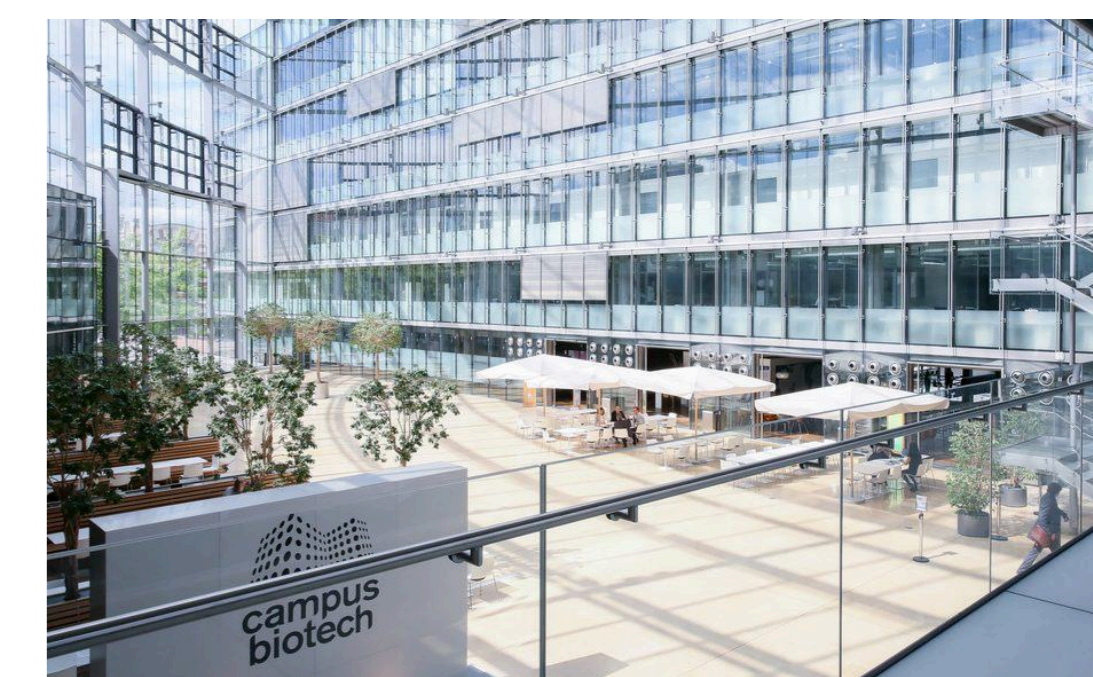
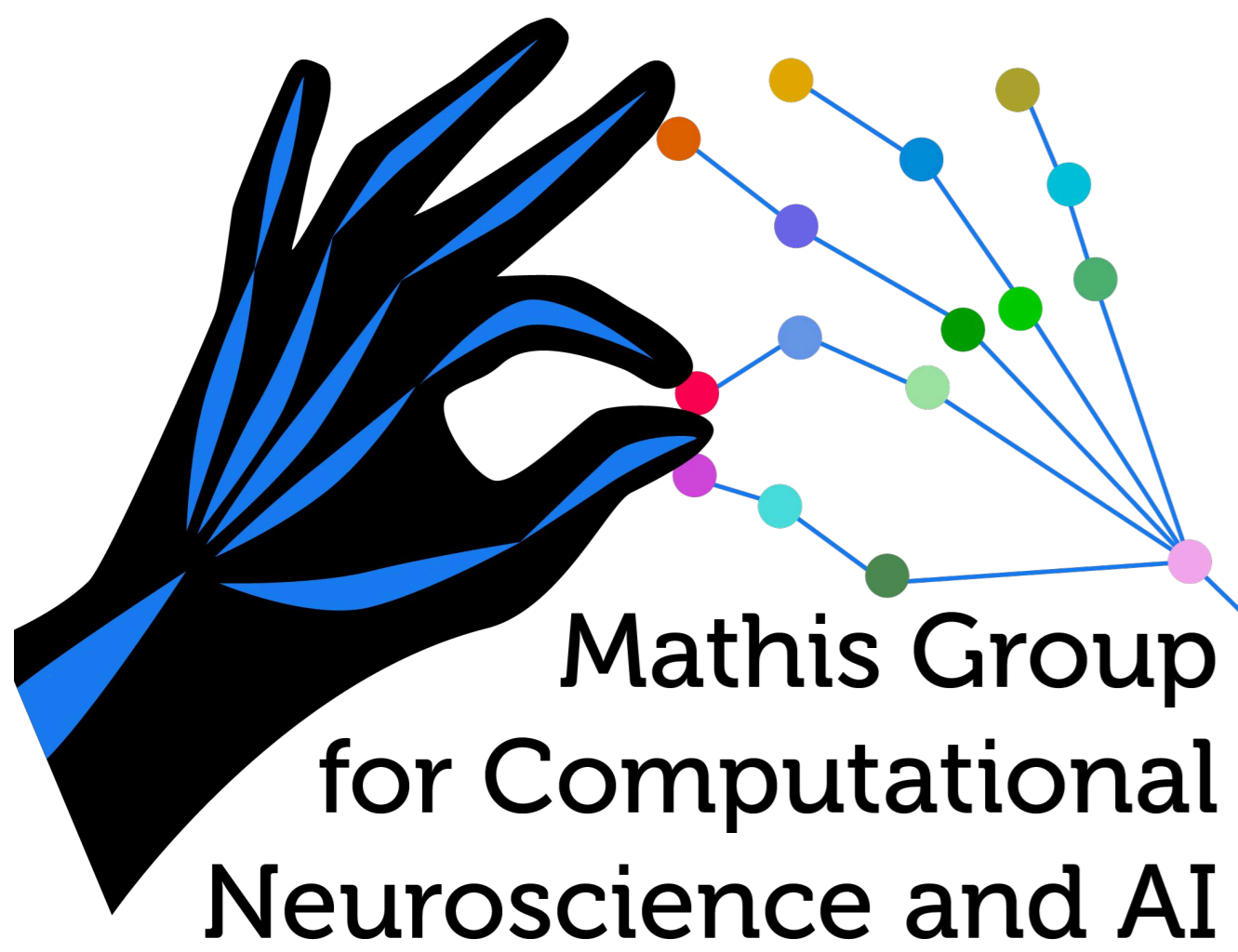


Deep learning for measuring behavior

We develop **computer vision** and **machine learning** tools for the analysis and quantification of **behavior** including **pose estimation**, **animal re-identification**, **action segmentation**...

Join us and Mackenzie Mathis' lab in Geneva!



