

Multi-view 3D Pose Estimation

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Introduction - Vicon

High-precision Motion capture

- Use many cameras and markers.
- Record in studio.



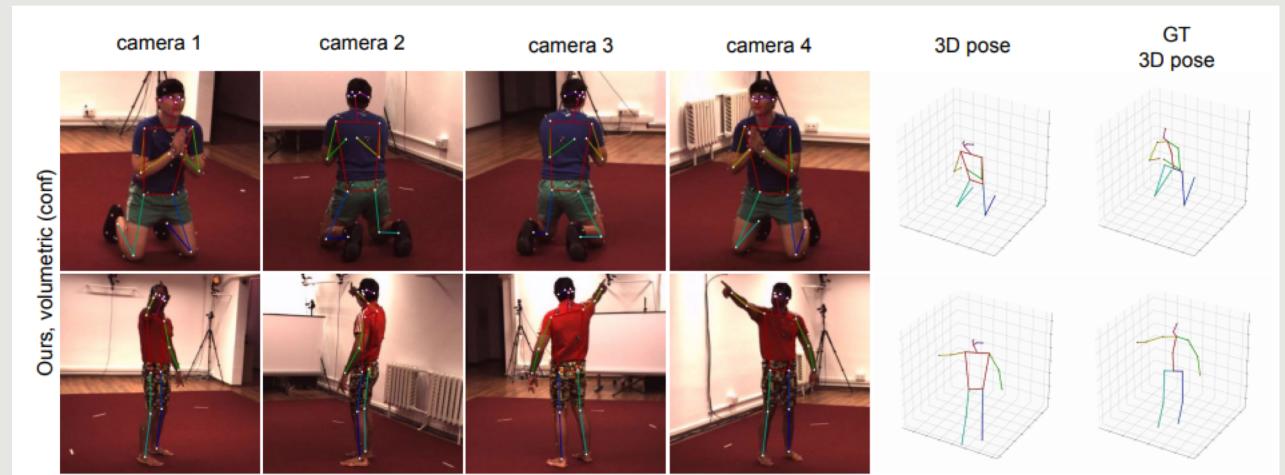
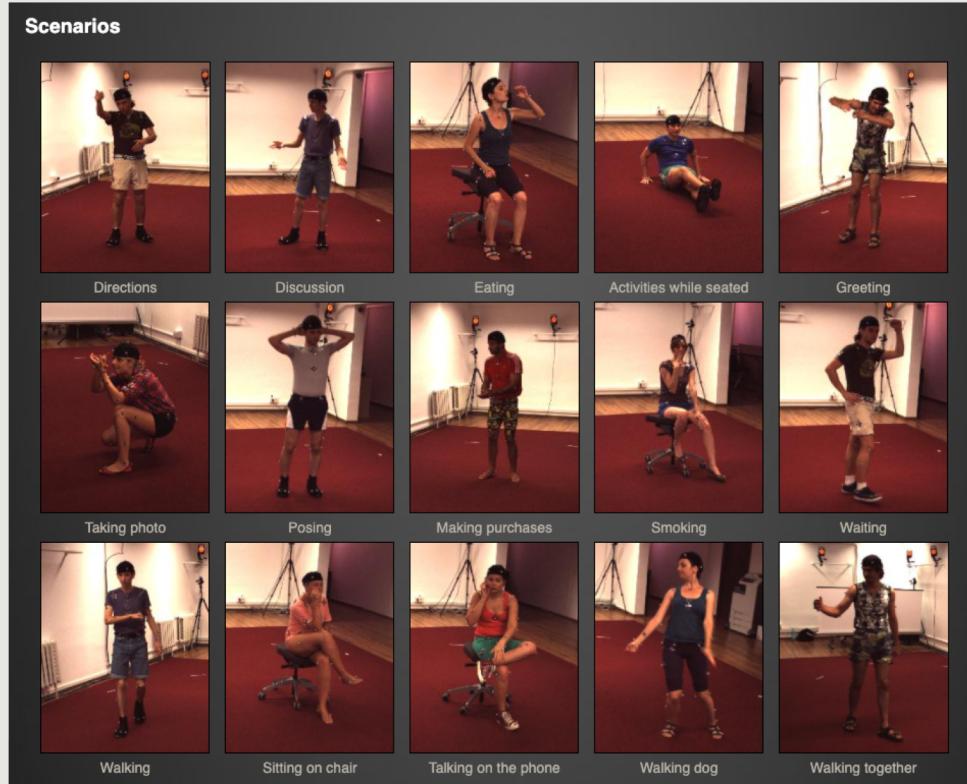
Reference : <https://ardas-it.com/motion-capture-in-blender-toolset-selection>

