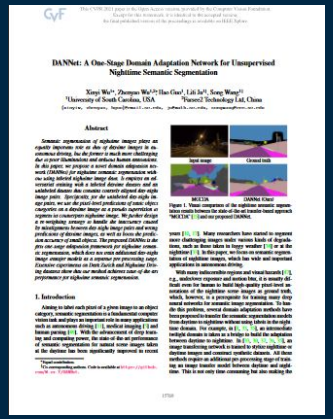
Vérification des performances d'un modèle de Deep Learning

DANNet: A One-Stage Domain Adaptation Network for Unsupervised Nighttime Semantic Segmentation

L'article

DANNet: A One-Stage Domain Adaptation Network for Unsupervised Nighttime Semantic Segmentation


DANNet: A One-Stage Domain Adaptation Network for Unsupervised Nighttime Semantic Segmentation

Abstract

1. Introduction

AUTEURS

Zhenyao Wu
Xinyi Wu
Hao Guo
Lili Ju
Song Wang

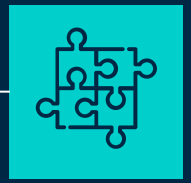
DATE

Juin 2021

CONFÉRENCE

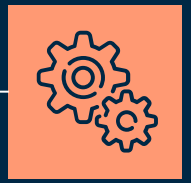
Computer Vision and Pattern Recognition (CVPR)