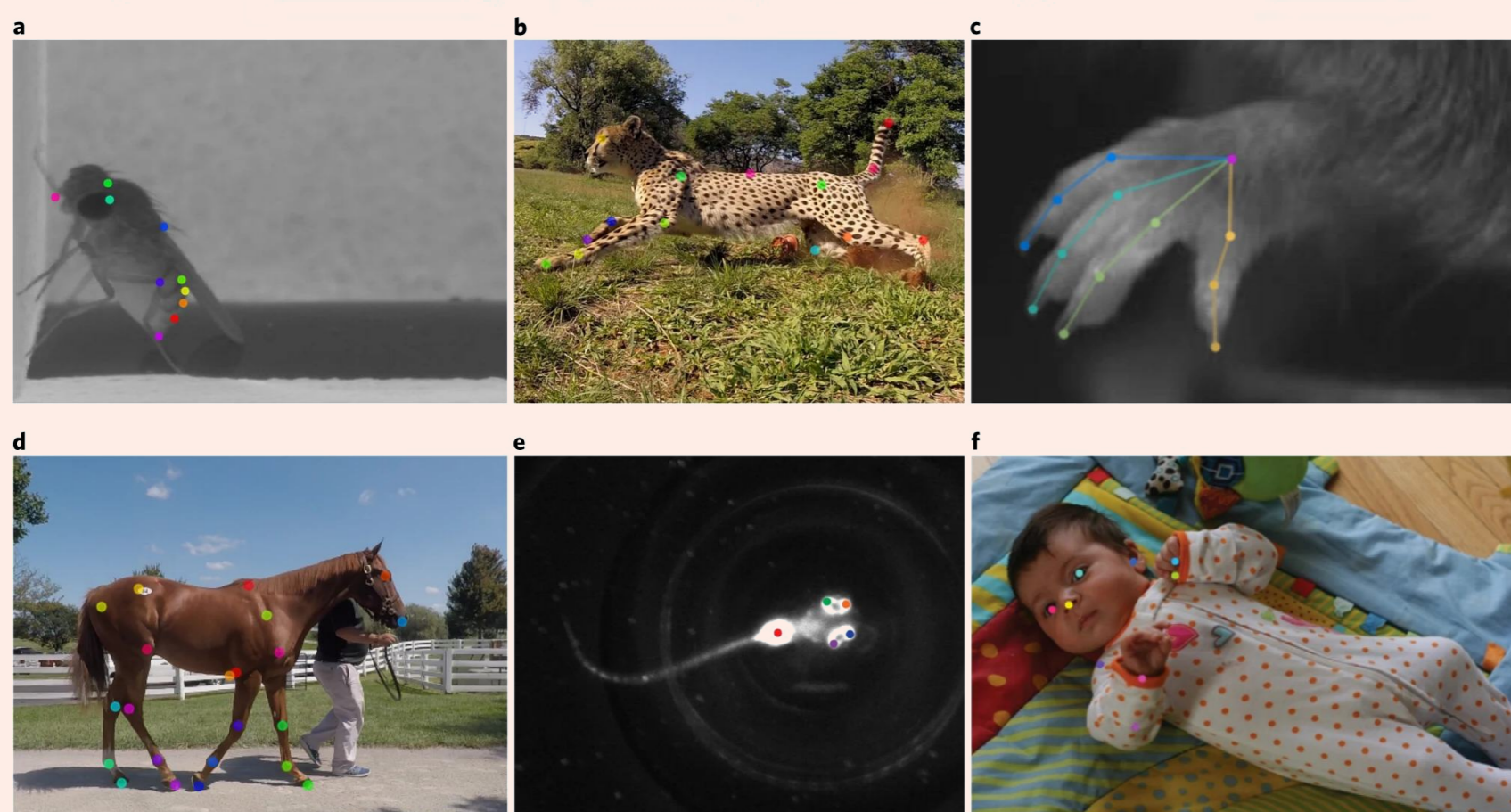
Pose estimation



DeepLabCut™: a software package for animal pose estimation

DLC: Efficient deep learning for single and multi-animal pose tracking and identification

downloads 635k | downloads/month 18k | pypi package 2.3.9 | Python package passing
License LGPL v3 | code style black | Star 4.2k | issue resolution 12 d | open issues 2%
forum 1794 topics | chat on gitter | DeepLabCut | Contributions Welcome

