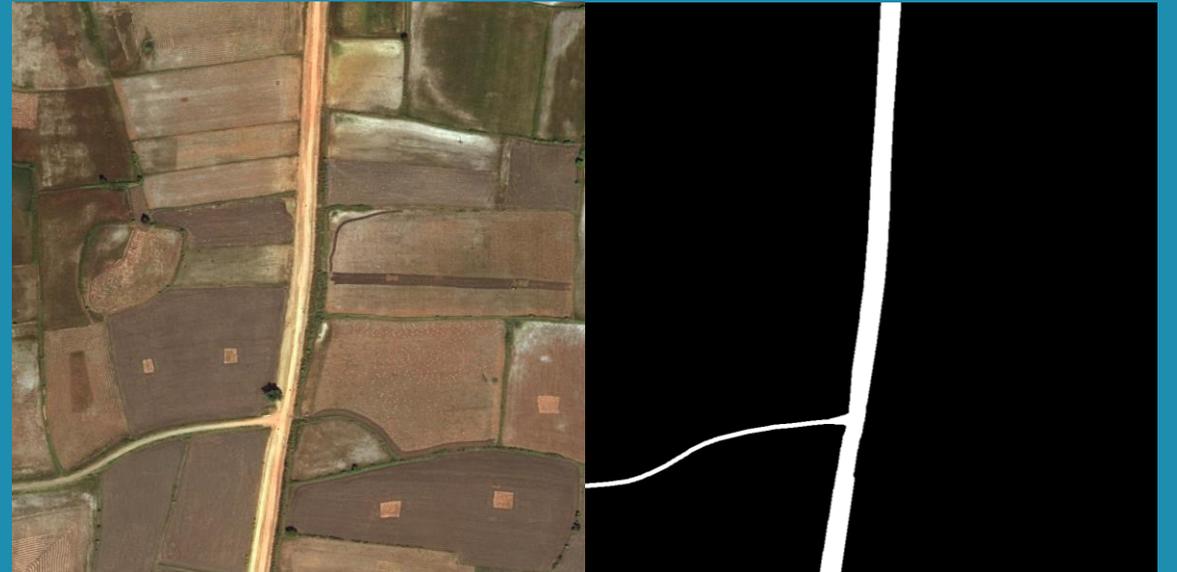


Satellite Imagery and Dynamic Inference

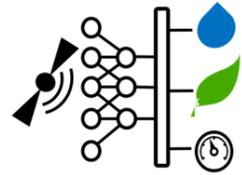


Speaker: Mingshi Li

Advisor: Matthew Blaschko, Zifu Wang

PSI(Processing Speech & Images)-ESAT, KU Leuven

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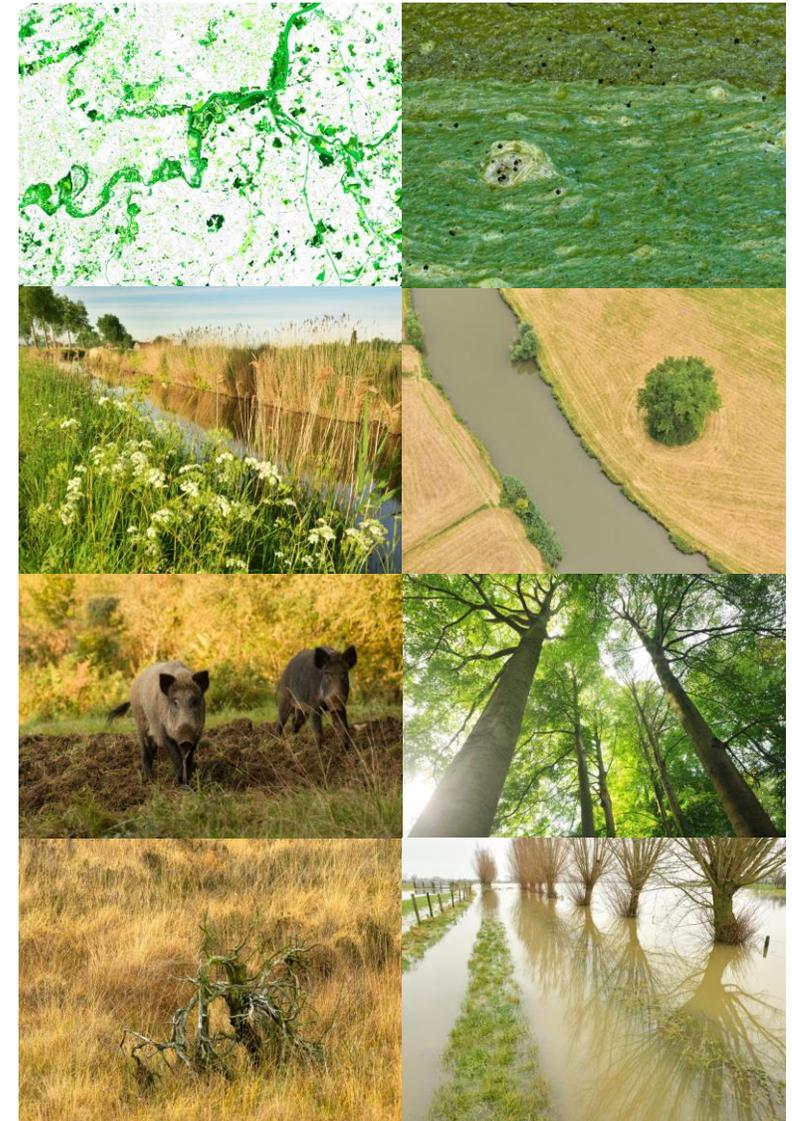