Introduction – Vision AI

**Extract 3D human pose from image/video using pose estimator
which trained with human pose dataset(Human 3.6M)**

Recently, high precise 3D pose can be extracted using multi-view based pose estimator

Introduction – Vision AI



Problem Statement

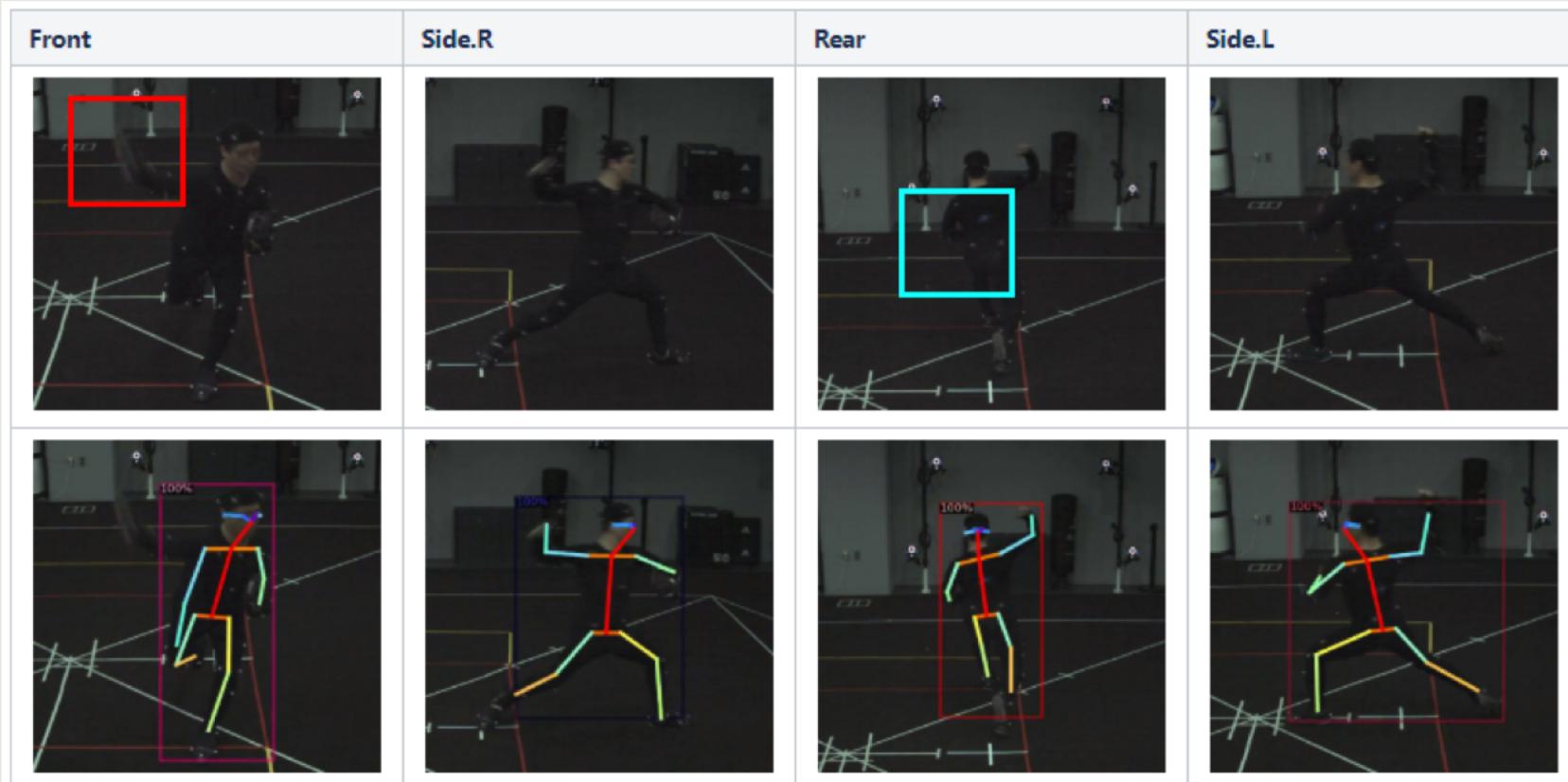
3D pose estimator using Vision AI is limited to indoor environment.