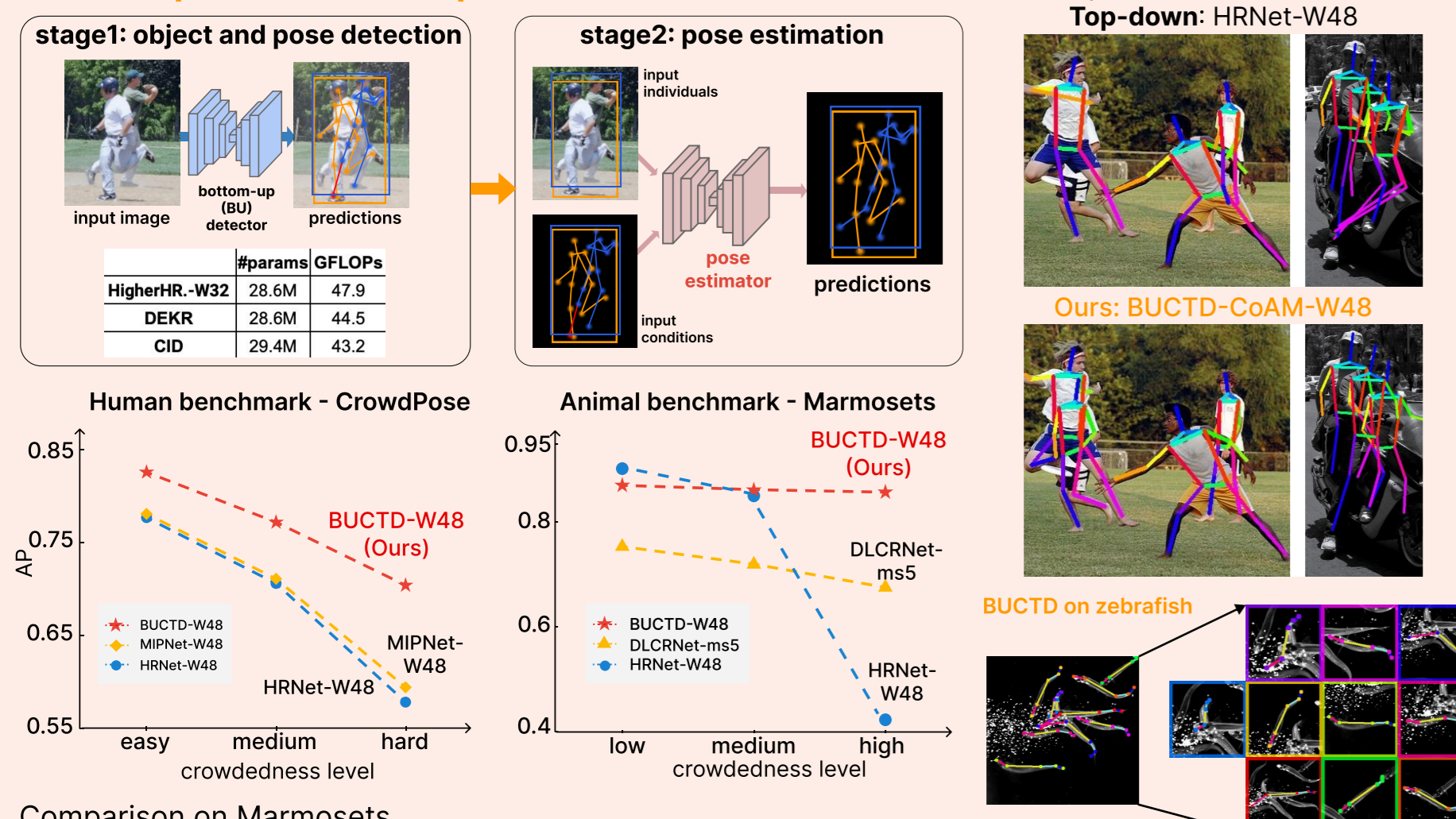


Mathis, A., et al. "DeepLabCut: markerless pose estimation of user-defined body parts with deep learning." *Nature neuroscience* 21.9 (2018): 1281-1289.
Nath, T., et al. "Using DeepLabCut for 3D markerless pose estimation across species and behaviors." *Nature protocols* 14.7 (2019): 2152-2176.
Lauer, J., et al. "Multi-animal pose estimation, identification and tracking with DeepLabCut." *Nature Methods* 19.4 (2022): 496-504.



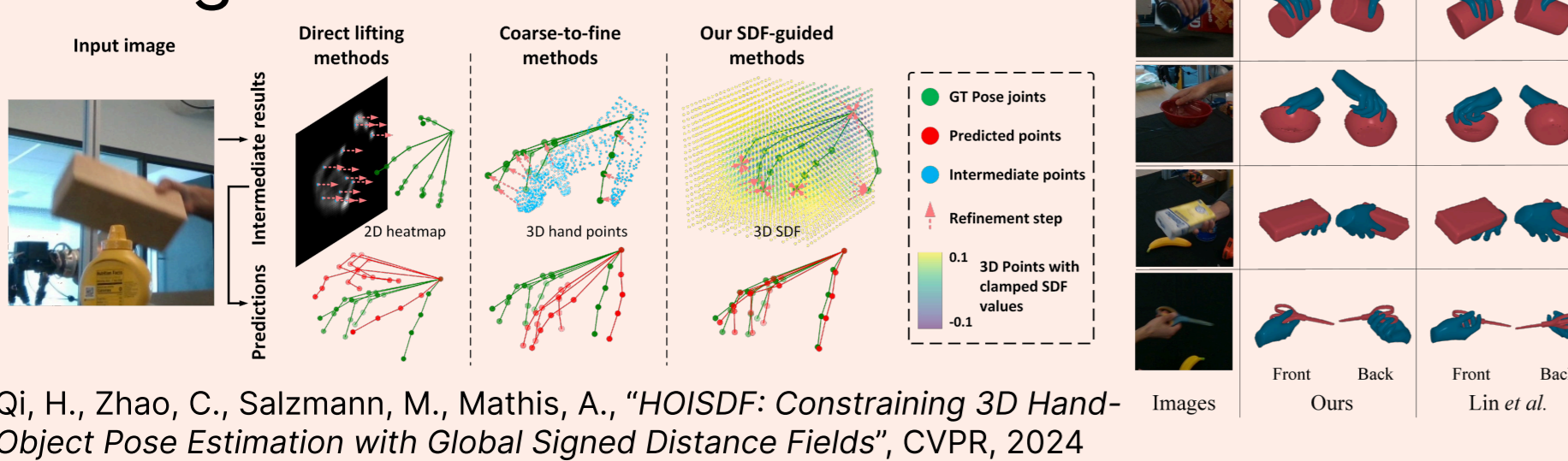
BUCTD: Overcoming the detection information bottleneck and ambiguity in pose estimation

Bottom-Up Conditioned Top-Down (BUCTD) method



Zhou, M., Stoffl, L., Mathis, MW., Mathis, A., "Rethinking pose estimation in crowds: overcoming the detection information bottleneck and ambiguity", *ICCV*, 2023

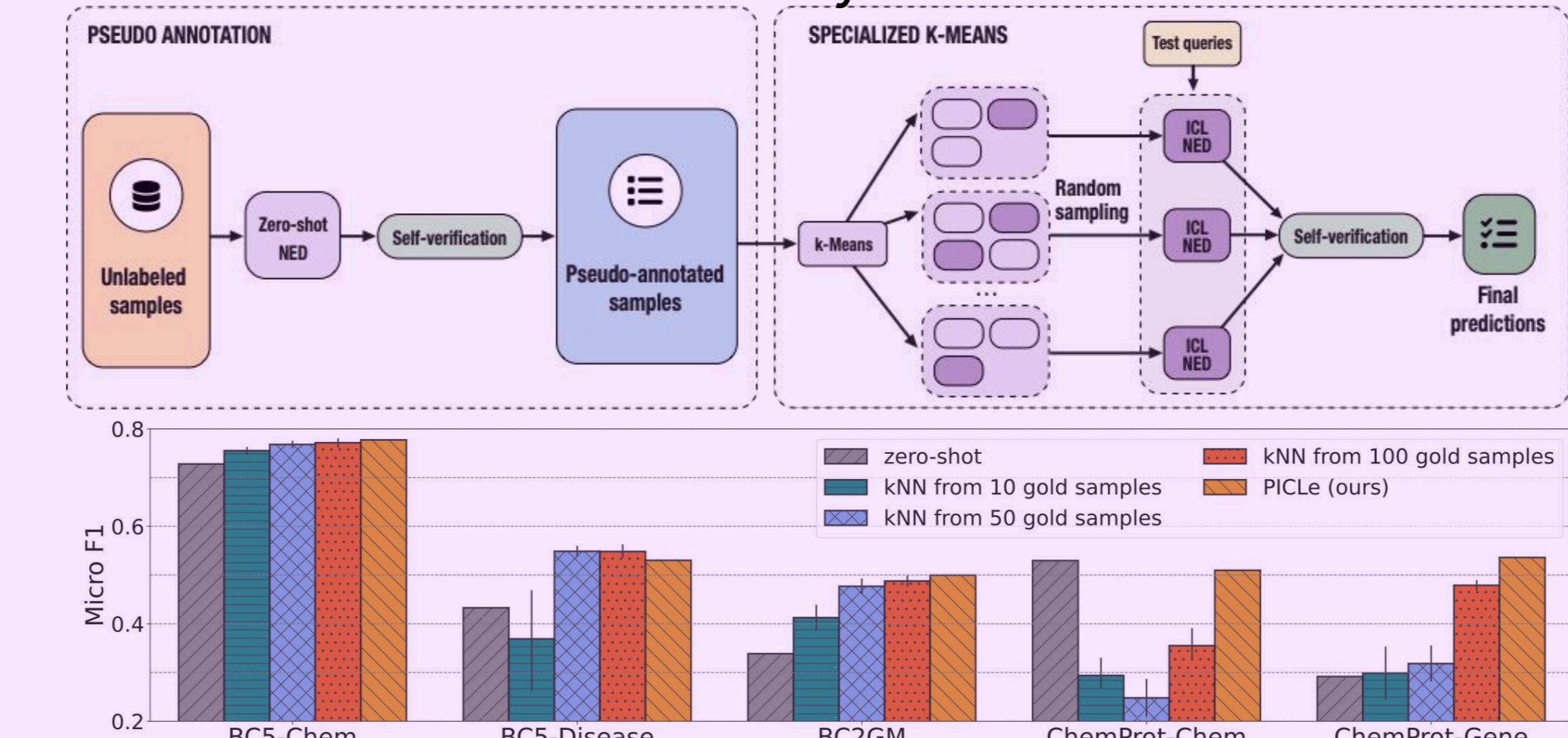
HOISDF: Hand object pose estimation based on Signed Distance Field



