SiamBOMB: A Real-time AI-based System for Home-cage Animal Tracking, Segmentation and Behavioral Analysis

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CVPR VIRTUAL JUNE 19-25

➢ Abstract

Biologists often need to handle numerous video-based home-cage animal behavior analysis tasks that require massive workloads. Therefore, we develop an AI-based multi-species tracking and segmentation system, **SiamBOMB**, for real-time automatic home-cage animal behavioral analysis. In this system, a **triplet background-enhanced** Siamese-based network with replaceable modular design ensures the flexibility and generalizability of the system. We also implement **temporal UpdateNet** to get more precise boundary. In fact, with just one-shot first frame label, the **user-friendly interface** makes the whole tuning process extremely convenient for researchers.
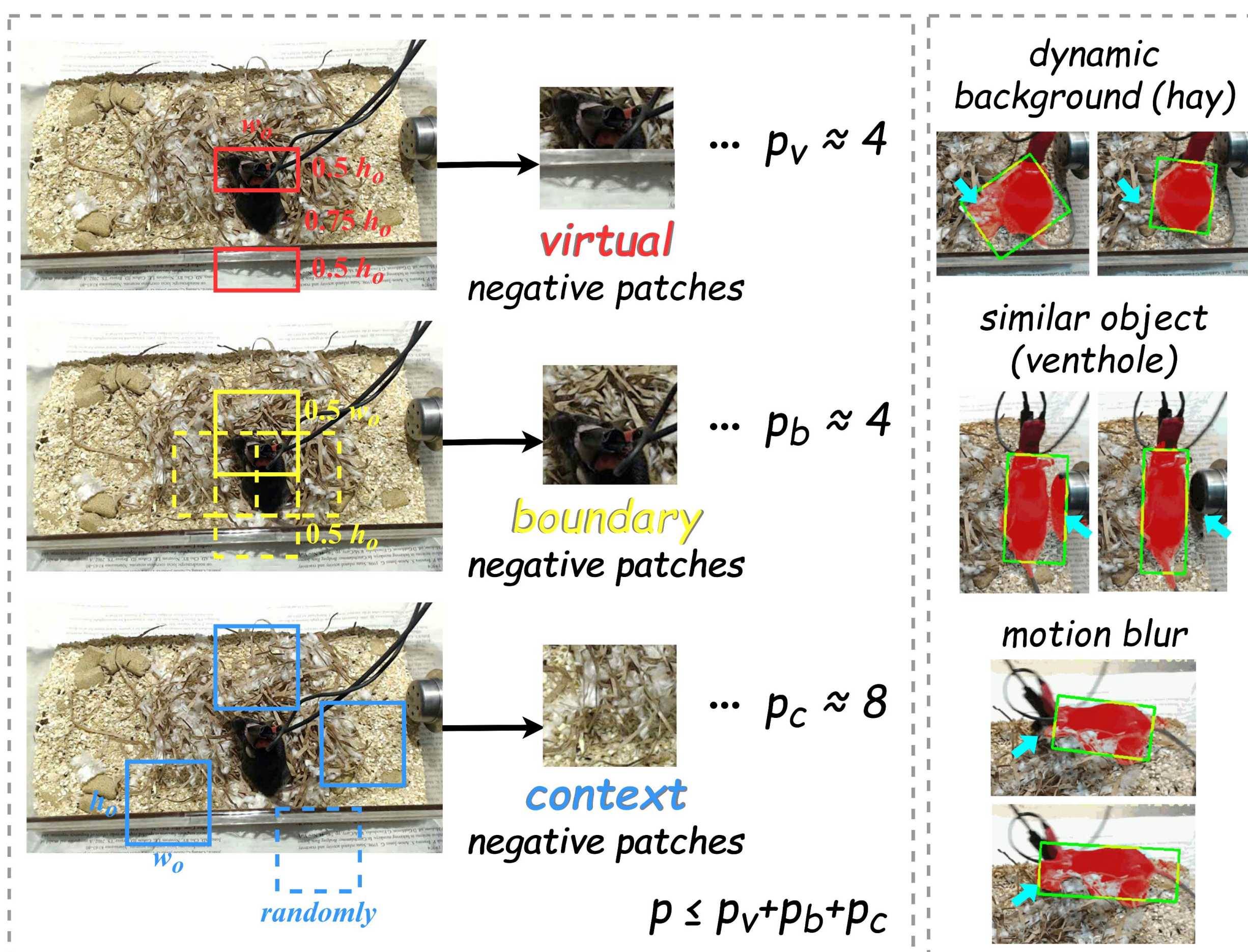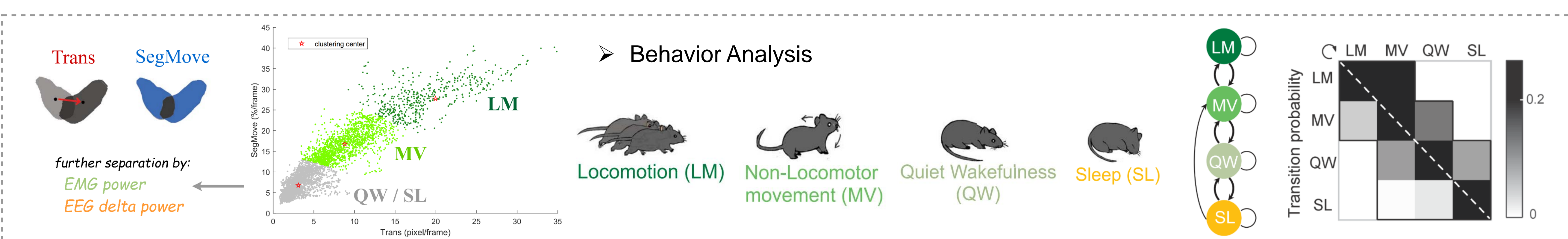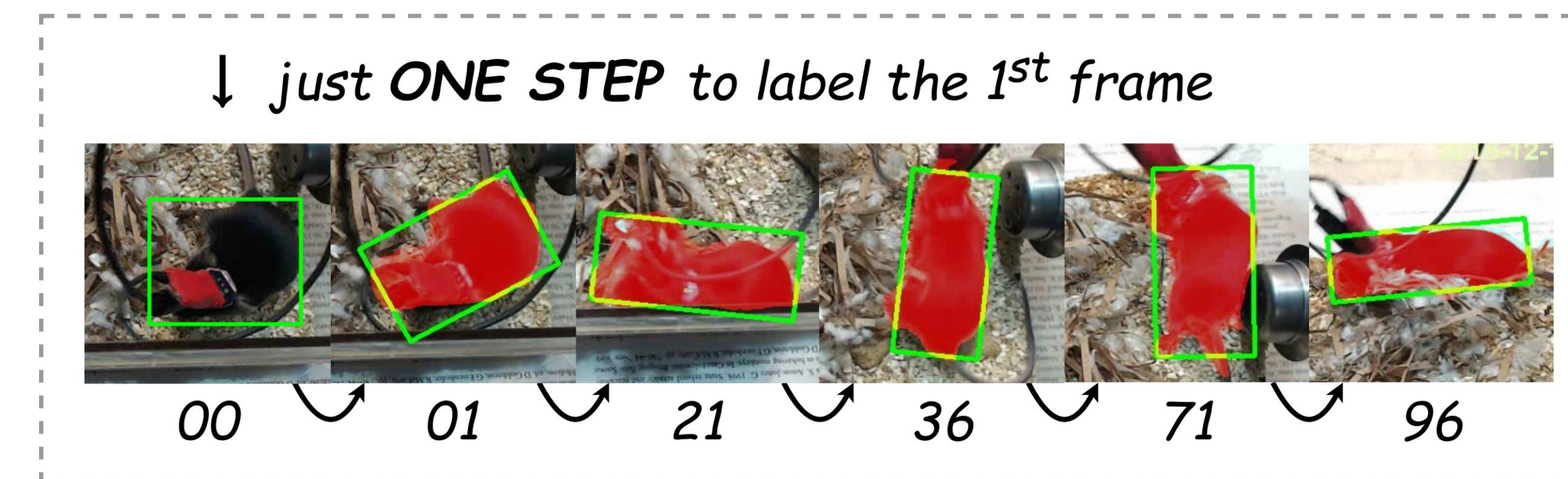
➢ Demonstration

https://youtu.be/lLlPdOsnzT8

➢ Code

https://github.com/JackieZhai/SiamBOMB

➢ Citation

https://doi.org/10.24963/ijcai.2020/776

➢ Patch Selection **(triplet background-enhanced)**

➢ Architecture

AlexNet · VGG · MobileNet V2 · Inception · ResNet-17 · ResNet-50 · ResNet-33 · ResNet-101

