Be the Change You Want to See:
Revisiting Remote Sensing Change Detection Practices

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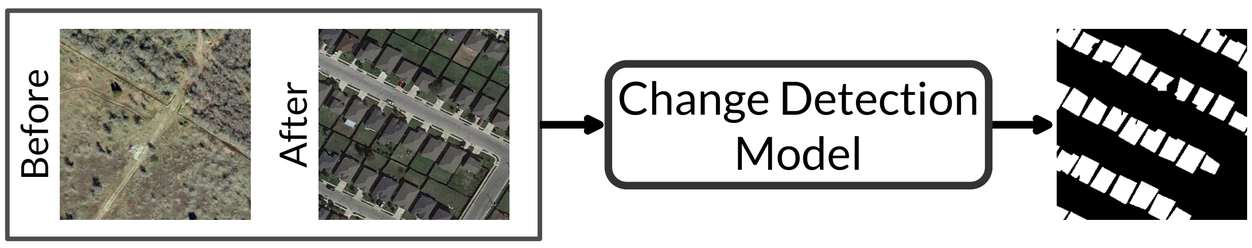
Remote Sensing Change Detection

- Localise relevant changes in remote sensing imagery

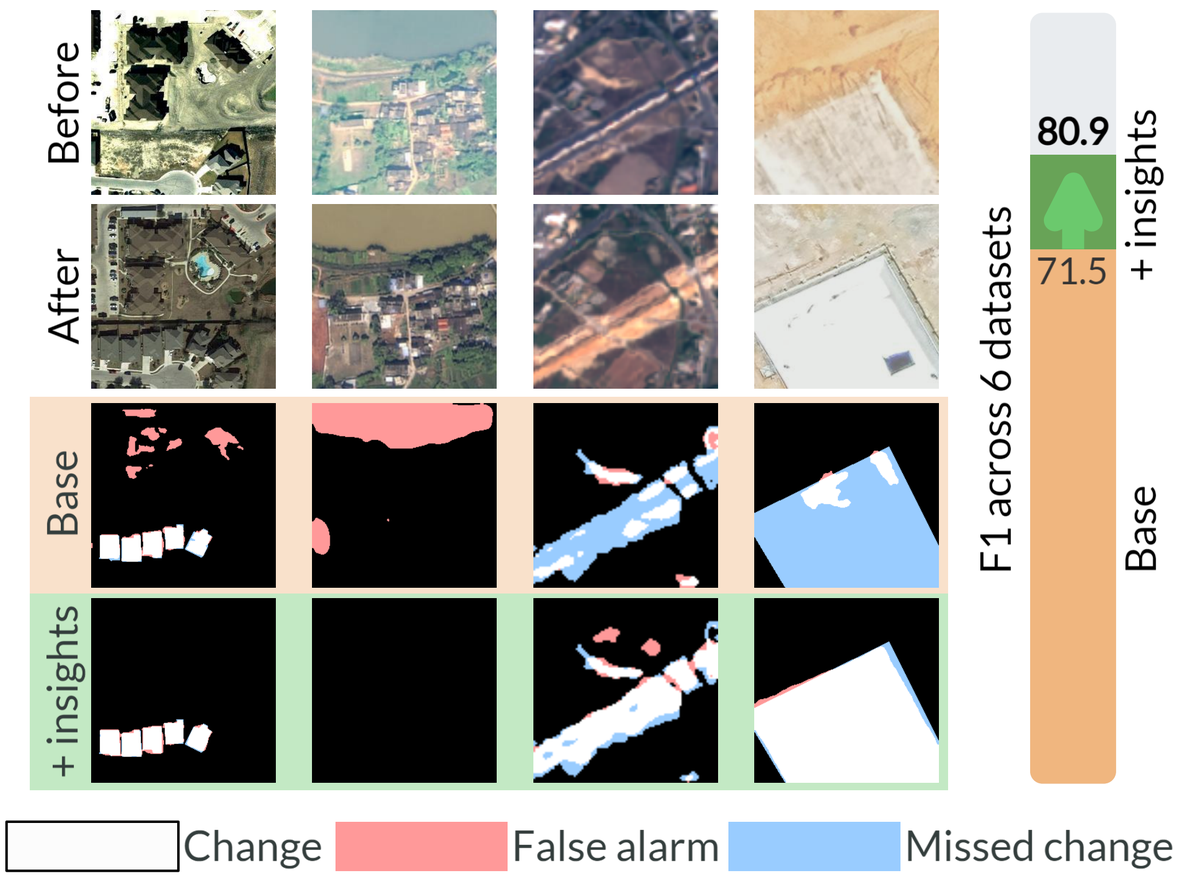


Problem with existing methods

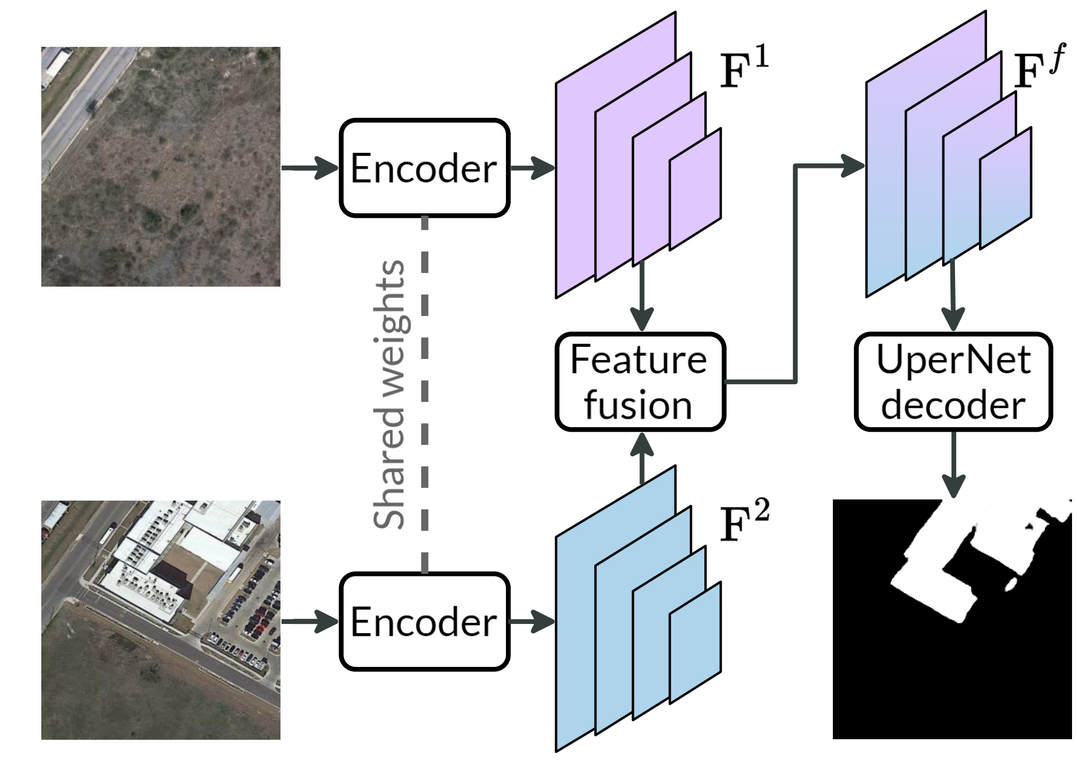
- Focus on architectural innovation, neglect basic components
- Lack of systematic analyses regarding core components

Contribution

- **Systematic analysis** of **core design choices**
- **Generalisation** of our findings **to existing methods**
- **BTC** (**B**e **T**he **C**hange) - simple yet powerful **change detection model** - a **strong foundation** for the future