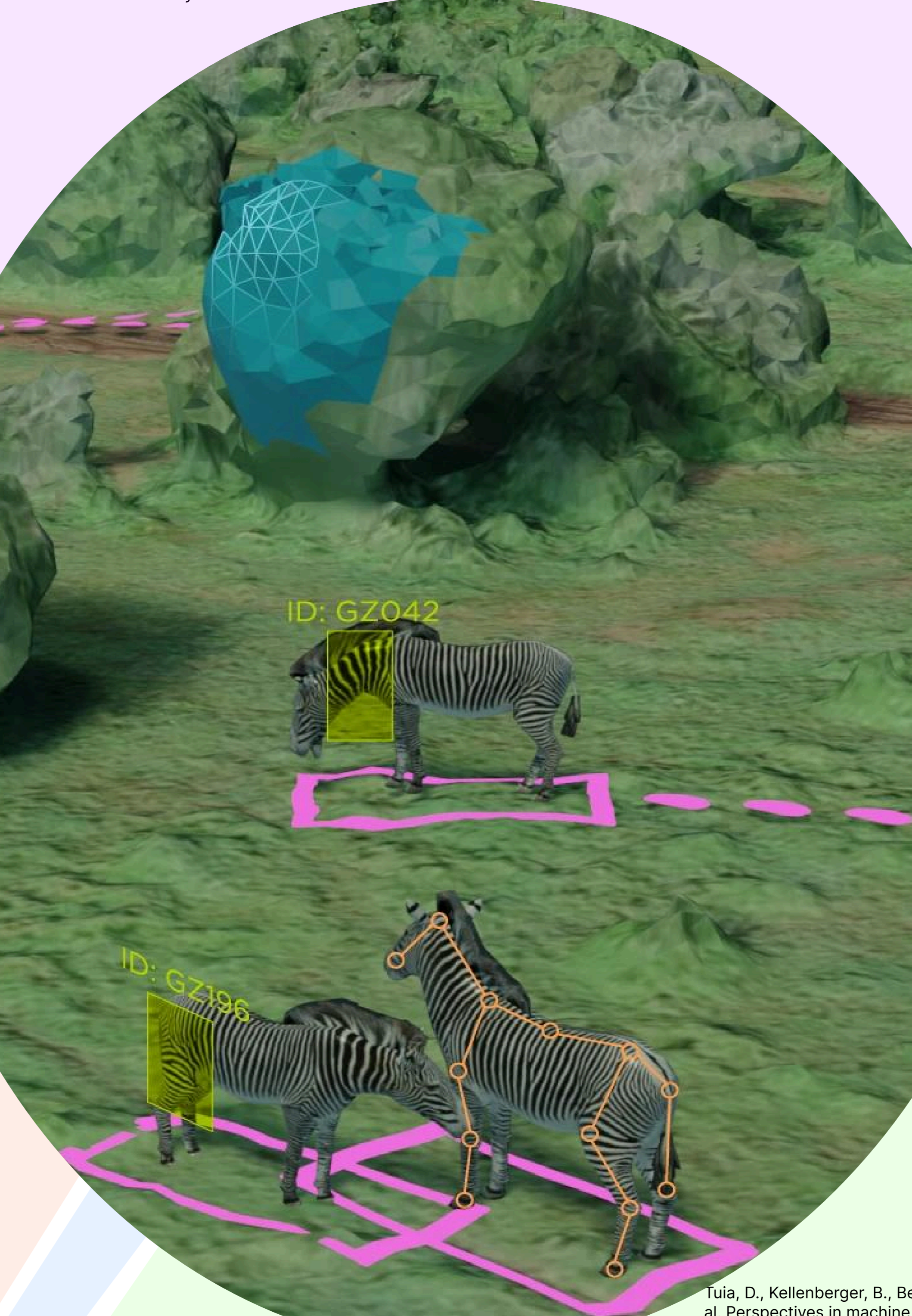
Qi, H., Zhao, C., Salzmann, M., Mathis, A., "HOISDF: Constraining 3D Hand-Object Pose Estimation with Global Signed Distance Fields", *CVPR*, 2024

AI4Science with language models

PICLe: Pseudo-annotations for In-Context Learning in Low-Resource Named Entity Detection