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Remote sensing and deep learning for
environmental policy support



Three Themes



Eight Uses

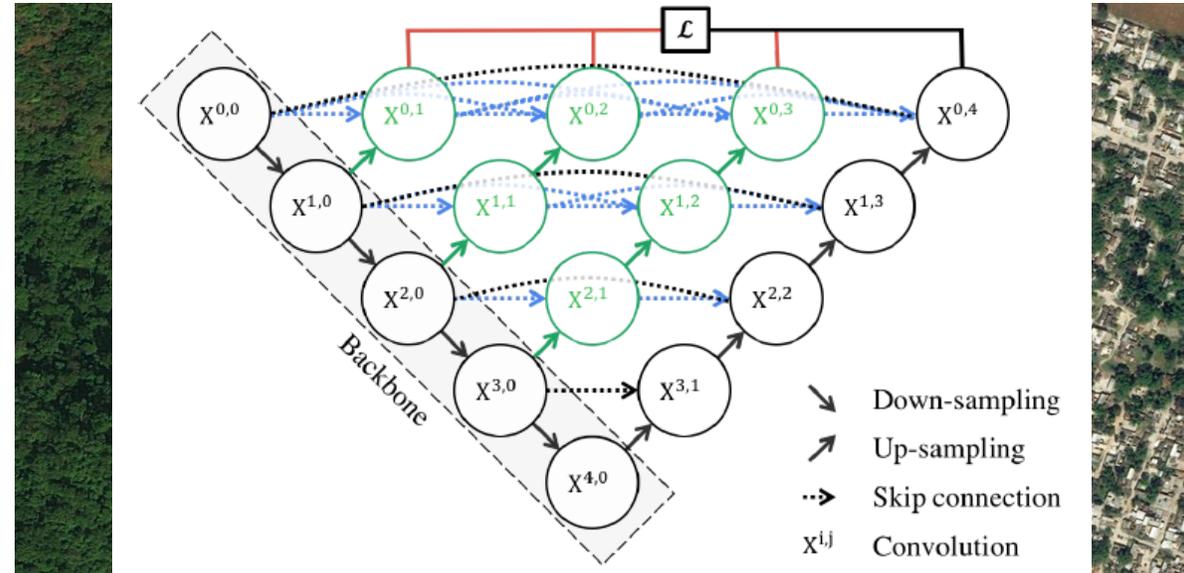
Some Facts

- Sentinel-2 earth scanning mission
- One download run per 50 minutes
- All land surfaces in 5 days at a resolution of 10~60 metres
- Huge amount of image data: 1TByte per day transmitted, 2.5 TByte per day processed
- User-end data overflow