Sommaire



01

PROBLEME



02

SOLUTION

03

RÉSULTATS

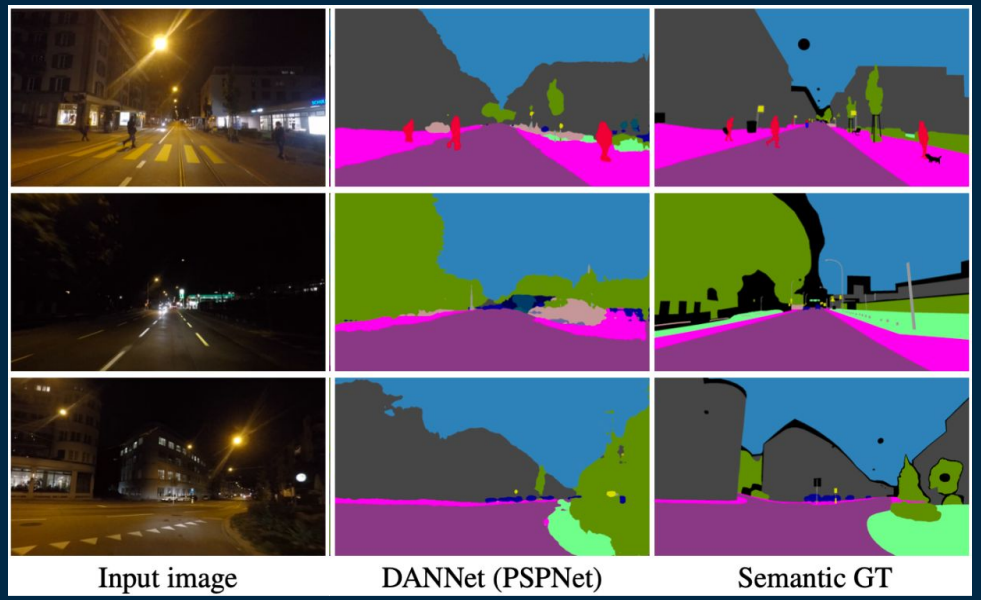
LE PROBLÈME

01

1 – LE PROBLÈME

Objectifs

Segmentation d’images de nuit non labellisées



1 – LE PROBLÈME

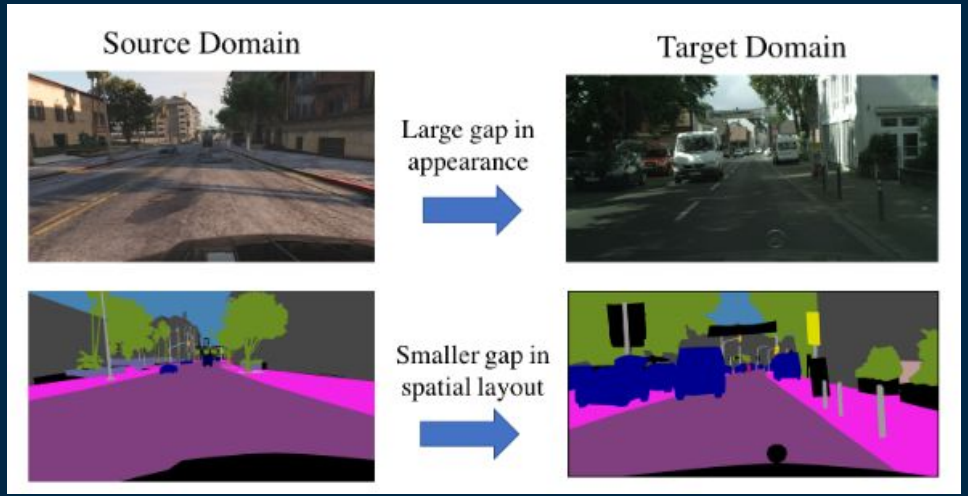
Adaptation de domaine

Domaine source

On dispose de connaissances et de vérité terrain

Domaine cible

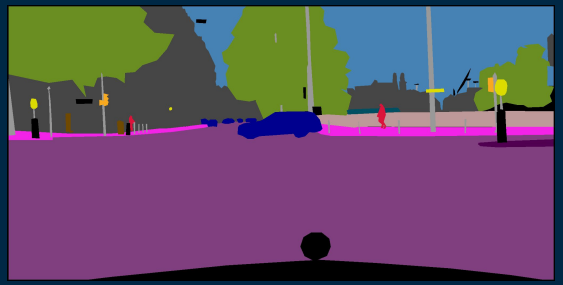
Vérité terrain inconnue



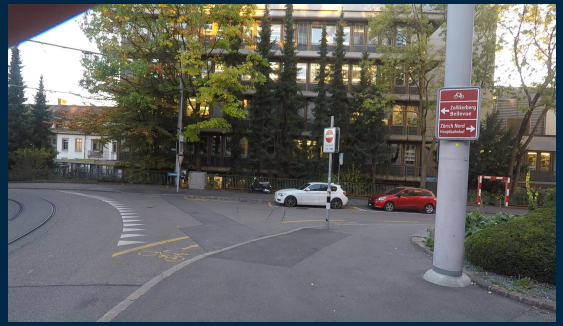
Source : https://arxiv.org/pdf/1802.10349.pdf