- Cannot predict outdoor images well

Also, 3D pose estimator's motion coverage is limited

- Limited Ground-Truth datasets

Problem Statement



Related Work

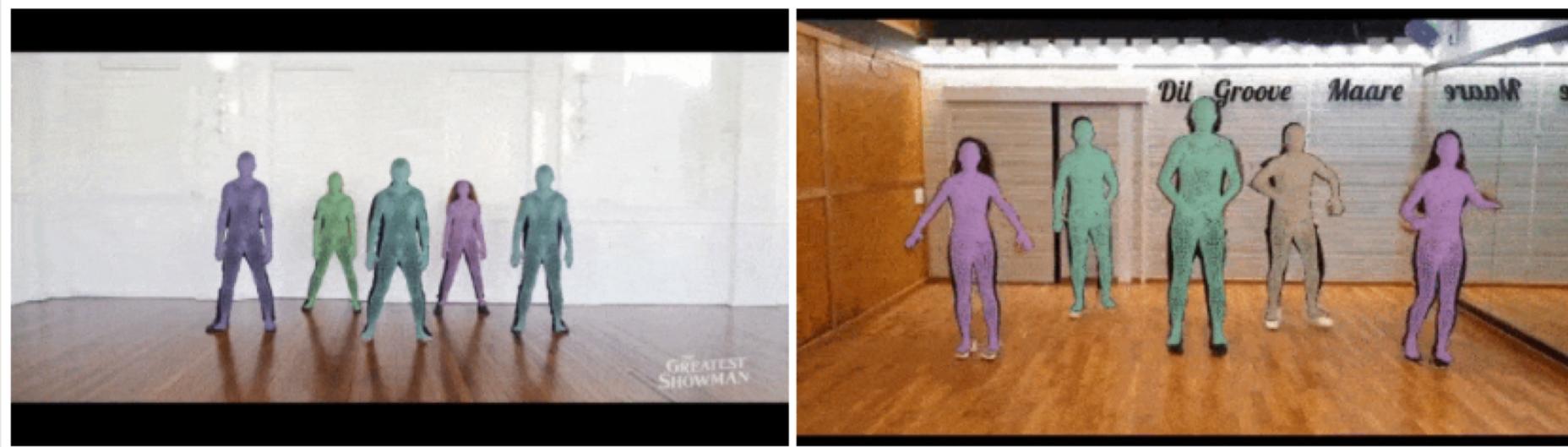
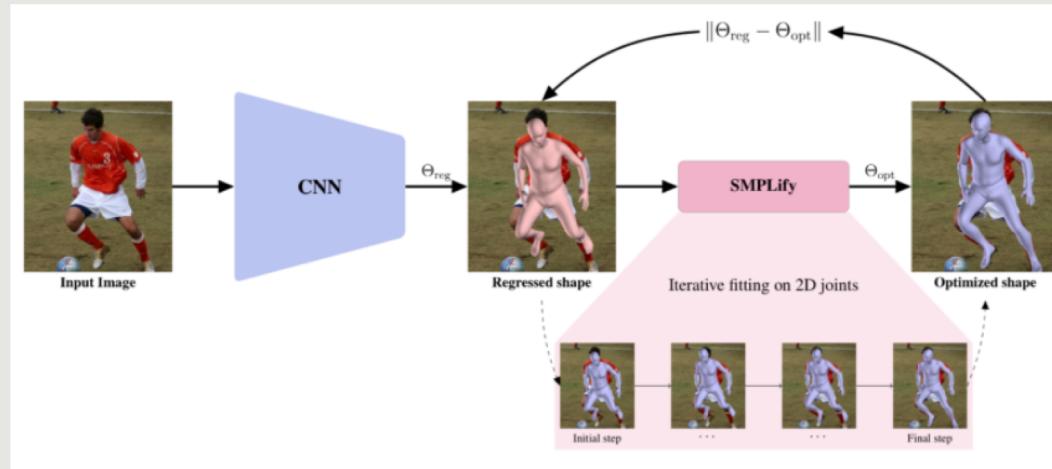
Supervision based multi-view pose estimation

- Learnable Triangulation of Human Pose (Samsung, ICCV19)
- Learning to Reconstruct 3D Human Pose and Shape via Model-fitting in the Loop (ICCV19)
- VIVE: Video Inference for Human Body Pose and Shape Estimation (CVPR20)

Weak-supervision based 3D pose estimation

- Weakly-Supervised 3D Human Pose Learning via Multi-view Images in the Wild (NVIDIA, CVPR20)
- DeepCap: Monocular Human Performance Capture Using Weak Supervision (MPI, CVPR20)

Related Work



Requirements

Functional Requirement

- Extract 3D pose using multi-view 3D pose estimator at outdoor environment

Non-functional Requirement

- Train with indoor 3D dataset and outdoor 2D video dataset with no 3D GT
- Use for outdoor sports like baseball, golf, soccer, and so on.