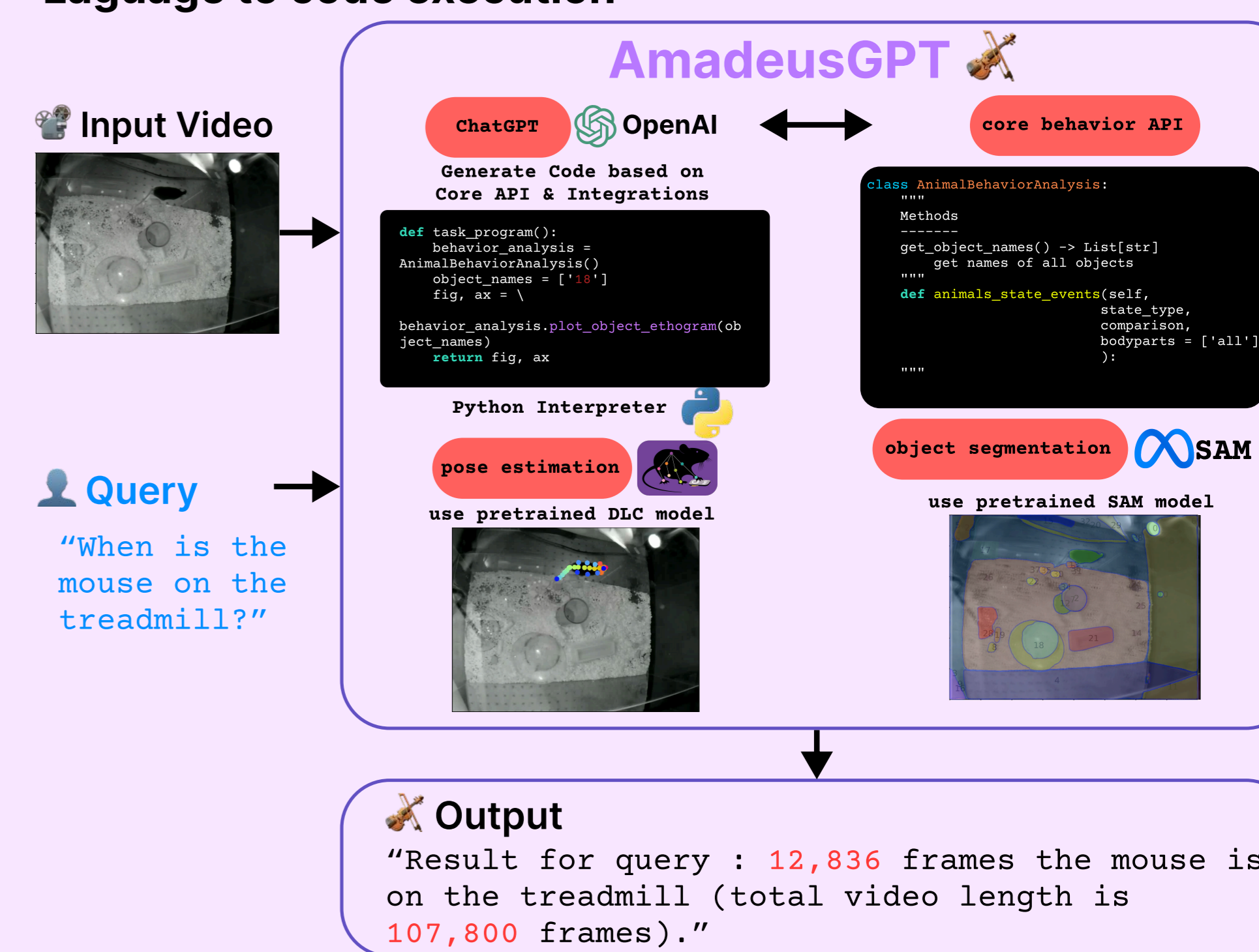
Mamoori S., Montarol S., Mathis A., Bosselut A. PICLe: Pseudo-annotations for In-Context Learning in Low-Resource Named Entity Detection. *NAACL 2025*



Tuia, D., Kellenberger, B., Beery, S., et al. Perspectives in machine learning for wildlife conservation. *Nat Commun* 13, 792 (2022)

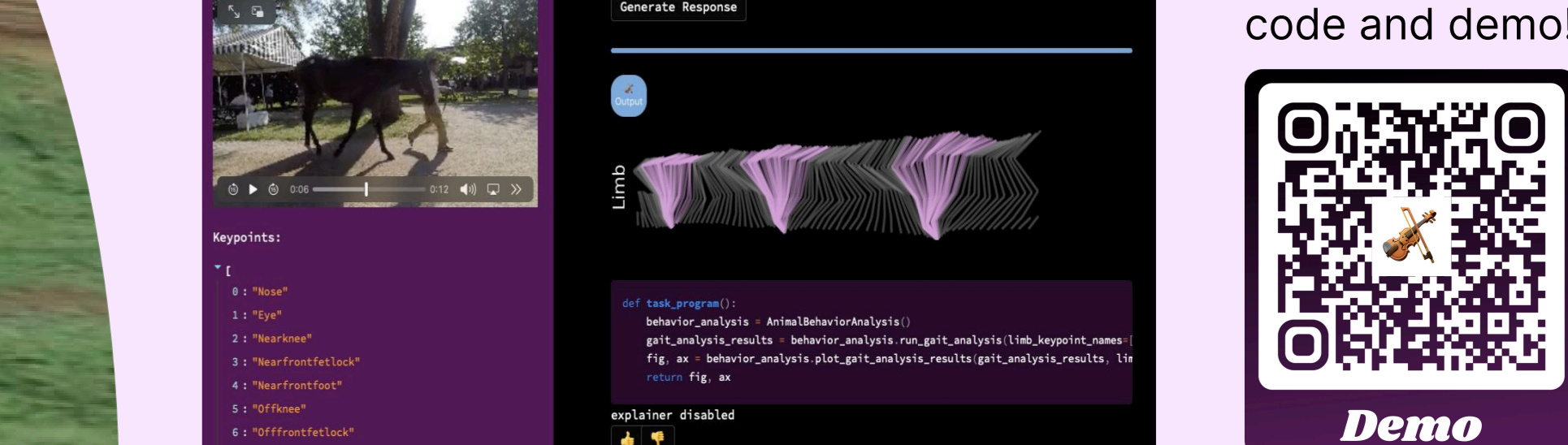
AmadeusGPT

AmadeusGPT: a natural language interface for interactive animal behavioral analysis
Language to code execution



Output: "Result for query : 12,836 frames the mouse is on the treadmill (total video length is 107,800 frames)."