1 – LE PROBLÈME

Les données d'apprentissage



CITYSCAPES DATASET



Dark_Zurich

1 – LE PROBLÈME

Les données de test

Dark_Zurich

Nighttime Driving

02

LA SOLUTION

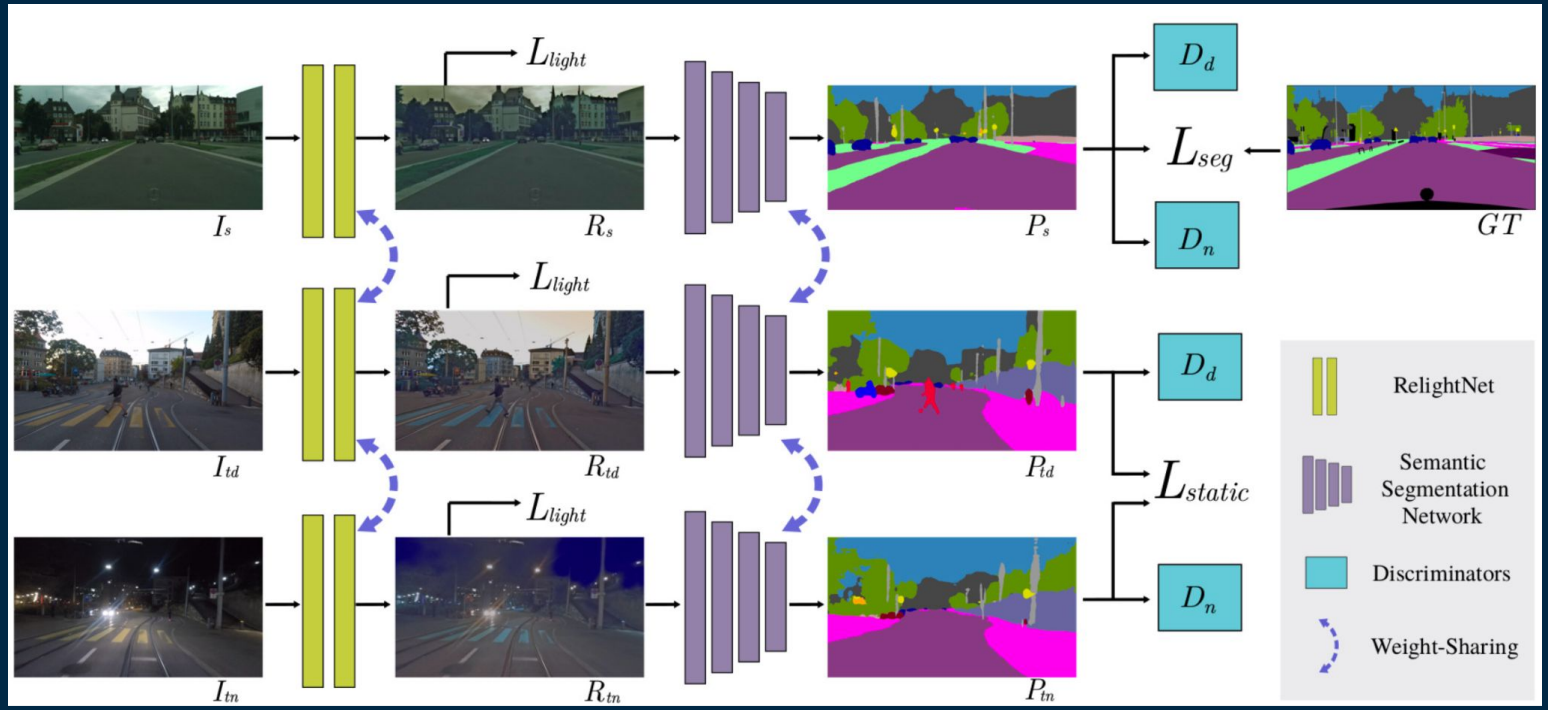
2 – LA SOLUTION

Structure du DANNet

CITYSCAPES DATASET

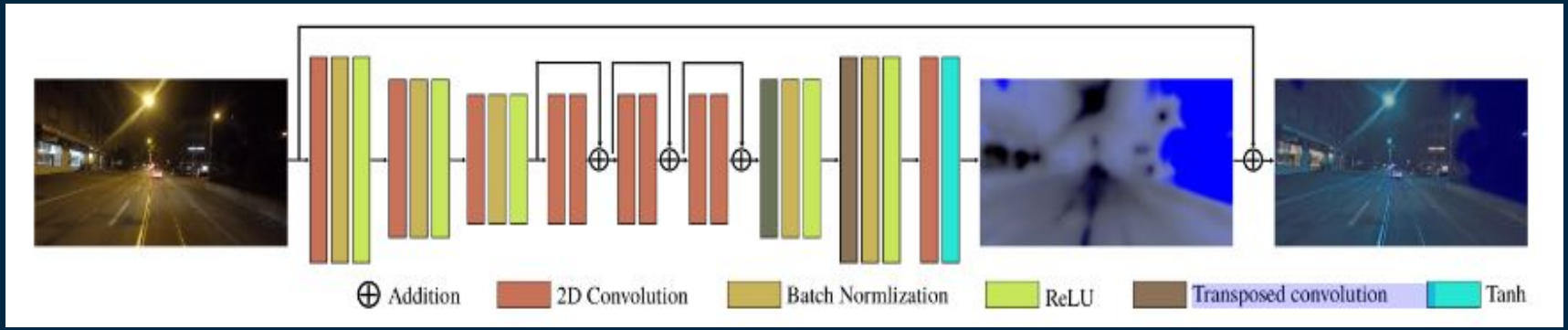