Solution

**Modify neural network of existing multi-view 3D
pose estimator for Weak-supervision**

**Pre-processing of outdoor environment datasets
without GT for our new network**

- Mannequin Challenge video and etc.

Schedule

Week 1 : Choose Topic

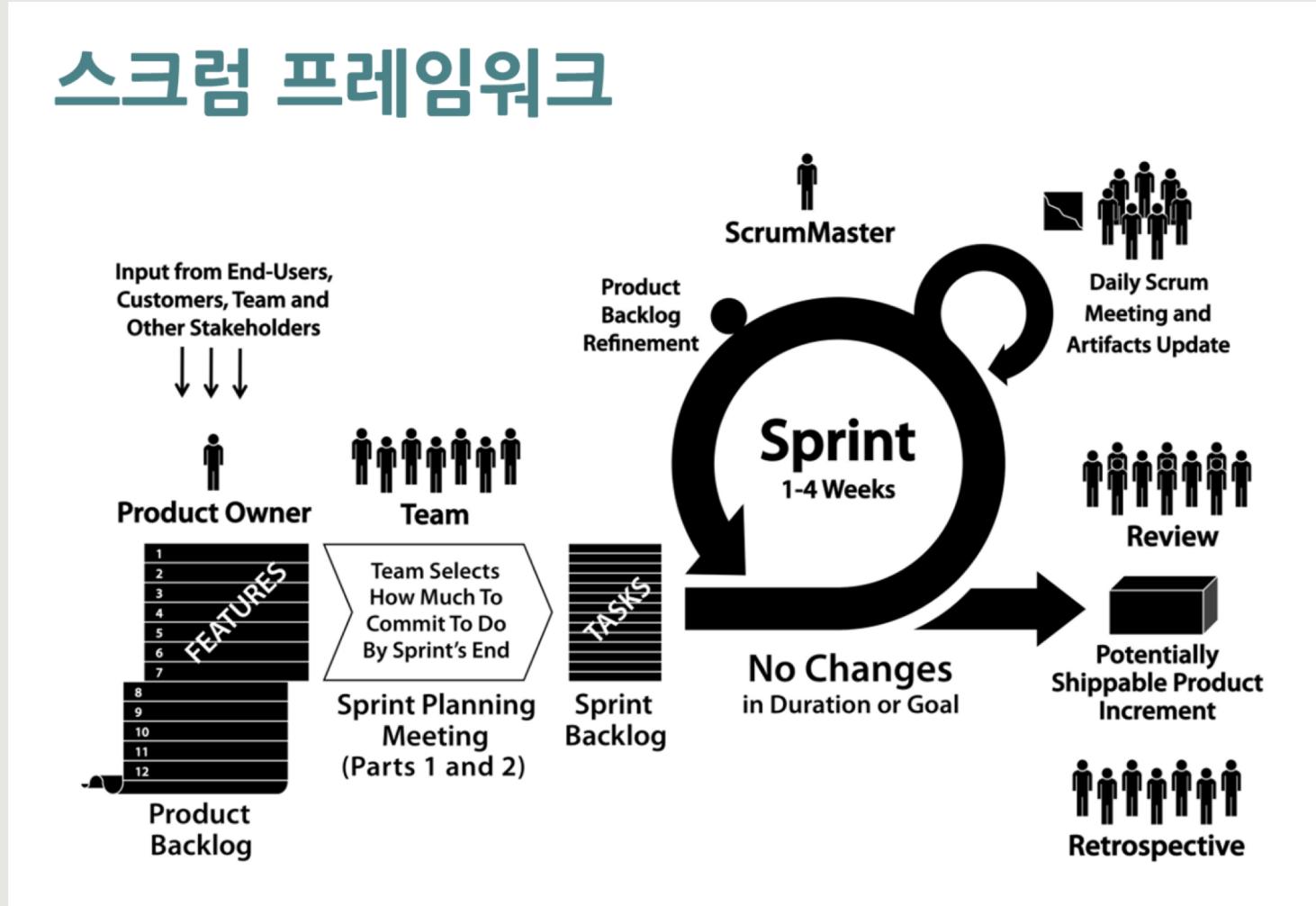
Week 2 : Understand requirements and background knowledges

