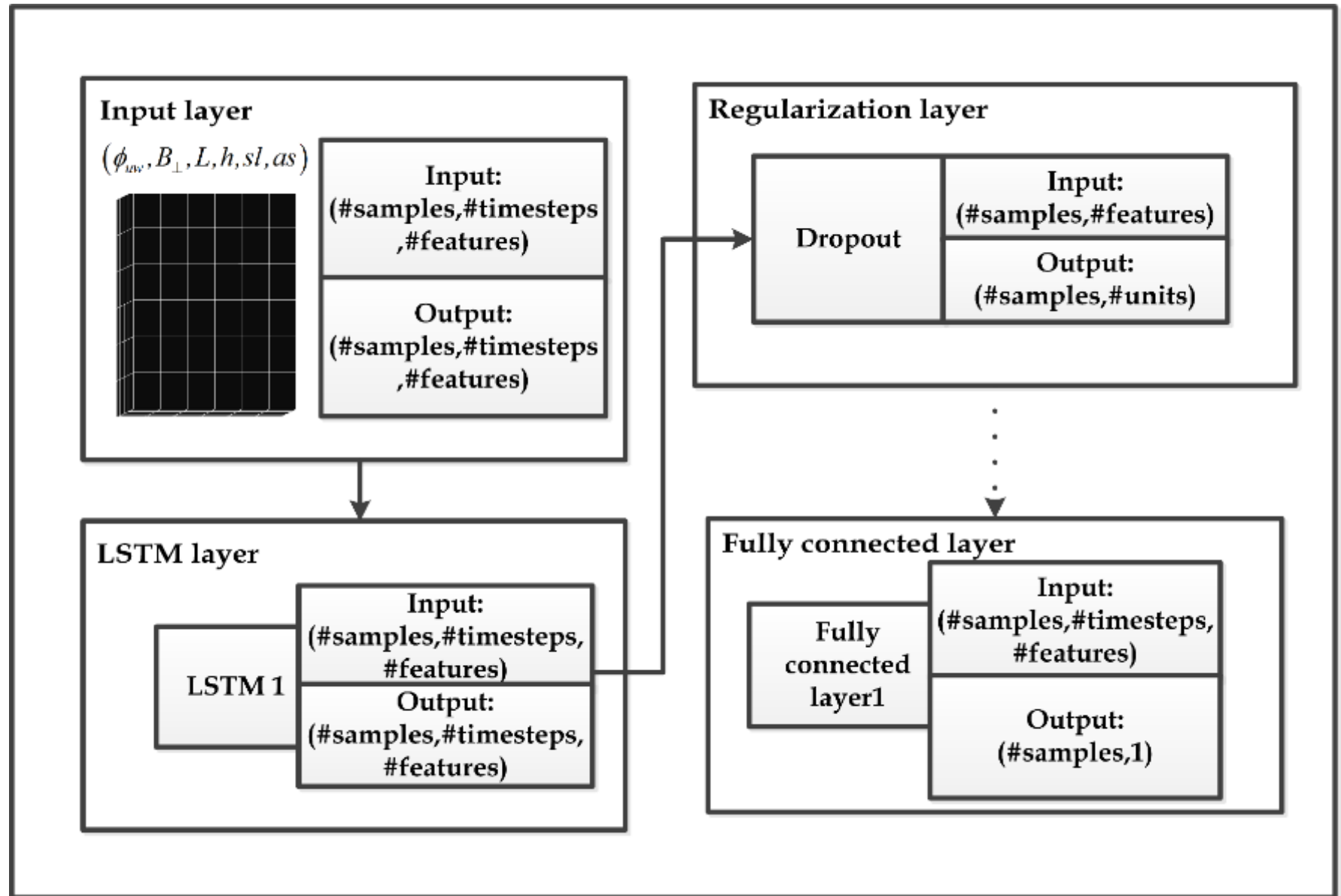


Models for Persistent Scatterer Selection

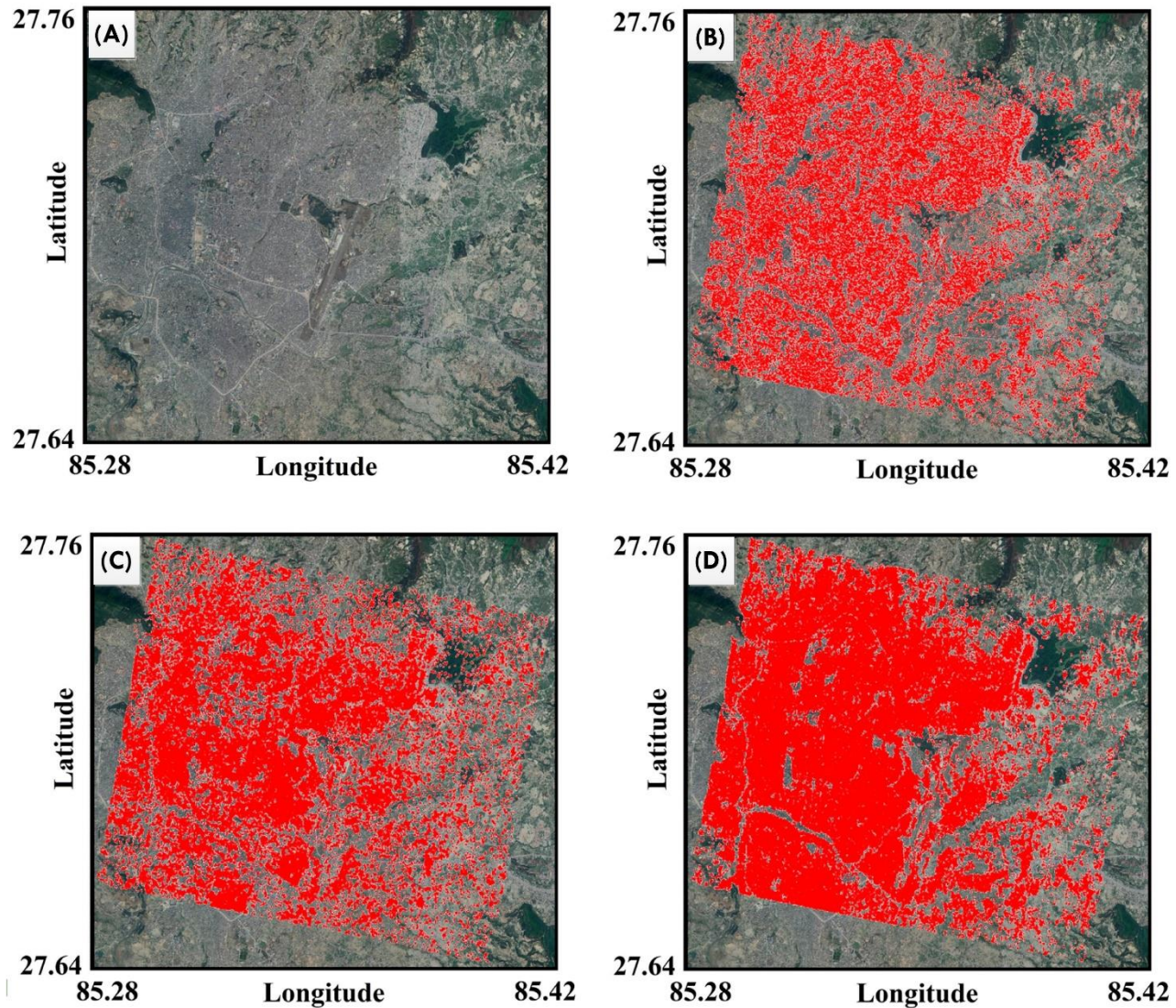


Models for Persistent Scatterer Selection

Models proposed for
displacement estimation



Results for Persistent Scatterer Selection