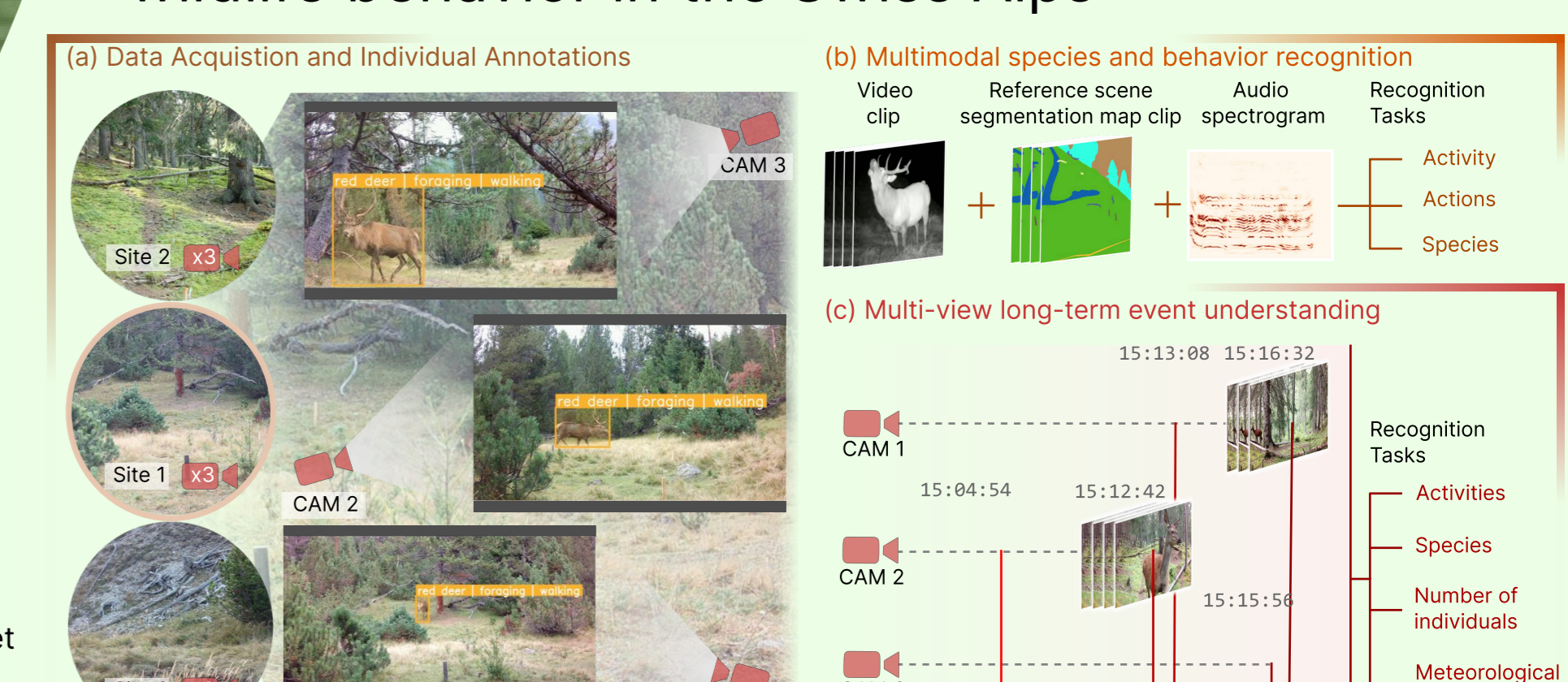
Demo app on walking horse



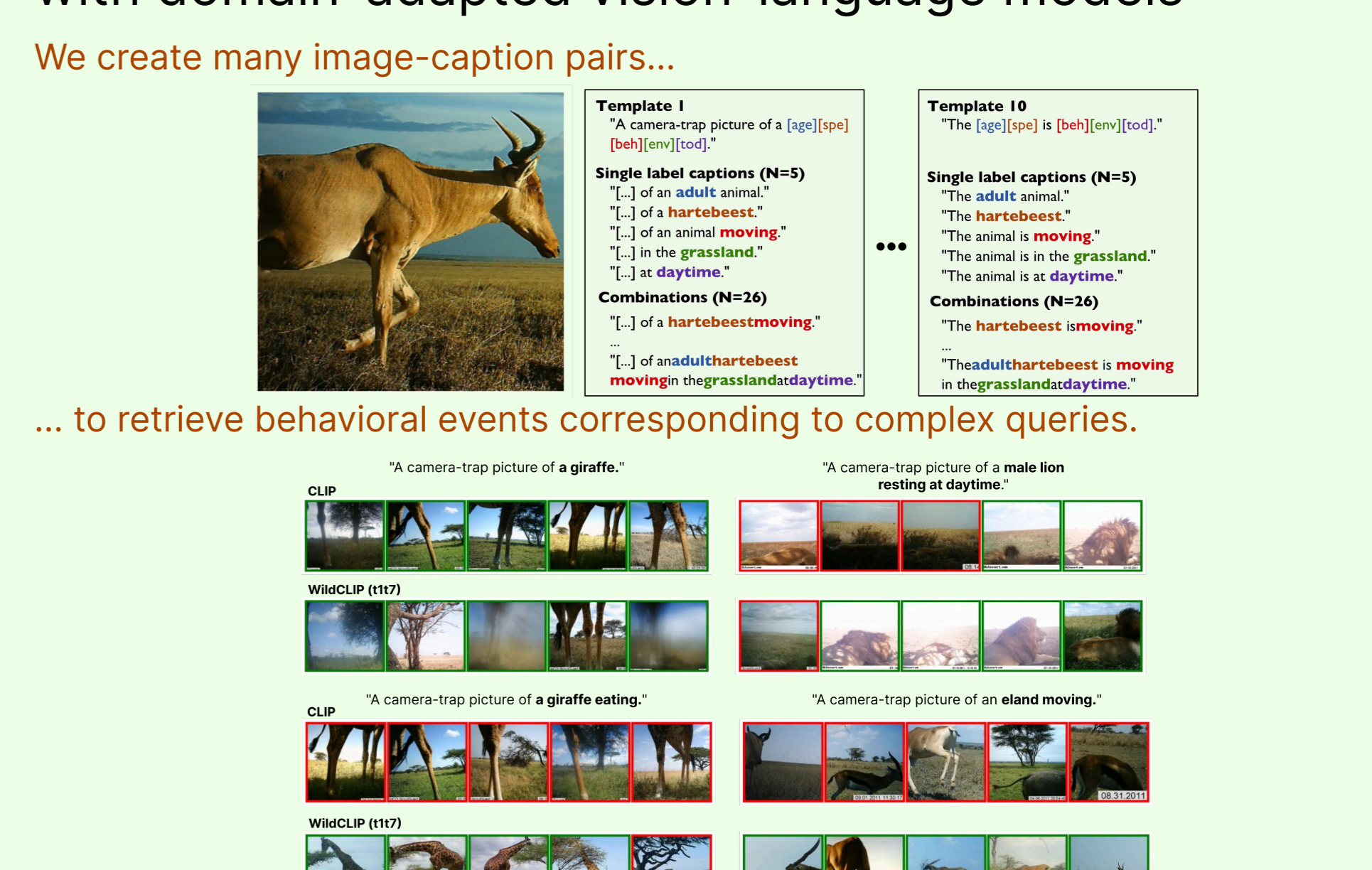
Ye, S., Lauer, J., Zhou, M., Mathis, A., and Mathis, MW, "AmadeusGPT: a natural language interface for interactive animal behavioral analysis", *NeurIPS*, 2023

Action understanding

MammAlps
A multimodal and multiview camera trap dataset of wildlife behavior in the Swiss Alps

