TELECOM SudParis

INSTITUT POLYTECHNIQUE DE PARIS

MID-TERM PRESENTATION

DEEP LEARNING BASED METHOD FOR AUTOMATIC HUMAN POSE UNDERSTANGING

KAÏS DJEDDOU, ALEXANDRE MAUREL, MATISSE JEAN-MARIE ET LOUIS KEMPF

Institut Mines-Télécom

OBJECTIVES

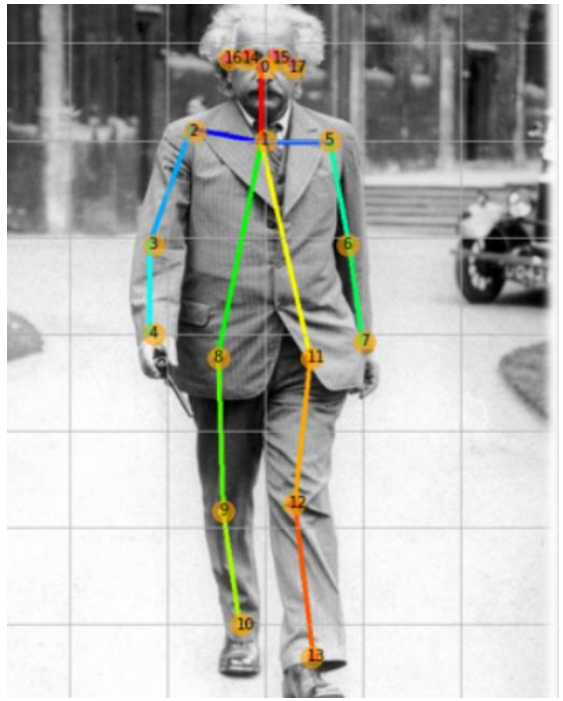
AUTOMATIC POSE RECOGNITION

1. To build basic person key-point detector with the use of Deep Learning based computer vision method.

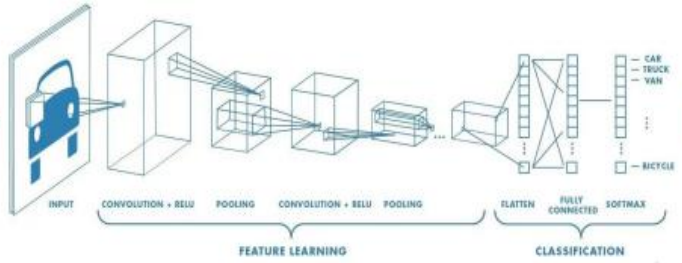
2. To evaluate the capability of the developed method on the common datasets

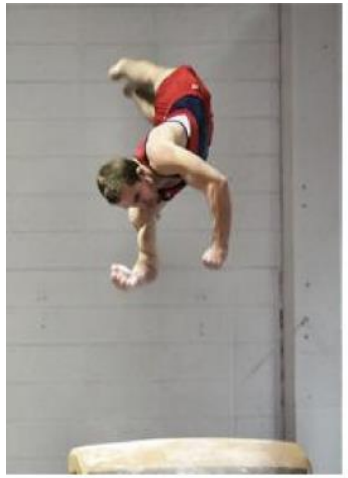
3. To apply the method on the real life setting

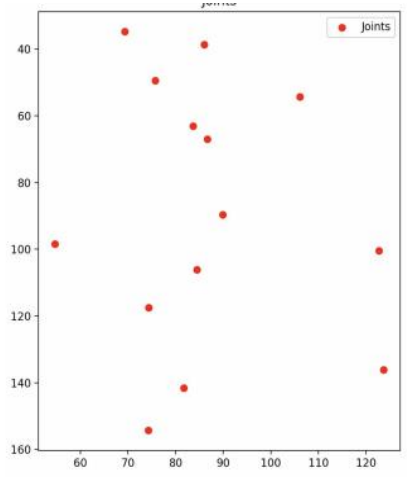
4. Use image or keypoints for action recognition