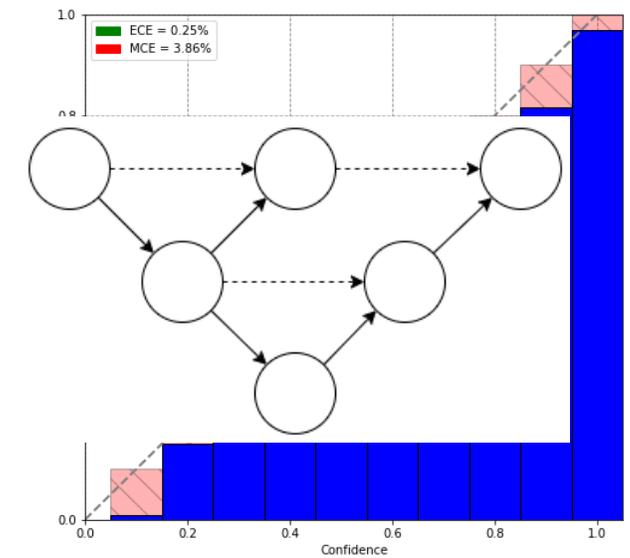
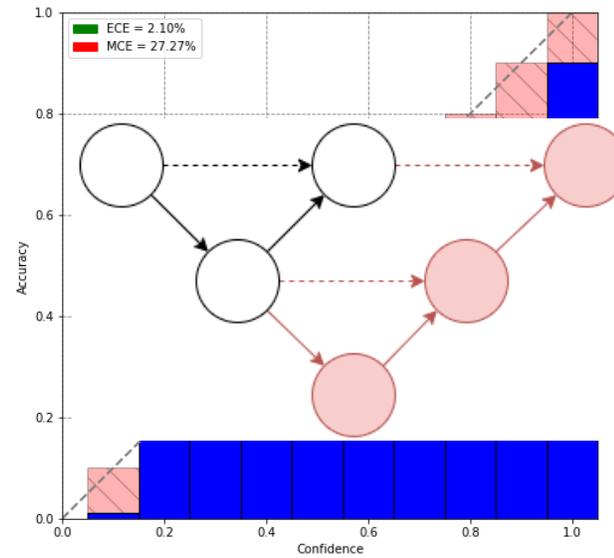
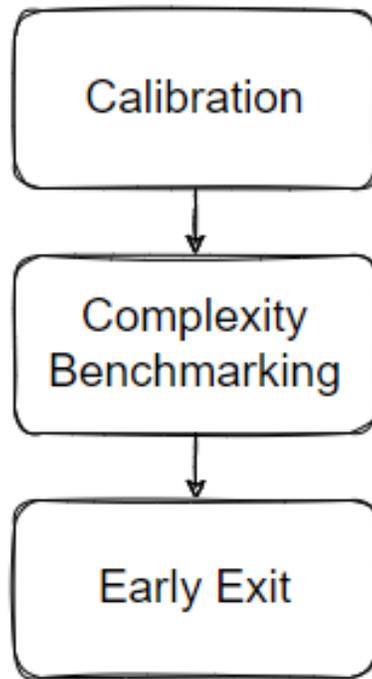
Deep Learning & Models

- Nested Unet
- Image difficulty: varied!
- Speed: slow
- Computation cost: Fixed for every batch of input

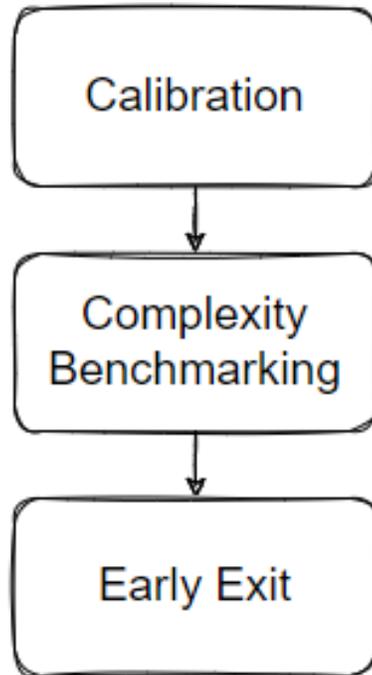


Speed Up!