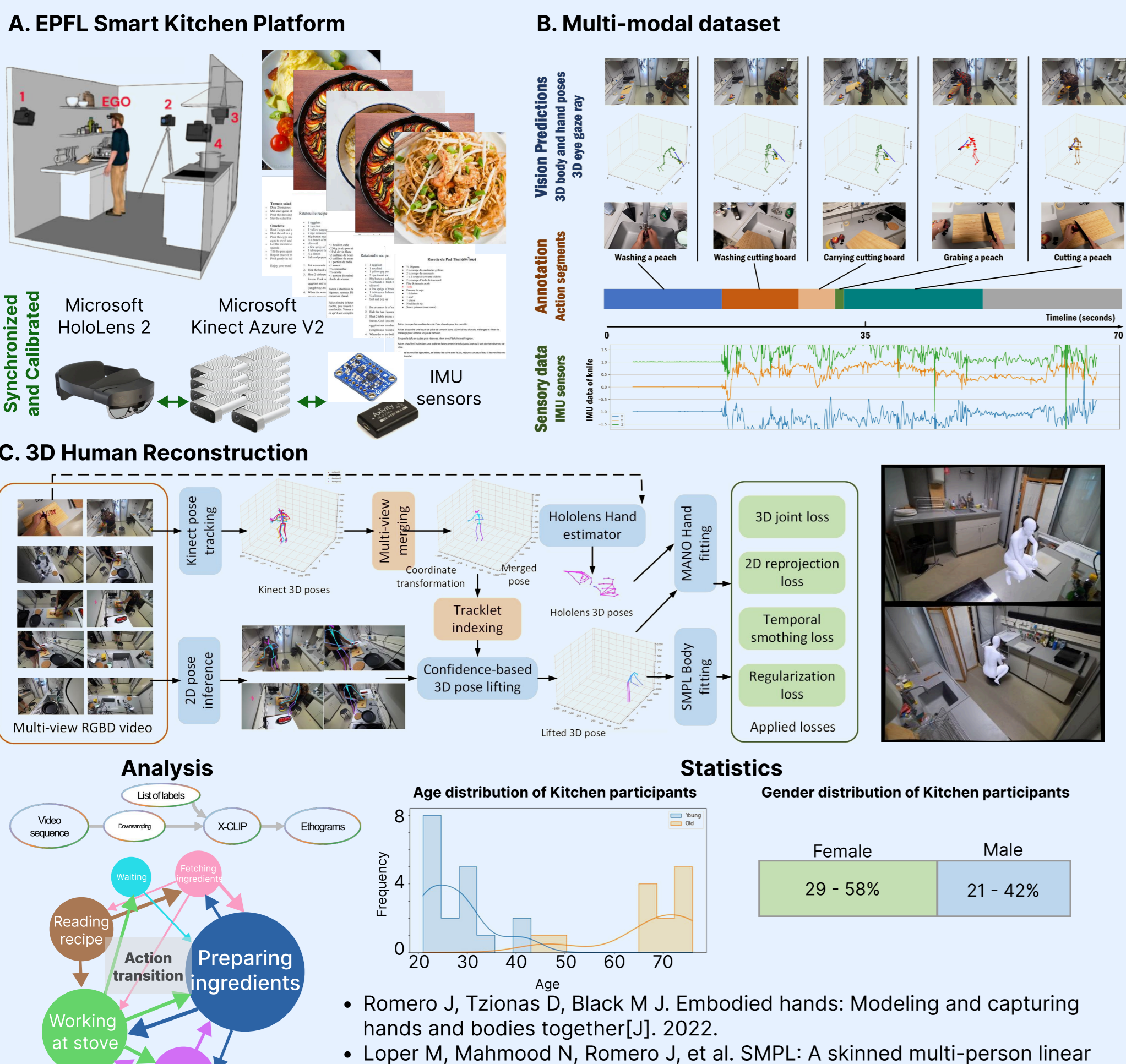


WildCLIP
Retrieving events of interest from camera trap images with domain-adapted vision-language models



Gabeff, V., Ruvswurm, M., Tuia, D., & Mathis, A. (2023). WildCLIP: Scene and animal attribute retrieval from camera trap data with domain-adapted vision-language models. *International Journal of Computer Vision (in press)*

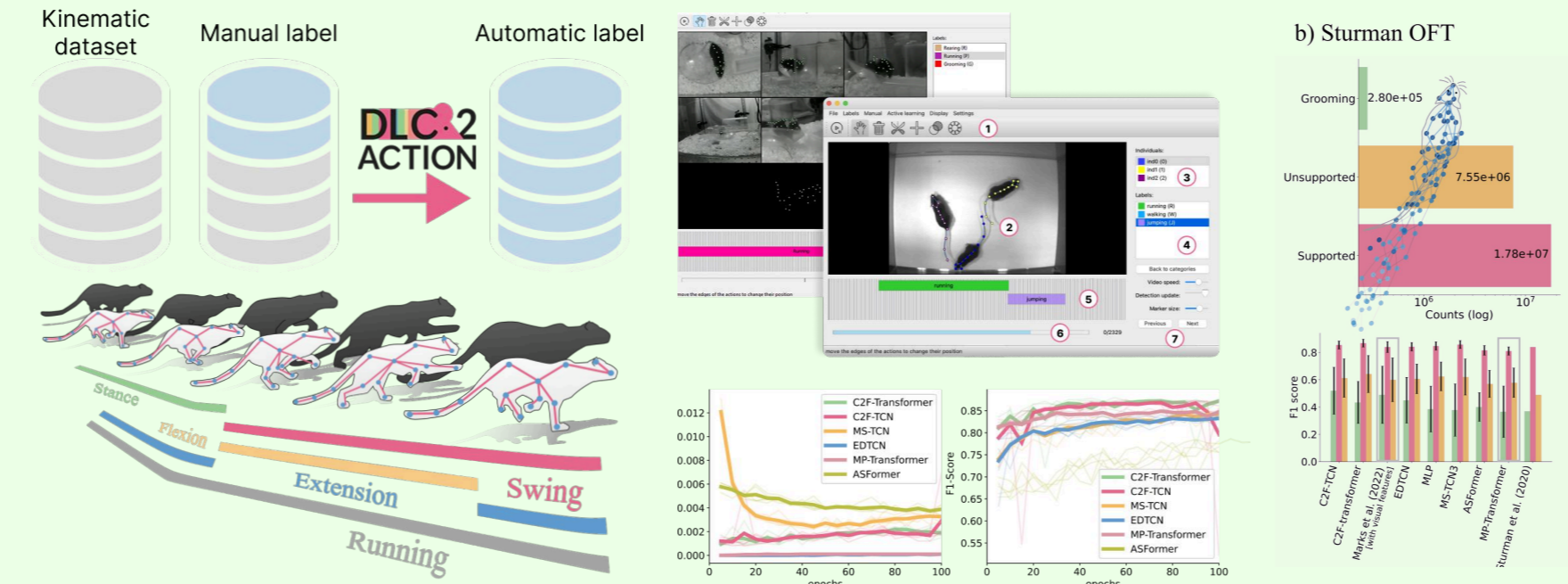
EPFL SMART KITCHEN Home-based functional assessment platform for neurological patients