↓ *just ONE STEP to label the 1st frame*

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➢ Behavior Analysis

Locomotion (LM) Non-Locomotor movement (MV) Quiet Wakefulness (QW) Sleep (SL)
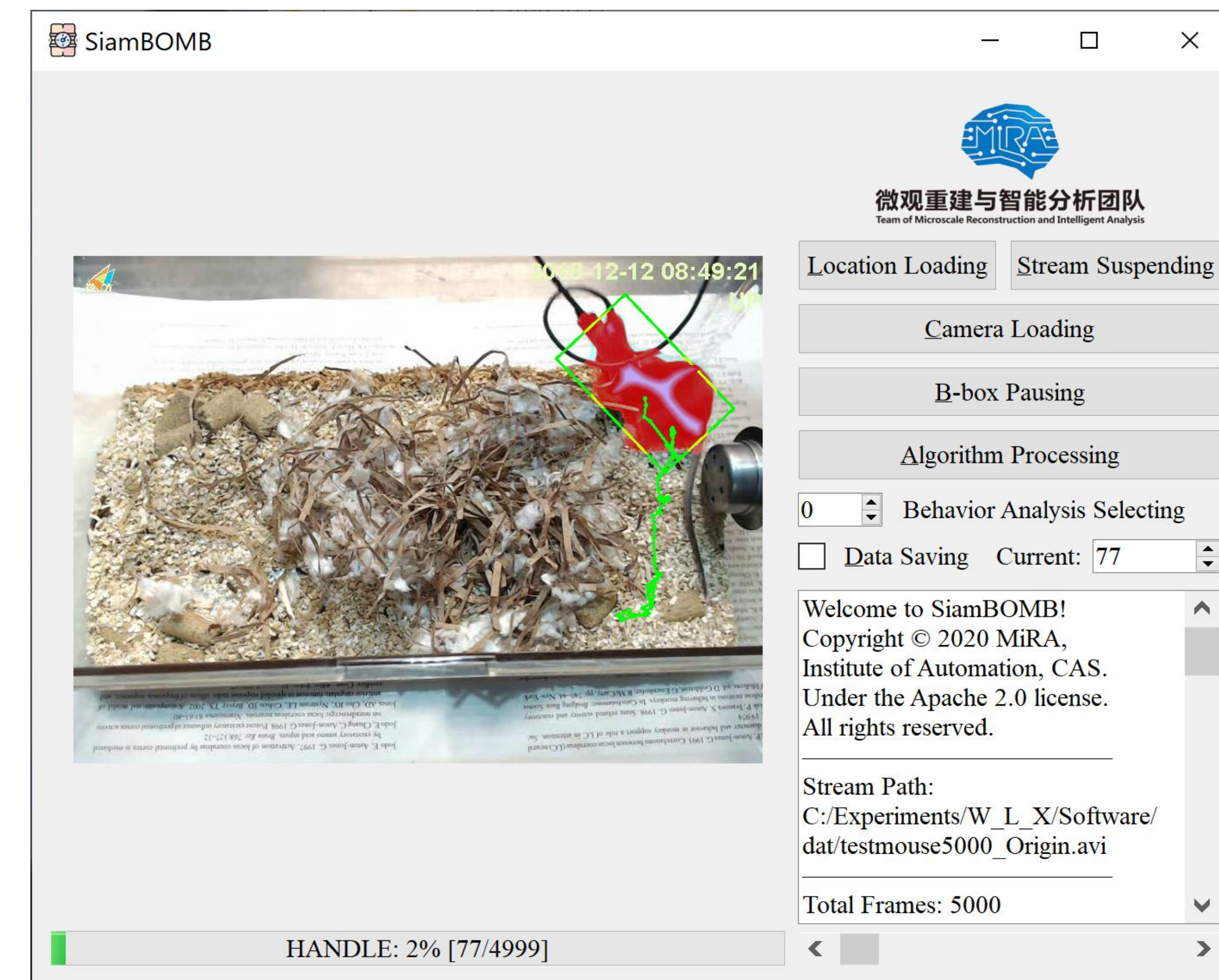