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Grupo de investigación: RobIRI: Robot Perception and Manipulation at the IRI

Ubicación del centro: Instituto de Robótica e Informática Industrial (IRI), Carrer Llorens i Artigas 4-6, 08028, Barcelona

Título del proyecto: 3D human pose estimation from egocentric videos of social interactions

Descripción del proyecto: Understanding social interactions from a first-person perspective has compelling applications in Assistive Robotics and Augmented/Virtual reality. A crucial cue for social interaction understanding is the body pose of interacting people, which is paramount in nonverbal communication. However, estimating the body pose of the camera wearer from first-person (egocentric) videos is a challenging task since the camera wearer is largely out of view from a typical wearable camera.

This project aims at addressing this challenge by leveraging inter-person interaction dynamics and 3D scene context. The method will be validated using the recently introduced Egobody dataset: <https://sanweiliti.github.io/egobody/egobody.html>.

The student is expected to have excellent programming skills and familiarity with deep learning frameworks (preferably PyTorch). She/he will work in close collaboration with our expert team that has large experience in both 3D pose estimation and social interaction analysis from egocentric videos. Upon reaching the project goals, a scientific publication is expected to be submitted to a major conference or journal.

References

1. X.Xu, H.Chen, F.Moreno-Noguer, L.Jeni, F. De la Torre. 3D Human Pose, Shape and Texture from Low-Resolution Images and Videos. IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), 2021.
2. F.Moreno-Noguer. 3D Human Pose Estimation from a Single Image via Distance Matrix Regression. IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Honolulu, USA, June 2017.
3. S. Felicioni, M. Dimiccoli. *Interaction-GCN: a Graph Convolutional Network based framework for social interaction recognition in egocentric videos*. IEEE International Conference on Image Processing (ICIP), Anchorage, Alaska, September 2021.
4. M. Aghaei, M. Dimiccoli, C. Canton-Ferrer, P. Radeva. *Towards social pattern characterization in egocentric photo-streams*. Computer Vision and Image Understanding (CVIU), 2018.