<Computer vision school: Advanced>

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AI HOUSE

<Pose Estimation>

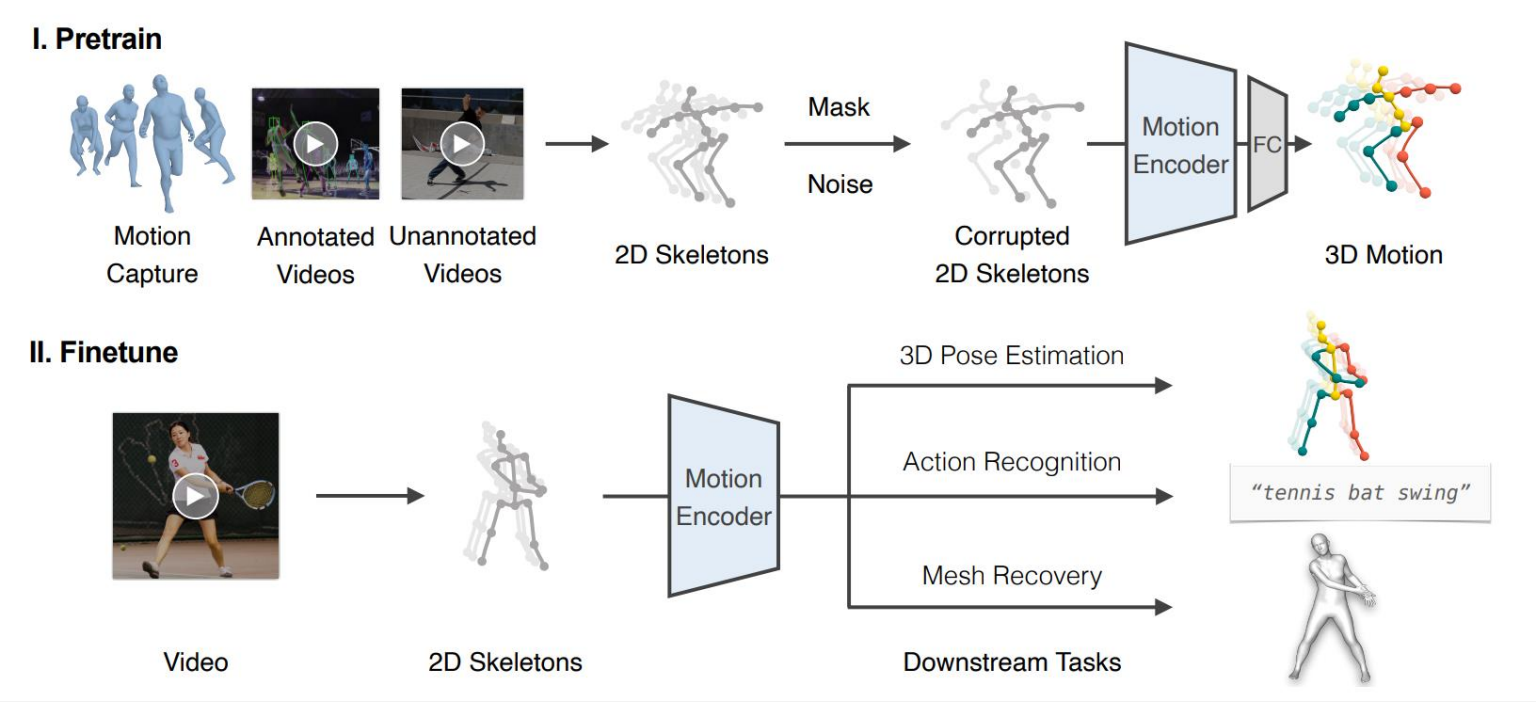
Practices

Pose estimation<Task>

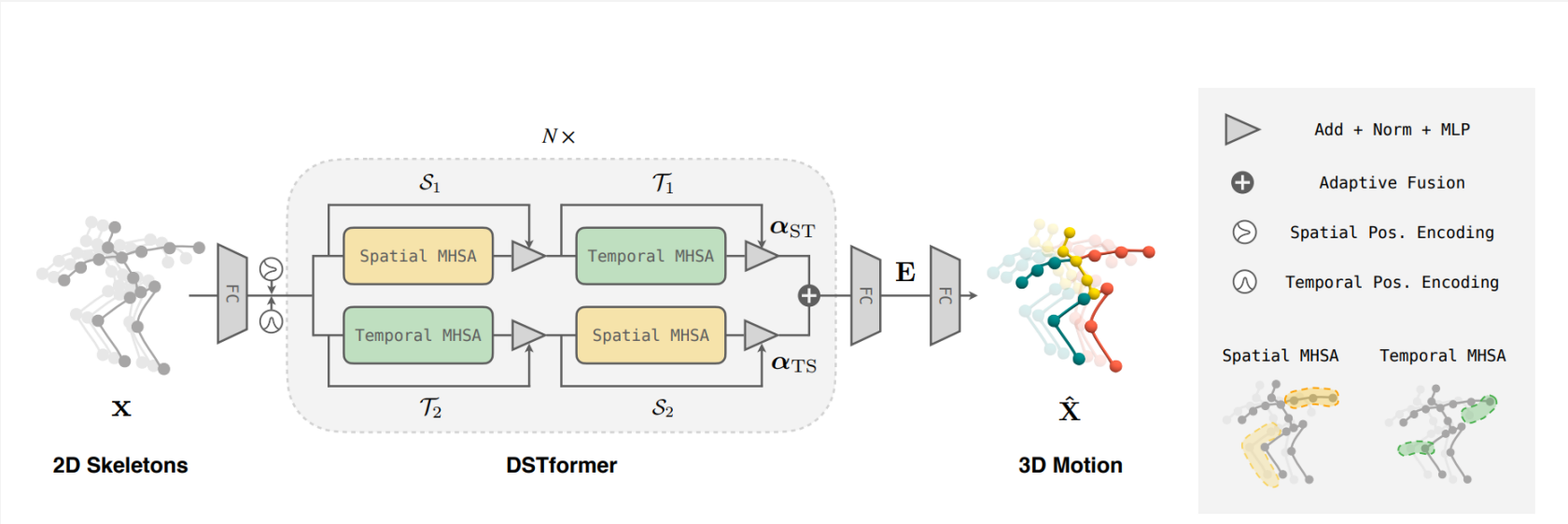
Objective.

1. Choose human pose estimation model
2. Create metric to compare poses
3. Implement small demo: motion similarity (sequence of poses) between 2 videos.

MotionBERT


I. Pretrain
Motion Capture
Annotated Videos
Unannotated Videos
2D Skeletons
Mask
Noise
Corrupted 2D Skeletons
Motion Encoder
FC
3D Motion
II. Finetune
Video
2D Skeletons
Motion Encoder
3D Pose Estimation
Action Recognition
Mesh Recovery
Downstream Tasks
"tennis bat swing"

MotionBERT


N×
$\mathcal{S}_1$
$\mathcal{T}_1$
Spatial MHSA
Temporal MHSA
α_{ST}
Temporal MHSA
Spatial MHSA
α_{TS}
$\mathcal{T}_2$
$\mathcal{S}_2$
FC
FC
FC
E
$\mathbf{X}$
$\hat{\mathbf{X}}$
2D Skeletons
DSTformer
3D Motion
Add + Norm + MLP
Adaptive Fusion
Spatial Pos. Encoding
Temporal Pos. Encoding
Spatial MHSA
Temporal MHSA

Existing datasets

COCO. Established as a key dataset in computer vision since 2014

Key Features:

- Size over 200,000 images with 1.5 million object instances
- 250k annotations of human keypoints
- Regularly updated with contributions from the global research community