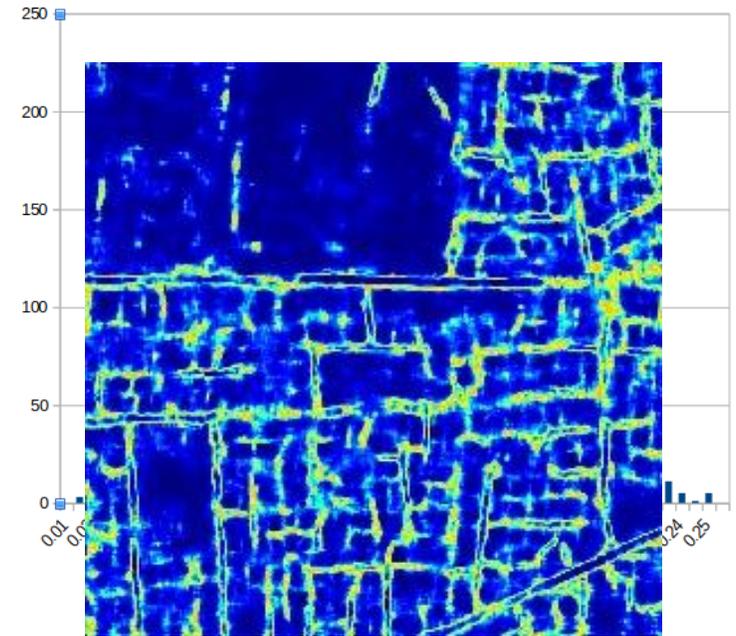
Early Exit & Calibration



Pruning with Complexity



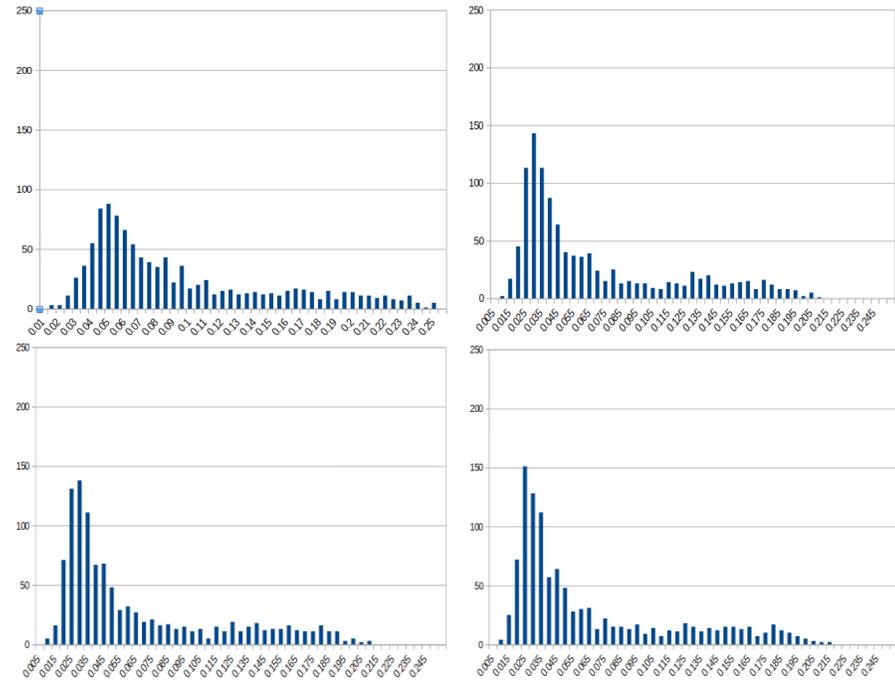
Original



Entropy heatmap

Technical Details

- DeepGlobe-CVPR18 challenge
- Temperature scaling
- Entropy: $p \cdot \log(p) + (1-p) \cdot \log(1-p)$



Output Node	GMACs
1	4.03
2	10.41
3	20.42
4	34.66

Thresholds	0.05	0.06	0.07	0.08	0.09	0.1	0.1	0.12
Exits	306	450	547	621	686	739	783	810
Improvement (GMACs)	9290	13784	16755	19021	21012	22636	23983	24810

Trials of different thresholds on first exit node(1101 samples)

Collaborators



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Thank you!