KEYPOINTS DETECTORS – DATA LOADER

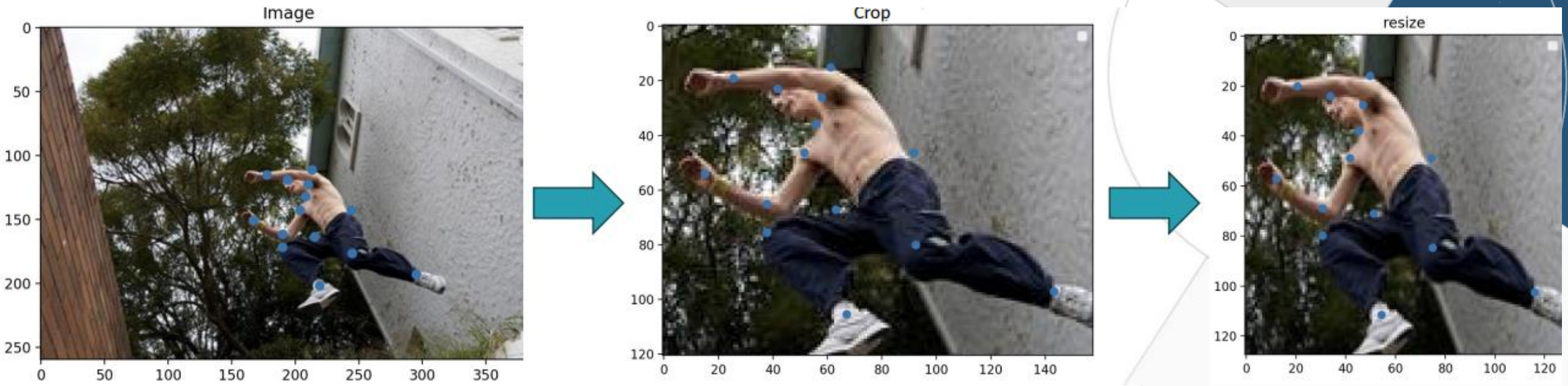






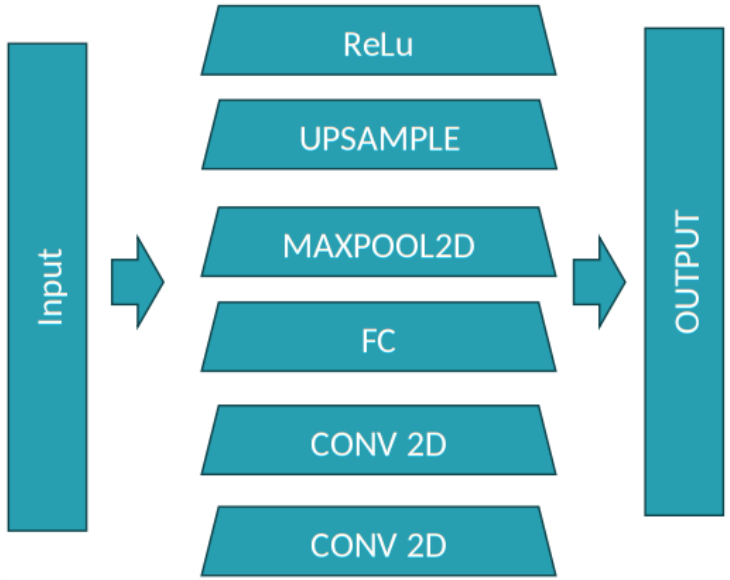
KEYPOINTS PIPELINE

DATA PROCESSING

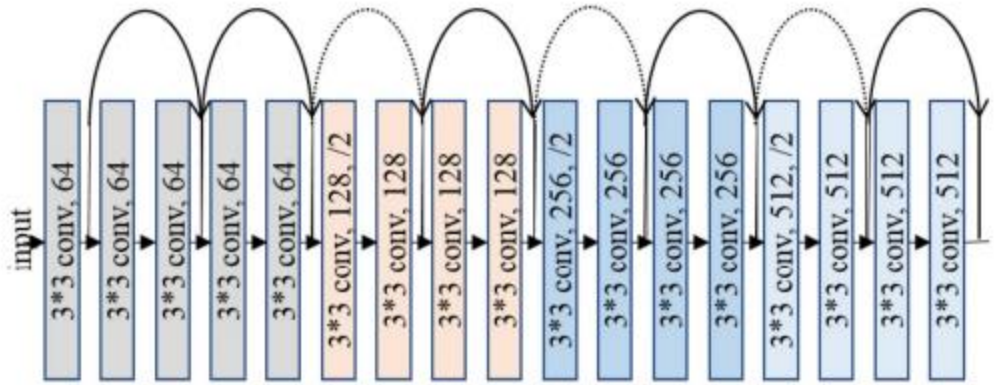


KEYPOINTS METHODS

CNN and ResNet



CNN



ResNet

DATASET : presentation mpii, lsp

Dataset 1 :