Dark_Zurich

Dark_Zurich



2 – LA SOLUTION

Relight



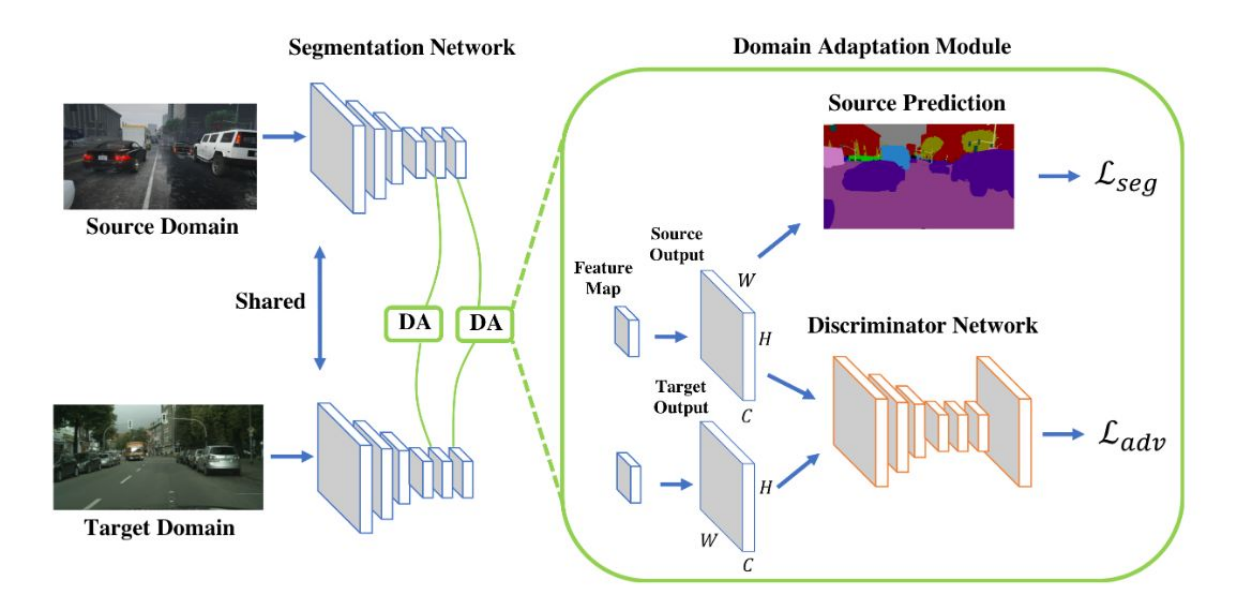
2 - LA SOLUTION

Segmentation

- PSPNet : https://arxiv.org/pdf/1612.01105.pdf
- RefineNet : https://arxiv.org/pdf/1611.06612.pdf
- DeepLab_v2 : https://arxiv.org/pdf/1606.00915.pdf