BTC - Be The Change



Analysis of Key Design Choices

	SYSU	LEVIR	EGYBCD	GVLM	CLCD	OSCD	*Avg*
Swin-T	77.0	88.2	76.7	87.5	62.7	37.0	71.5
+ IN1k pre-train	82.0 +5.0	91.0 +2.8	83.5 +6.8	88.8 +1.3	74.6 +11.9	47.6 +10.6	77.9 +6.4
+ Flip augment	81.3 -0.7	91.4 +0.4	85.4 +1.9	90.0 +1.2	78.7 +4.1	51.0 +3.4	79.6 +1.7
⟲ CityS. pre-train	81.0 -0.3	91.5 +0.1	85.9 +0.5	90.1 +0.1	79.1 +0.4	54.8 +3.8	80.4 +0.8
+ Cosine scheduler	81.0 0	91.6 +0.1	**86.2** +0.3	90.5 +0.4	79.4 +0.3	**54.9** +0.1	80.6 +0.2
⟲ Swin-B	81.8 +0.8	**91.7** +0.1	86.0 -0.2	**90.7** +0.2	**81.6** +2.2	52.4 -2.5	80.7 +0.1
⟲ Dice loss	**82.4** +0.6	91.5 -0.2	85.6 -0.4	90.7 0	80.9 -0.7	54.3 +1.9	**80.9** +0.2

