

Towards Automatic Transformer-based Cloud Classification and Segmentation

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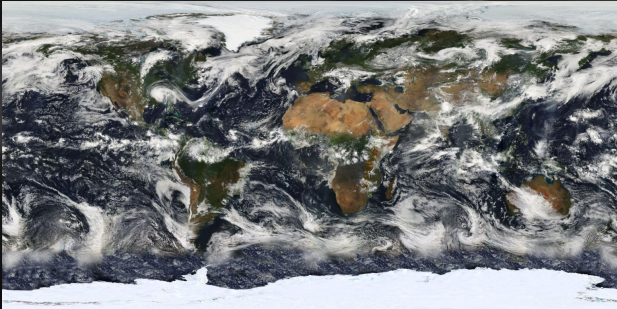
Agenda

- Introduction and Motivation
- Cloud Classification and Segmentation Methodology
- Results
- Outputs Visualized!

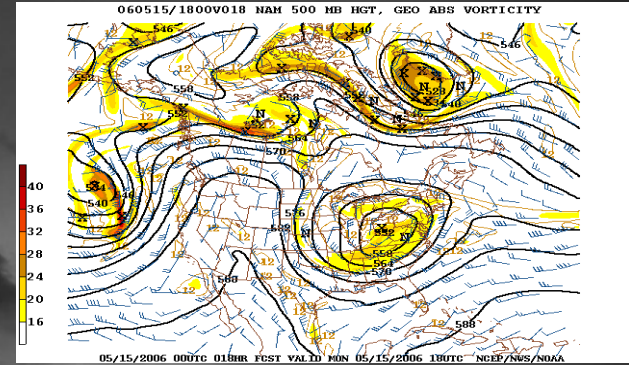
Introduction and Motivation



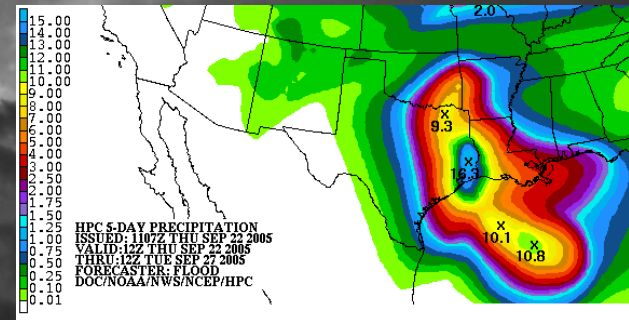
Solar Energy Power Plants



Cloud Cover Estimation



Weather Prediction System



Rainfall Estimation System

Cloud Classification



Altostratus



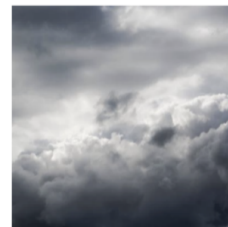
Altostratus



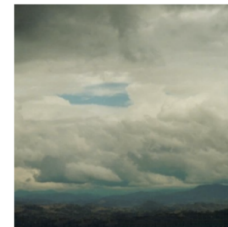
Cumulonimbus



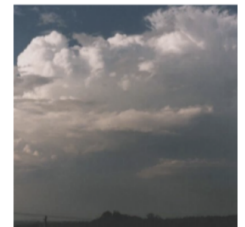
Cirrocumulus



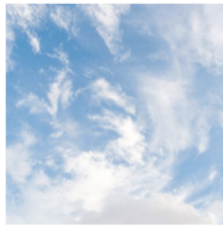
Nimbostratus



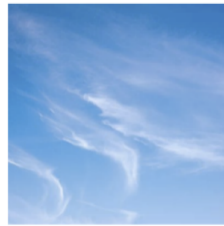
Stratocumulus



Stratus



Cirrus



Cirrostratus



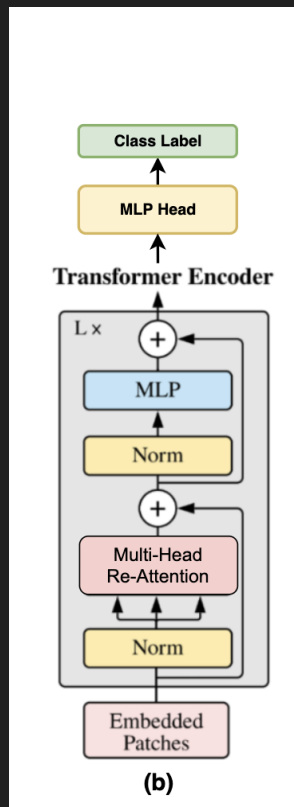
Contrail



Cumulus

Cirrus Cumulus Stratus Nimbus Dataset (CCSN)