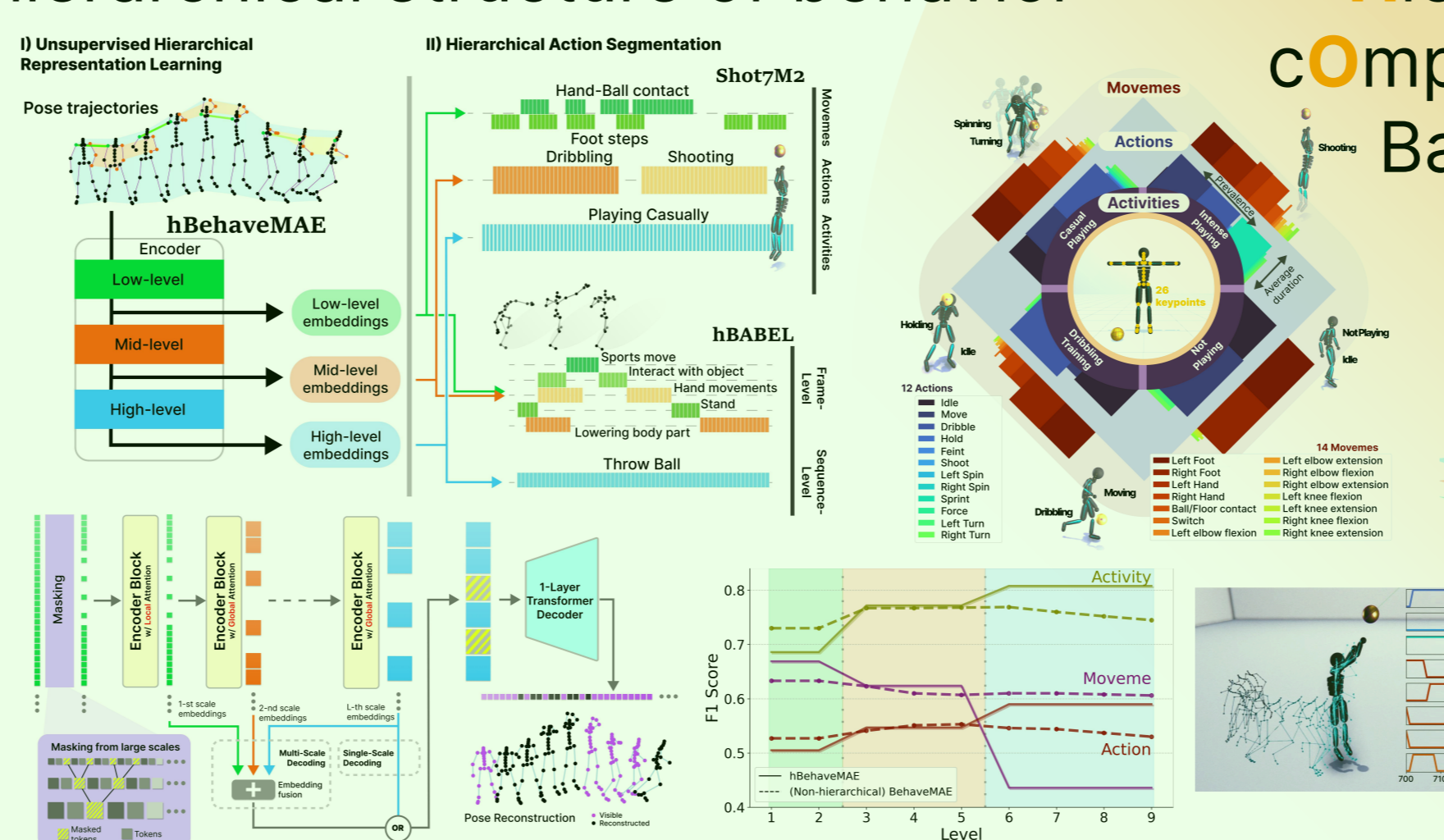
Romero J, Tzionas D, Black M J. Embodied hands: Modeling and capturing hands and bodies together[J]. 2022.
Loper M, Mahmood N, Romero J, et al. SMPL: A skinned multi-person linear model[M]//Seminal Graphics Papers.2023.

DLC2ACTION What is my cat doing?

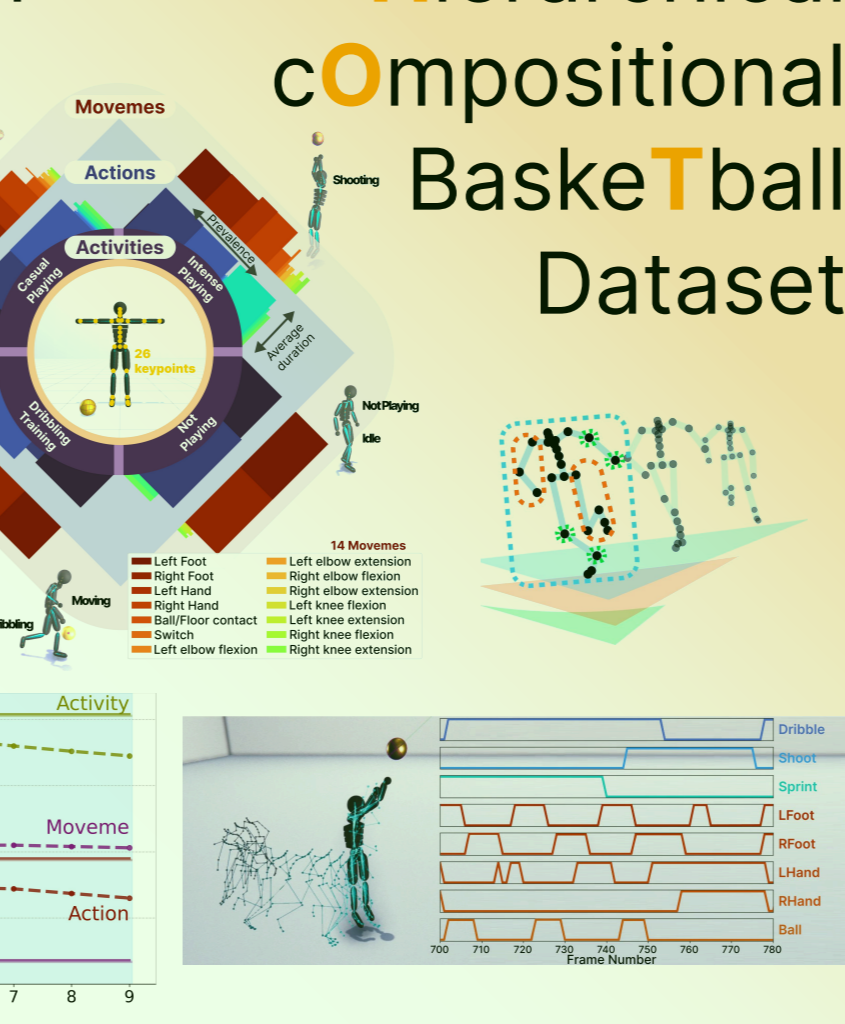
DLC2Action is an easy-to-use python toolbox to perform action segmentation from body kinematics. Supporting diverse pose data formats, the toolbox allows you to extract kinematic features and tidily run trainings, evaluations and predictions from a set of supervised Deep Learning models. The toolbox is associated with a User Interface to manually annotate actions of interest from videos.



hBehaveMAE: Learning the hierarchical structure of behavior



Shot7M2: Synthetic Hierarchical Compositional Basketball Dataset



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