Existing datasets

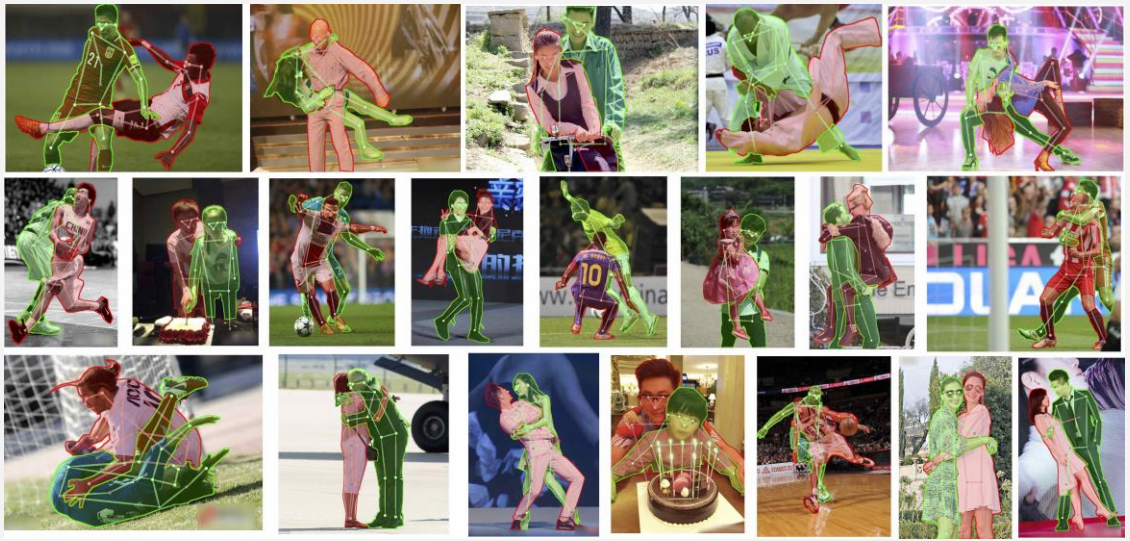
MPII Human Pose Database.
Key Features:

- 25k images, 40k humans
- Covers 410 different activities
- Includes occlusion labeling and 3D orientation of head and torso

Existing datasets

OCHuman Dataset.

- 5k images
- 13k human annotation



Short description

- Environment Setup

> Setup Google Collab

> Install MMPose and its dependencies

> Ensure access to a GPU for model training and inference (Collab T4, after – Vast.ai)

Short description

- Data Preparation Setup

> Download any of datasets: MPII Human Pose, COCO pose

> Familiarize yourself with its structure and annotations

Short description

- Model Selection

> Choose a pre-trained Pose estimation model.

> Inference model on images from dataset

> Implement evaluation metrics for pose estimation

Short description

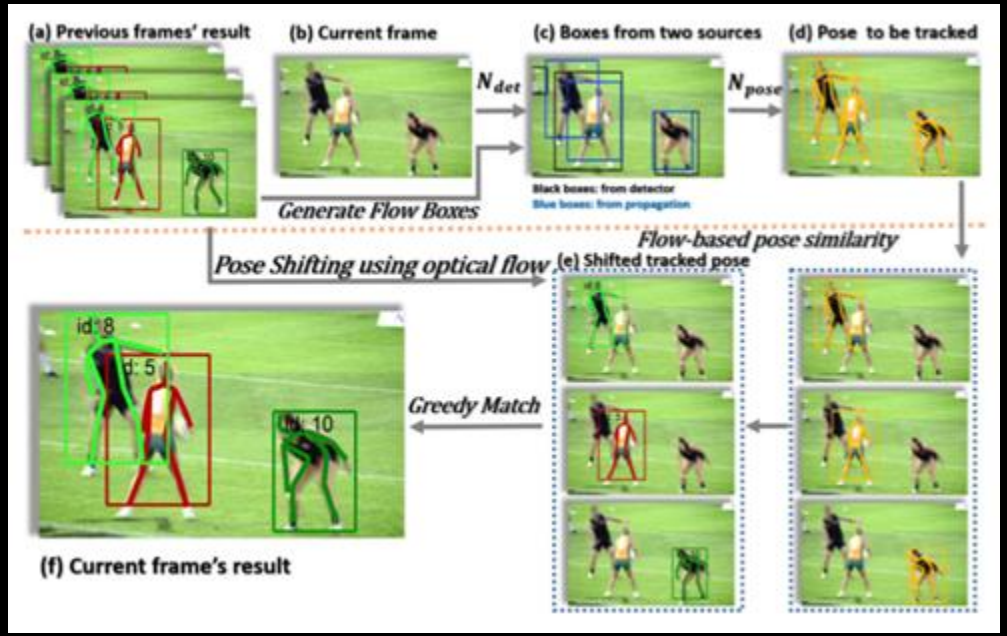
- Pose similarity estimation

> Implement pose similarity. Some examples: Pr-VIPE, DTW , OKS , etc.

> Validate pose similarity on dataset images

Short description

- Prepare demo



<Q&A>

SEE YOU
NEXT TIME ;)

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