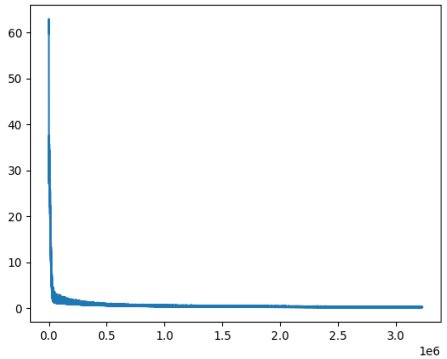
LSPe : 10 000 images with 14 joints
Trained then tested on CNN and ResNet-50

Dataset 2 :

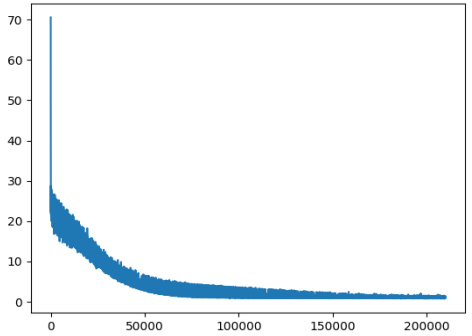
MPII : around **25 000 images with 16 joints**
Trained then tested on CNN and ResNet-50

QUANTITATIVE RESULTS

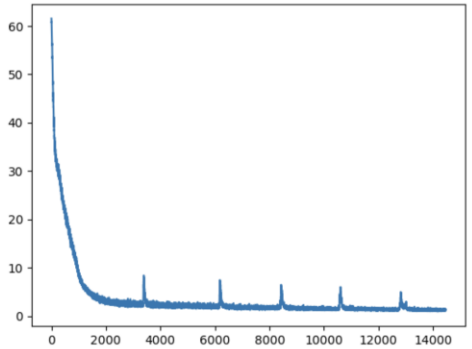
1.Loss



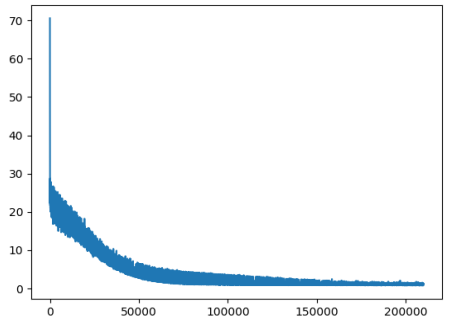
CNN + dataset 1



CNN + dataset 2



ResNet + dataset 1

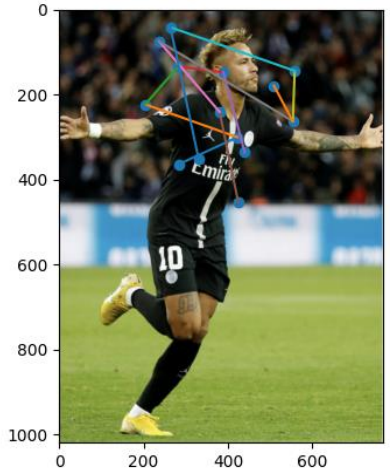


ResNet + dataset 2

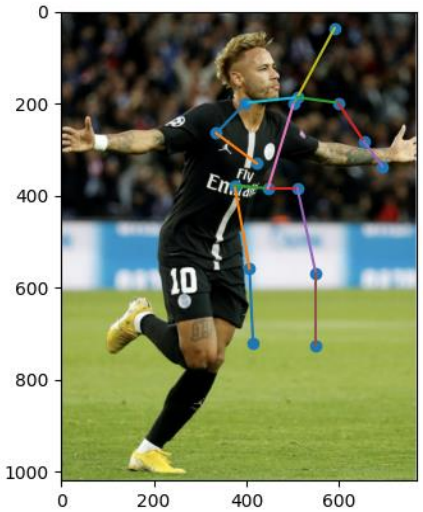
2. Mean Squared Error

Model	Dataset 1	Dataset 2
CNN	38.19	20.43
ResNet	28.58	16.51

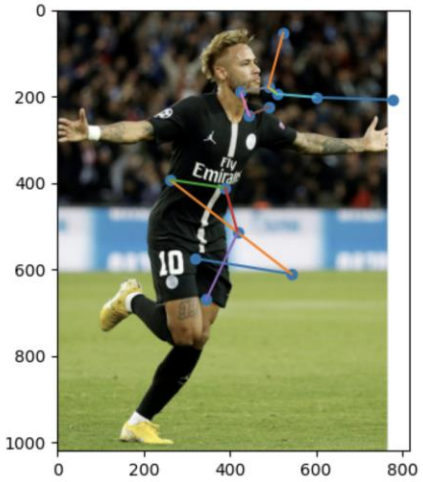
QUALITATIVE RESULTS



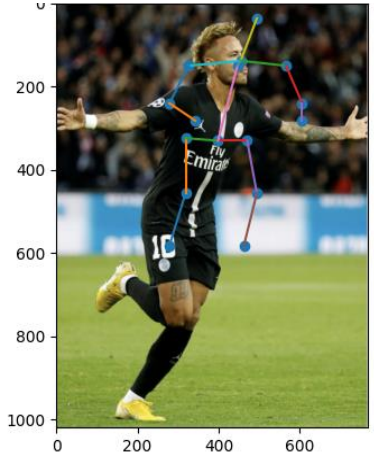
CNN + dataset 1



CNN + dataset 2