Week 3-6 : Supervision based Multi-view Human Pose Estimation

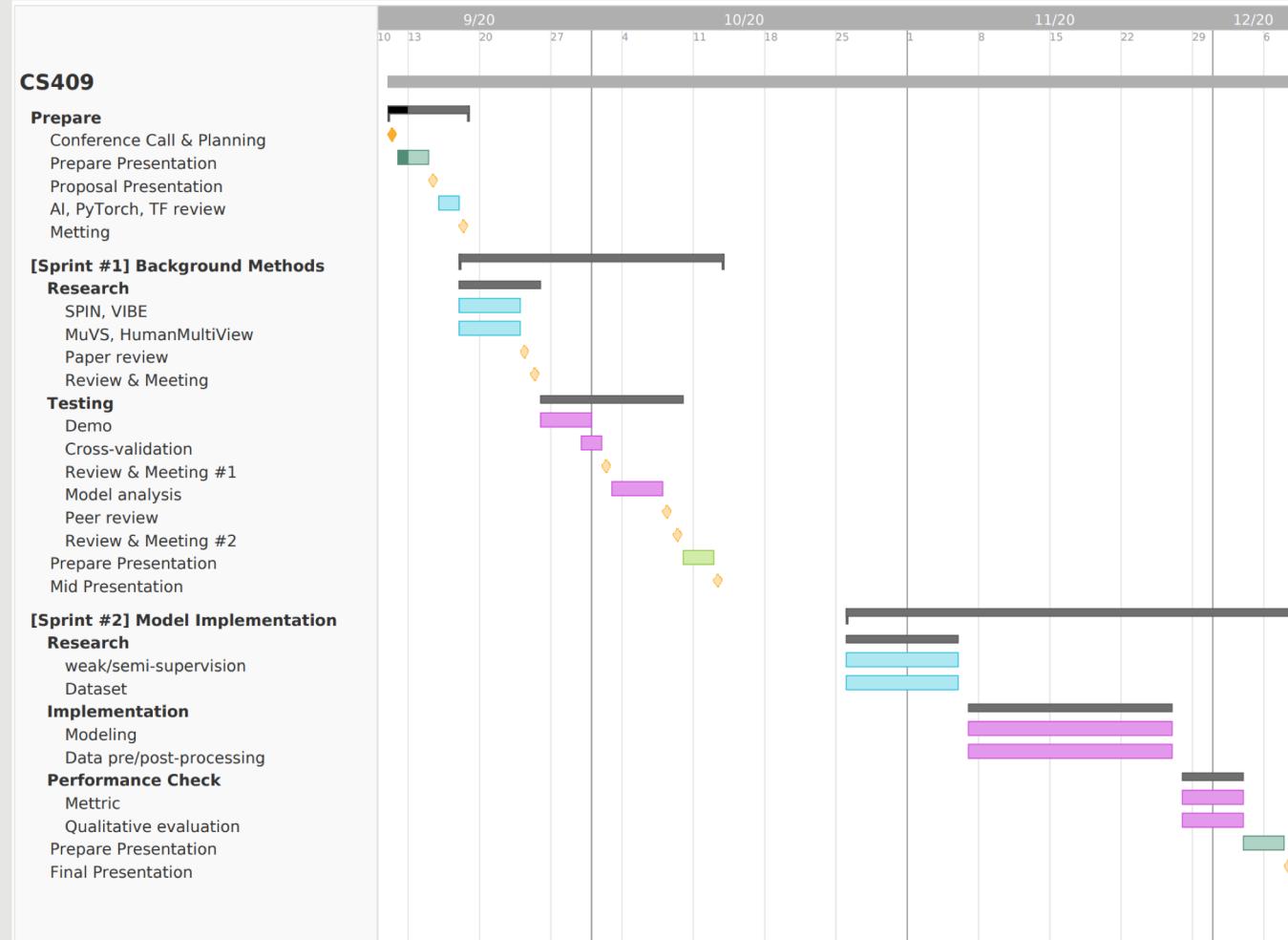
Week 7-12 : Design weak-supervision network to cover outdoor environment and various poses

Week 13-14 : Wrap-up for final presentation

Detailed Plan – Sprint Planning



Detailed Plan – Sprint Planning



Two Scrum Sprint

- #1 Supervised-based
- #2 Weak-supervised

Weakly Review

- Peer review with team members
- Review & Meeting with mentor every Friday 14:00

Role and Responsibility

NCSOFT Vision AI Lab Human Pose Team

- Provide Background knowledge
- Advice on the process
- Datasets support

Junkyu Park, Seungho Baek

- Research related work and testing
- Implement a new network for our goal
- Cooperation together

Constraint

Resources : Insufficient datasets that have no GT.

Time : until December 8th

People : Group of 2