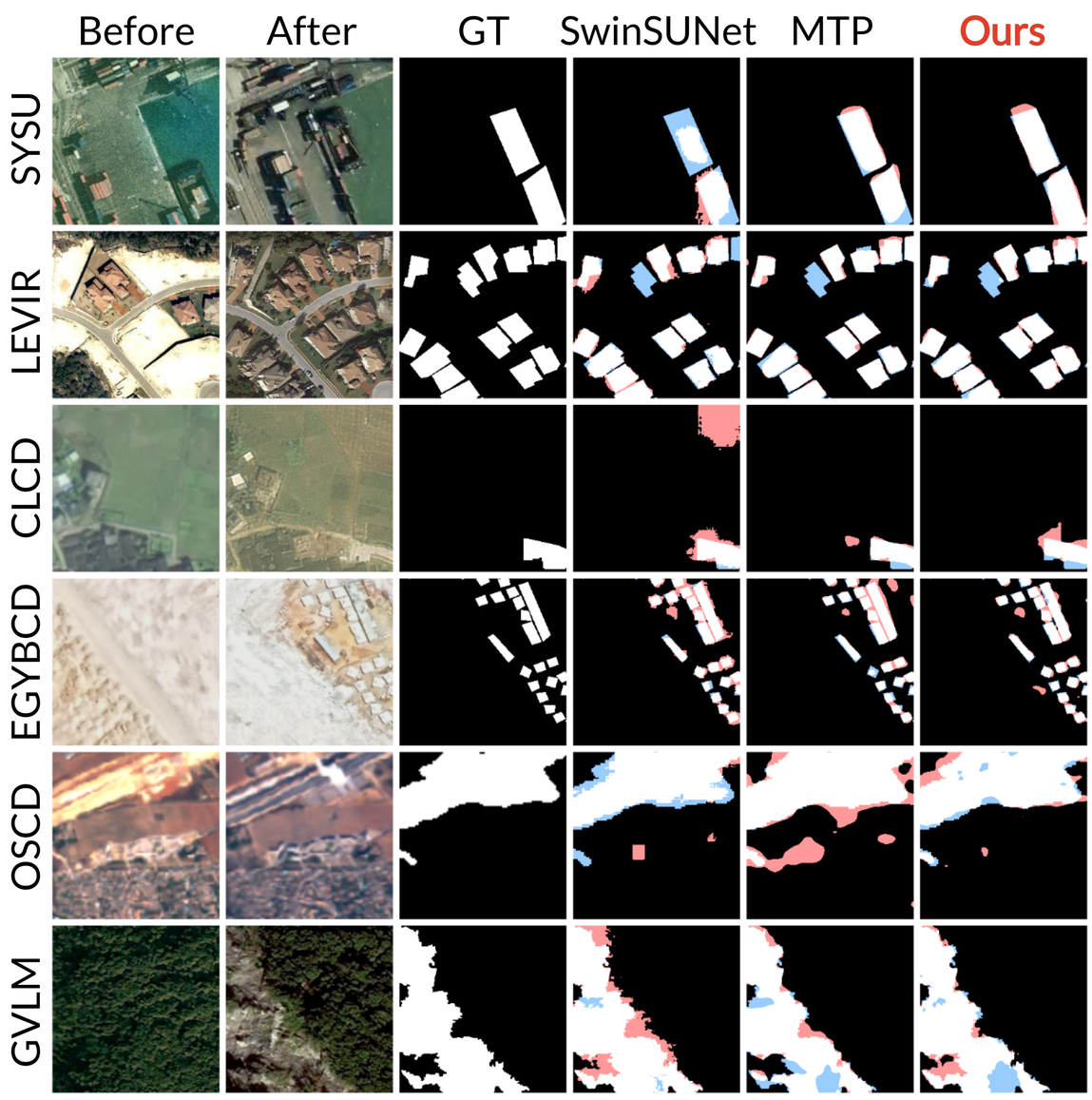
Results

- Comparison with SOTA

	Backbone	Pre-train	FPS [img/s]	Param. [M]	*Avg & std*
FCS-Diff	UNet	-	170.1	1.4	60.5 ±0.5
BIT	RN-18	IN1k	57.7	12.4	73.0 ±0.4
ChangeFormer	MiT-B0	-	36.2	41.0	73.8 ±0.3
BiFA	MiT-B0	ADE20k	32.2	9.9	76.3 ±0.8
SeCo	RN-50	RS	100.7	64.0	77.0 ±0.2
SwinSUNet	Swin-T	IN1k	33.1	43.6	78.0 ±0.4
CaCo	RN-50	RS	100.9	64.0	79.3 ±0.0
SatMAE	ViT-L	RS	71.2	322.6	79.5 ±0.2
GFM	Swin-B	RS	44.9	120.5	79.6 ±0.3
GeSSL	RN-50	RS	100.4	64.0	79.7 ±0.2
MTP	ViT-B + RVSA	RS	31.2	107.8	80.3 ±0.1
BTC T (Ours)	Swin-T	CityS.	57.8	58.9	80.5 ±0.2
BTC B (Ours)	Swin-B	CityS.	32.4	120.1	**80.9** ±0.0

- Generalisation to existing methods

	SeCo	CaCo	SatMAE	GFM	GeSSL	MTP	FCSiamD	SwinSUN
Base	74.0	75.7	77.1	77.7	75.9	77.2	60.5	78.0
+ Opt.	77.0 +3.0	79.3 +3.6	79.5 +2.4	79.6 +1.9	79.7 +3.8	80.3 +3.1	77.4 +16.9	79.6 +1.6



Key Insights

- Simple choices like *encoder architecture and pre-training*, paired with *basic augmentations* have a *large impact* on performance
- Insights *generalise* to related work, indicating future potential

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