ResNet + dataset 1



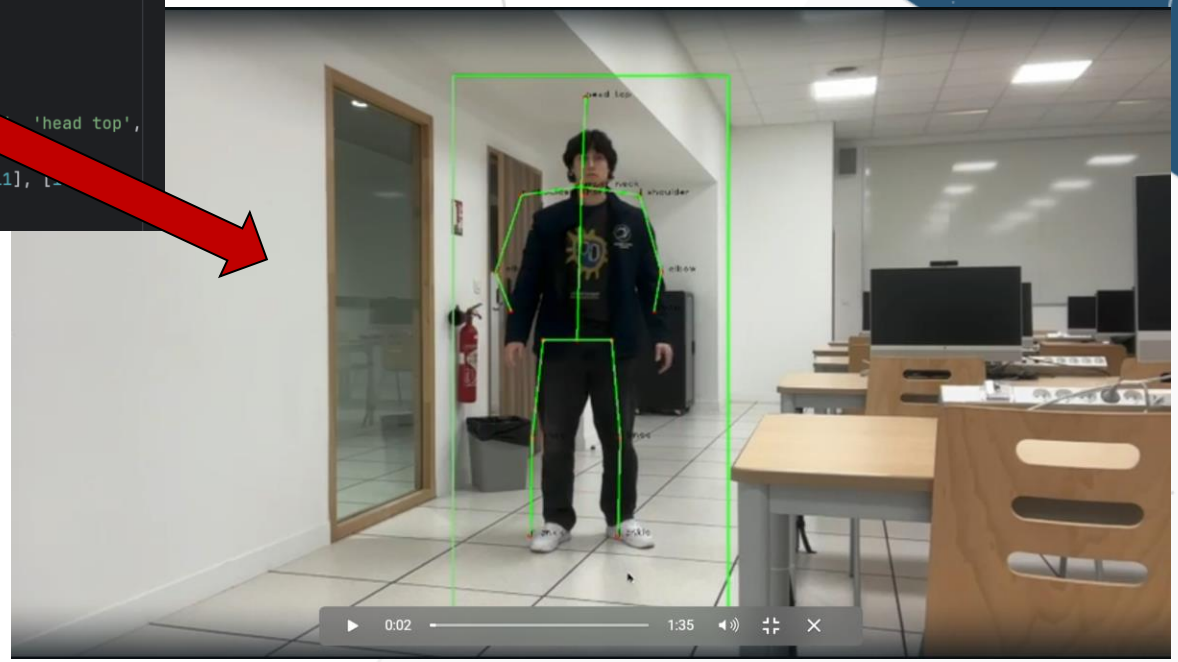
ResNet + dataset 2

REAL TIME VIDEO

Human_detection.py | utils.py | metrics.py | models.py | config.py

savingname 6/6

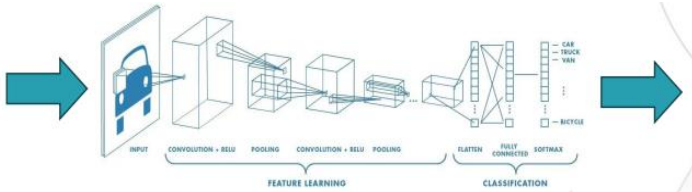
```
from utils import *
from metrics import *
from config import device
import os

ssl._create_default_https_context = ssl._create_unverified_context

joint_order = ['r ankle', 'r knee', 'r hip', 'l hip', 'l knee', 'l ankle', 'pelvis', 'thorax', 'upper nec', 'head top',
               'r wrist', 'r elbow', 'r shoulder', 'l shoulder', 'l elbow', 'l wrist']
joint_connexion = [[0, 1], [1, 2], [2, 6], [6, 3], [3, 4], [4, 5], [6, 7], [7, 8], [8, 9], [8, 12], [12, 11], [
                   [8, 13], [13, 14], [14, 15]]
```