**Highest Accuracy: 93.1 % by
CLSTM-ISS model**

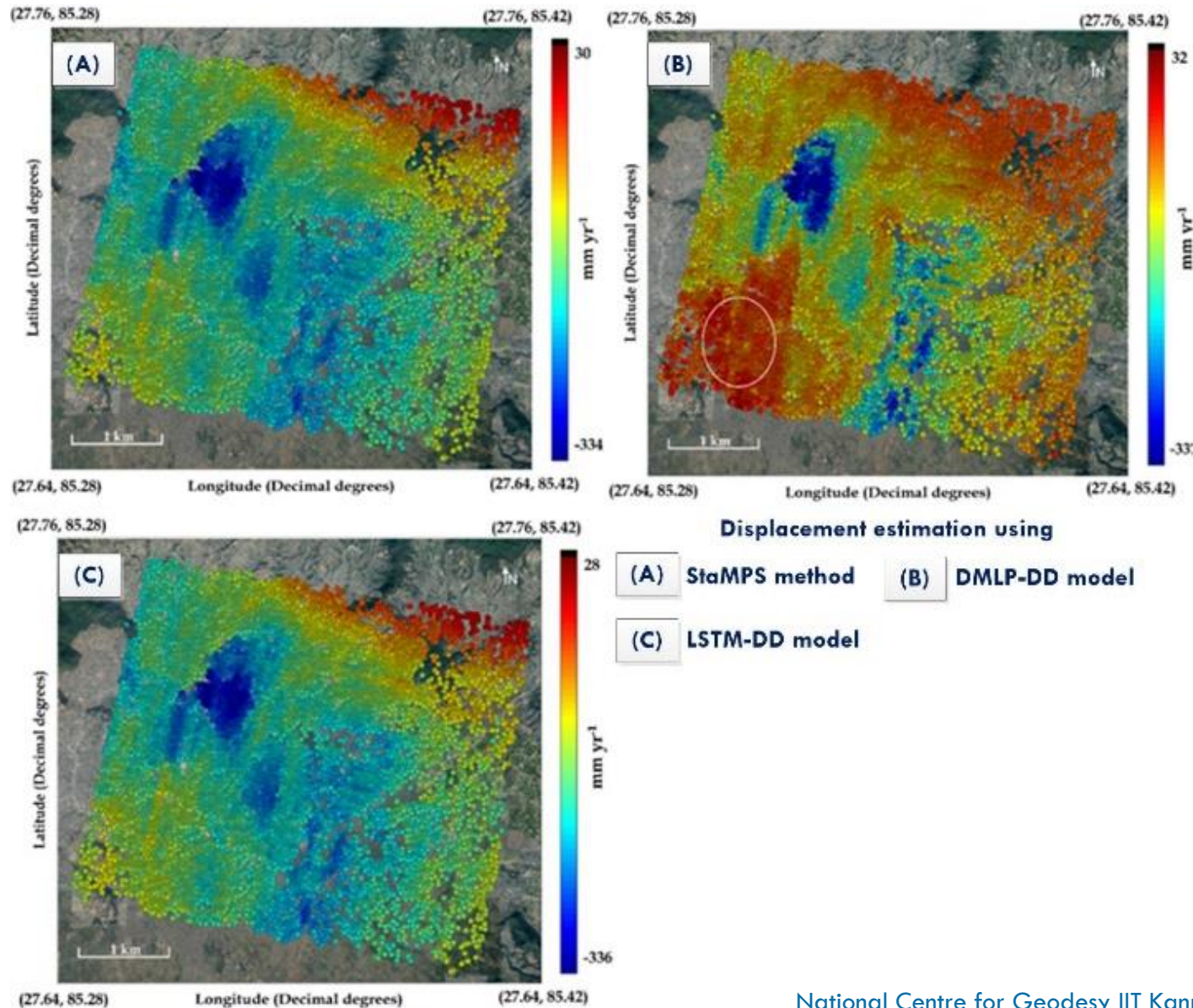
(A) Test dataset

(B) StaMPS results

(C) CNN-ISS results

(D) CLSTM-ISS results

Results for Persistent Scatterer Selection



Discrepancy	% of pixels	
	DMLP-DD	LSTM-DD
0-2 mm	36.56	75.34
2-5 mm	34.92	13.46
> 5 mm	28.52	11.20

Summary

- Proposed architectures provide better computational efficiency and reliable displacement estimation.
- Architectures now tested for longer time series.

Thanks for your attention