Method

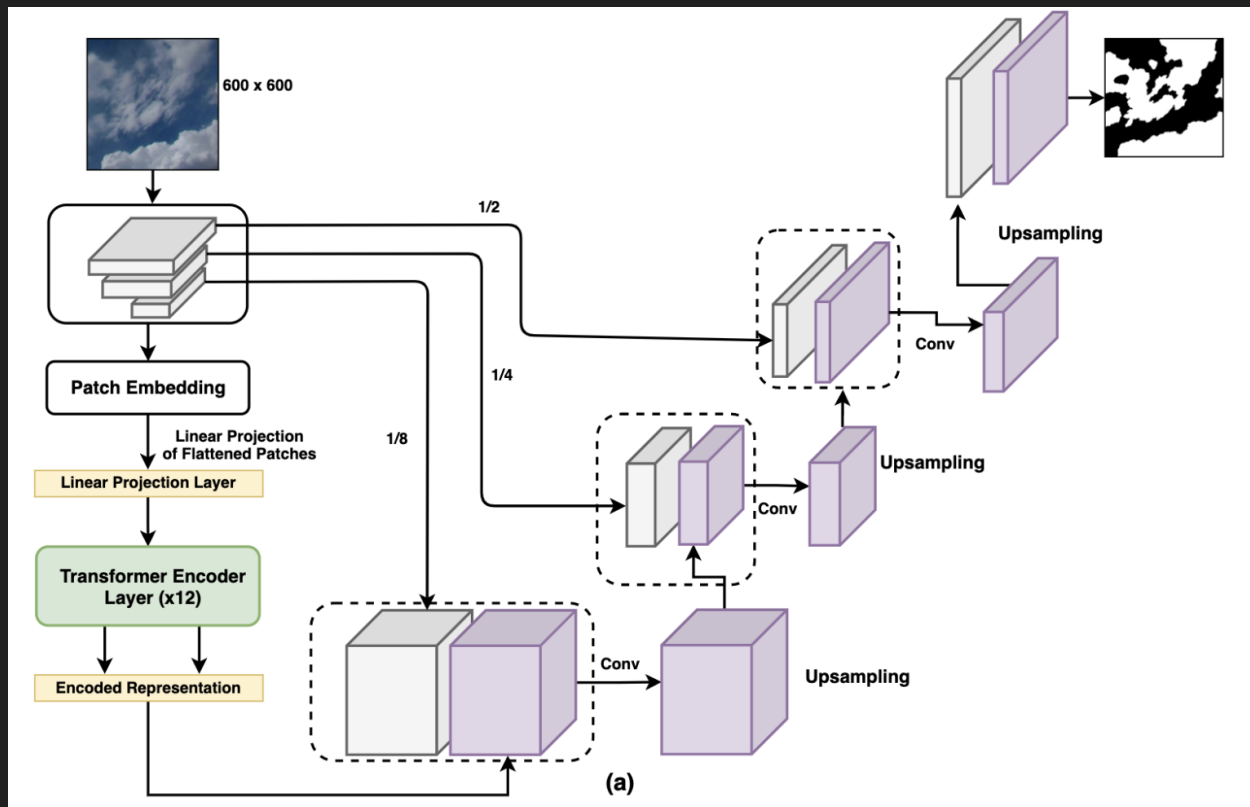


Cloud Segmentation



Singapore Whole Sky Imaging Segmentation Database (SWIMSWG)

Method



Quantitative Results

	Ci	Ac	As	Cu	Cb	Ct	Sc	St	Mean
Accuracy (%)	91.30	94.50	69.29	96.73	91.70	100	68.92	88.14	90.06
F1 score	0.96	0.96	0.59	0.96	0.92	1	0.69	0.82	0.89
Precision	0.92	0.92	1	0.92	0.92	1	0.72	0.9	0.91
Recall	1	1	0.72	1	0.92	1	1	0.75	0.92

CloudViT Classification metrics on CCSN Dataset

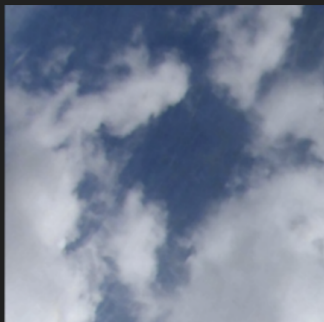
Model	mIoU	mDice
U-Net (12)	0.7626	0.8388
DeepLabV3 (3)	0.6281	0.7036
PLS (4)	0.6467	0.6919
CloudUT (Ours)	0.832	0.8927

Comparison on **SWIMSWG** dataset

	Precision	Recall	F1	Accuracy
ResNet	0.84	0.82	0.81	83.30
CNet (18)	0.84	0.87	0.86	87.62
CloudViT	0.91	0.92	0.89	90.06

Comparison on CCSN dataset

Qualitative Results



Input Image



Ground Truth



Predicted Map



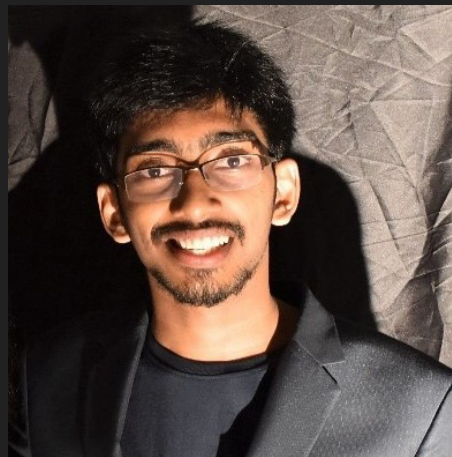
Segmentation output on
CCSN dataset

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