CURRENT WORK

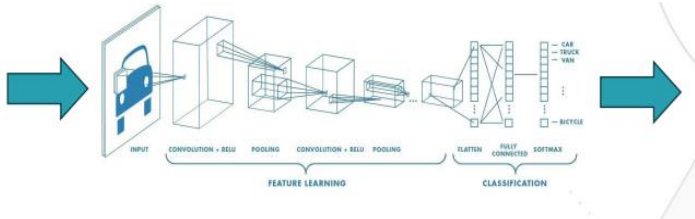
images

keypoints



1. Walking
2. Running
3. Flying
4. Swimming
5. Golfing

labels

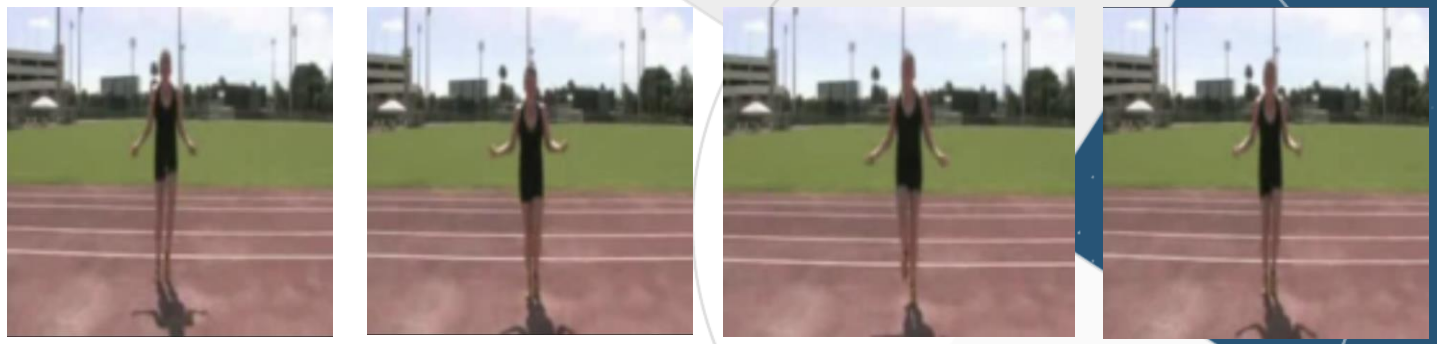


1. Walking
2. Running
3. Flying
4. Swimming
5. Golfing

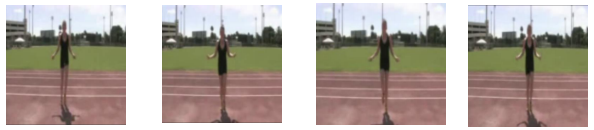
labels

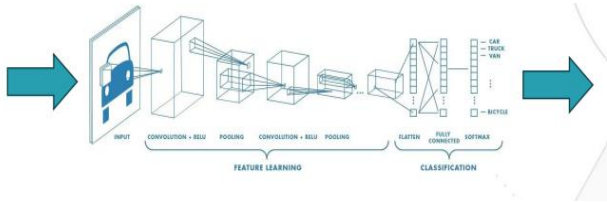
CURRENT WORK

- **New dataset : UCF101**
- Data pre-processing :
  - Statistic : 13 320 videos & 101 labels
  - Input : videos .avi
  - Output : frames (16/video) + class labels



```
================================================
Début de l'extraction des frames pour l'action : JumpRope
Dossier de destination : /home/amine_tsp/DL2026/Datasets/UCF101/mes_frames_video
Terminé ! Toutes les images sont générées.
================================================
```





1. Walking
2. Running
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ANY QUESTIONS ?

THANK YOU

- DJEDDOU Kaïs
- MAUREL Alexandre
- JEAN-MARIE Matisse
- KEMPF Louis