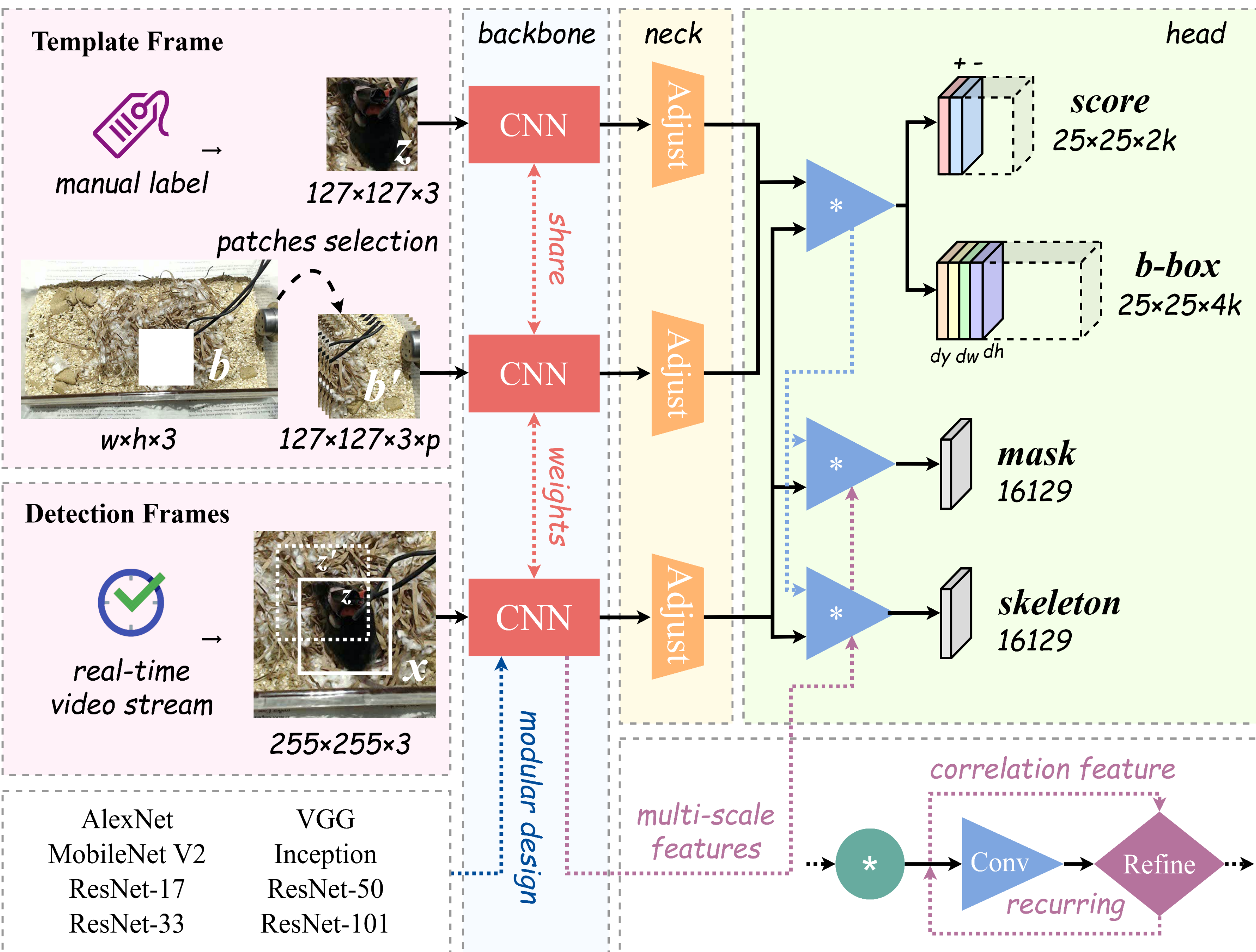
➢ Future Work

Hao Zhai *et al.* focus on the optimization of complex scenarios that **track multiple objects**. The new version of SiamBOMB is coming, please stay tuned for updates on the GitHub.