2 - LA SOLUTION

Discriminateurs

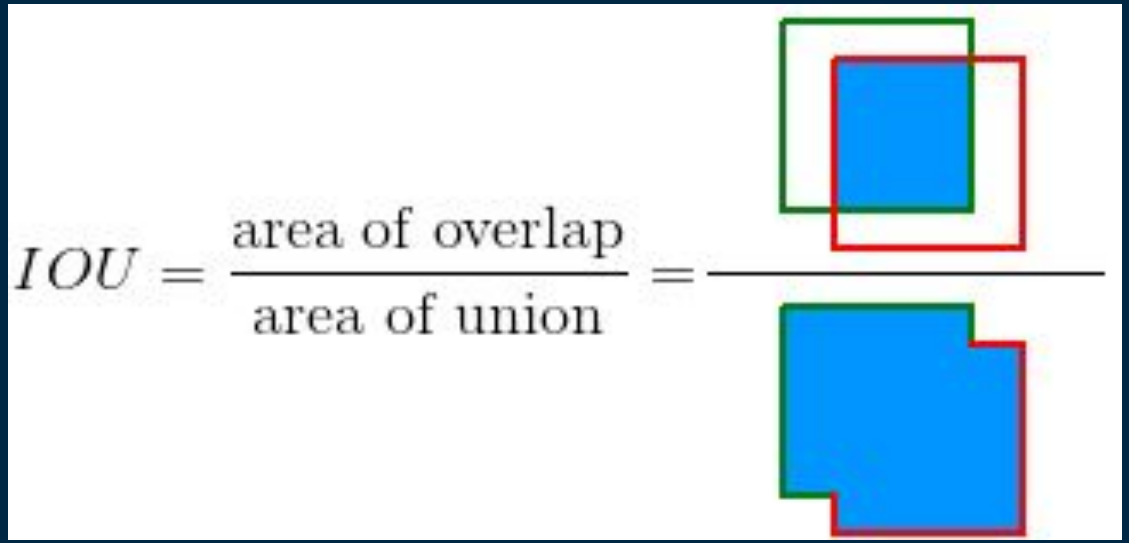


Source : https://arxiv.org/pdf/1802.10349.pdf

RÉSULTATS

03

Intersection Over Union



Source : https://www.researchgate.net/figure/Intersection-Over-Union-IOU_fig2_343194514

Réseaux de segmentation

Method	road	sidewalk	building	wall	fence	pole	traffic light	traffic sign	vegetation	terrain	sky	person	rider	car	truck	bus	train	motorcycle	bicycle	**mIoU**
DANNet (DeepLab-v2)	88.6	53.4	69.8	34.0	20.0	25.0	31.5	35.9	69.5	**32.2**	82.3	44.2	43.7	54.1	22.0	0.1	40.9	36.0	**24.1**	42.5
DANNet (RefineNet)	90.0	54.0	**74.8**	**41.0**	21.1	25.0	26.8	30.2	**72.0**	26.2	**84.0**	47.0	33.9	68.2	19.0	**0.3**	66.4	38.3	23.6	44.3
DANNet (PSPNet)	**90.4**	**60.1**	71.0	33.6	**22.9**	30.6	34.3	33.7	70.5	31.8	80.2	45.7	41.6	67.4	16.8	0.0	**73.0**	31.6	22.9	**45.2**

3 – RÉSULTATS

Notre instance du modèle

Langage

Nombre d'epoch des réseaux pré-entraînés

150 000

Nombre d'epoch des auteurs

35 000 avec un GPU 2080TI

Nombre d'epoch de notre réseau

13 000 en 48h

3 – RÉSULTATS

Segmentations obtenues

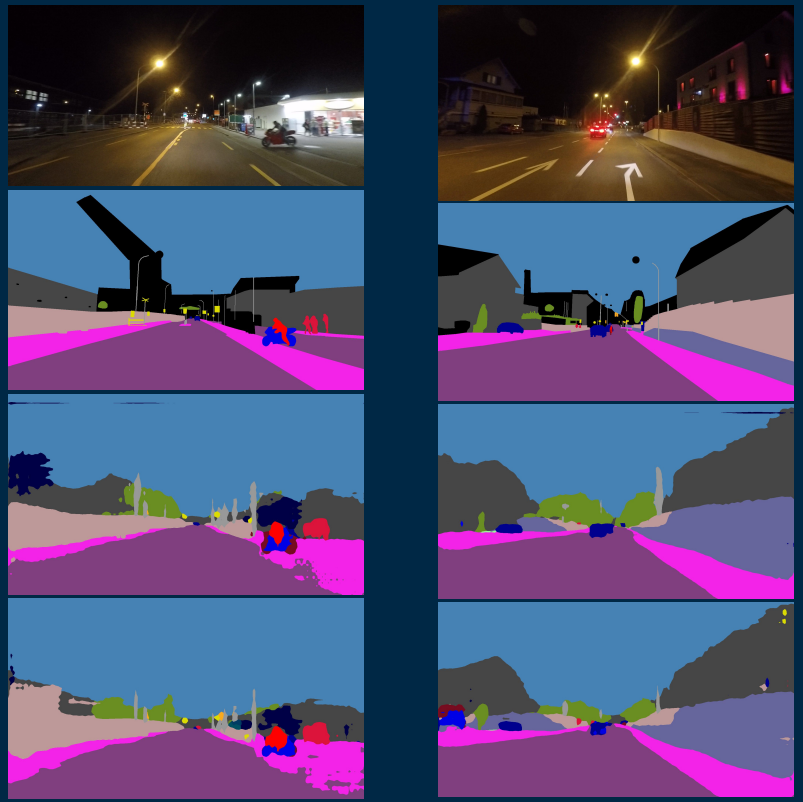
Source

Ground Truth

Dark_Zurich

Modèle entraîné des auteurs

Notre modèle entraîné



Performances sur Zurich-val

```
Num classes 19
===>road:       90.93
===>sidewalk:   59.35
===>building:   77.08
===>wall:       37.79
===>fence:      40.35
===>pole:       14.08
===>light:      39.95
===>sign:       14.15
===>vegetation: 68.26
===>terrain:    28.61
===>sky:        82.91
===>person:     21.01
===>rider:      25.44
===>car:        46.99
===>truck:      0.0
===>bus:        0.0
===>train:      0.0
===>motocycle:  10.21
===>bicycle:    41.33
===> mIoU: 36.76
```

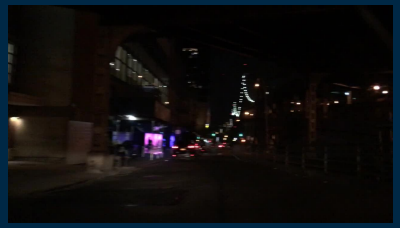
35000 epochs

```
Num classes 19
===>road:       89.1
===>sidewalk:   58.17
===>building:   71.77
===>wall:       34.51
===>fence:      38.67
===>pole:       14.53
===>light:      26.16
===>sign:       6.35
===>vegetation: 63.06
===>terrain:    27.11
===>sky:        79.88
===>person:     21.33
===>rider:      29.14
===>car:        48.62
===>truck:      0.0
===>bus:        0.0
===>train:      0.0
===>motocycle:  7.6
===>bicycle:    24.17
===> mIoU: 33.69
```

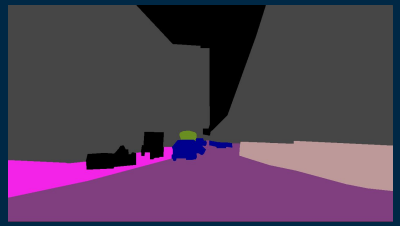
13000 epochs

Résultats sur les données Berkeley DeepDrive

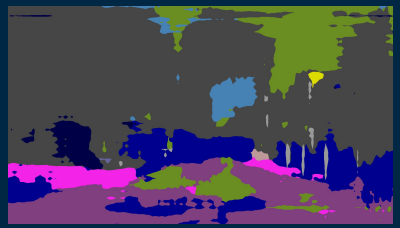
Source



Ground Truth



Notre modèle entraîné



BAIR
BERKELEY ARTIFICIAL INTELLIGENCE RESEARCH