

MEMFOF: High-Resolution Training for Memory-Efficient Multi-Frame Optical Flow Estimation

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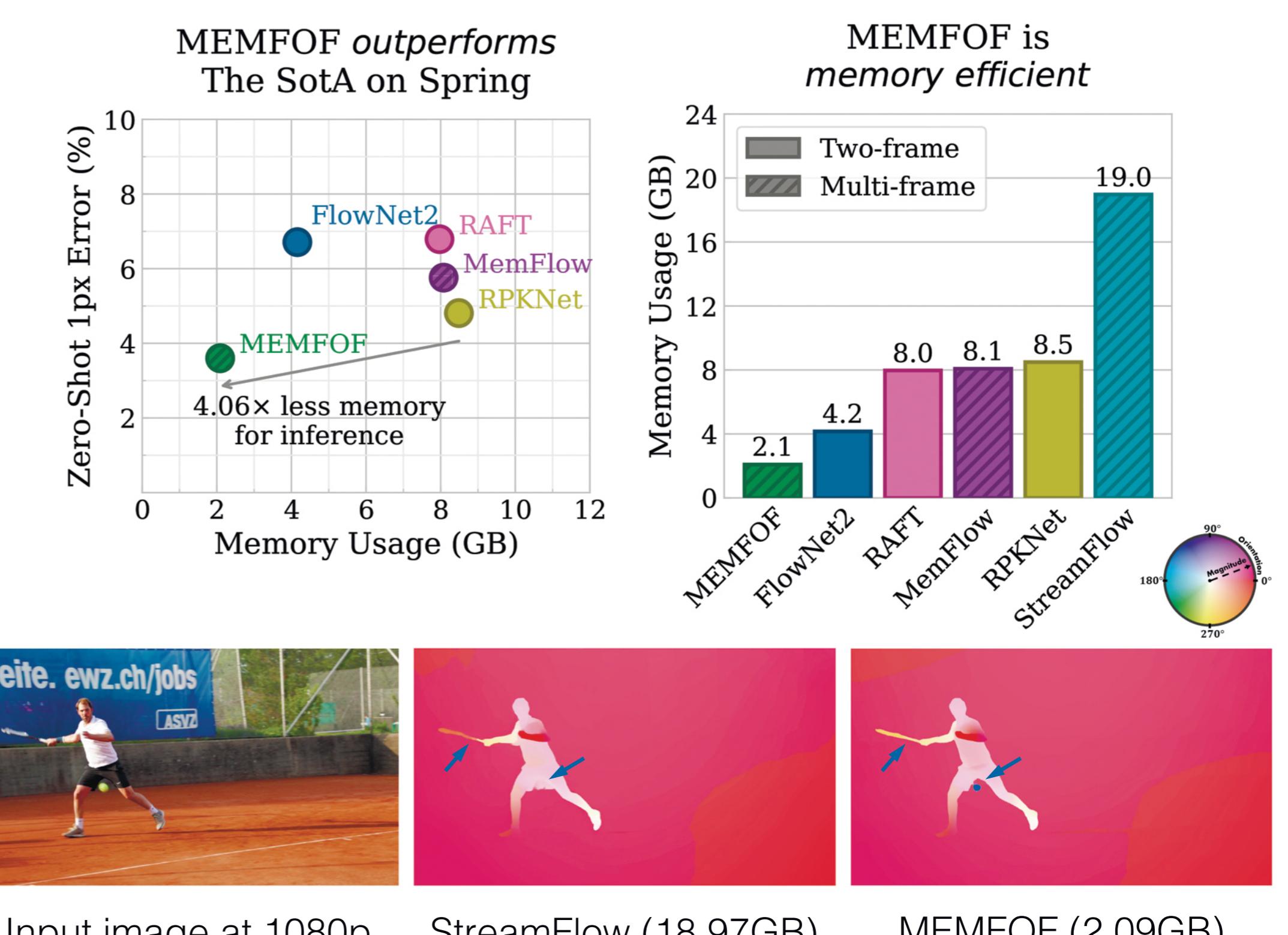
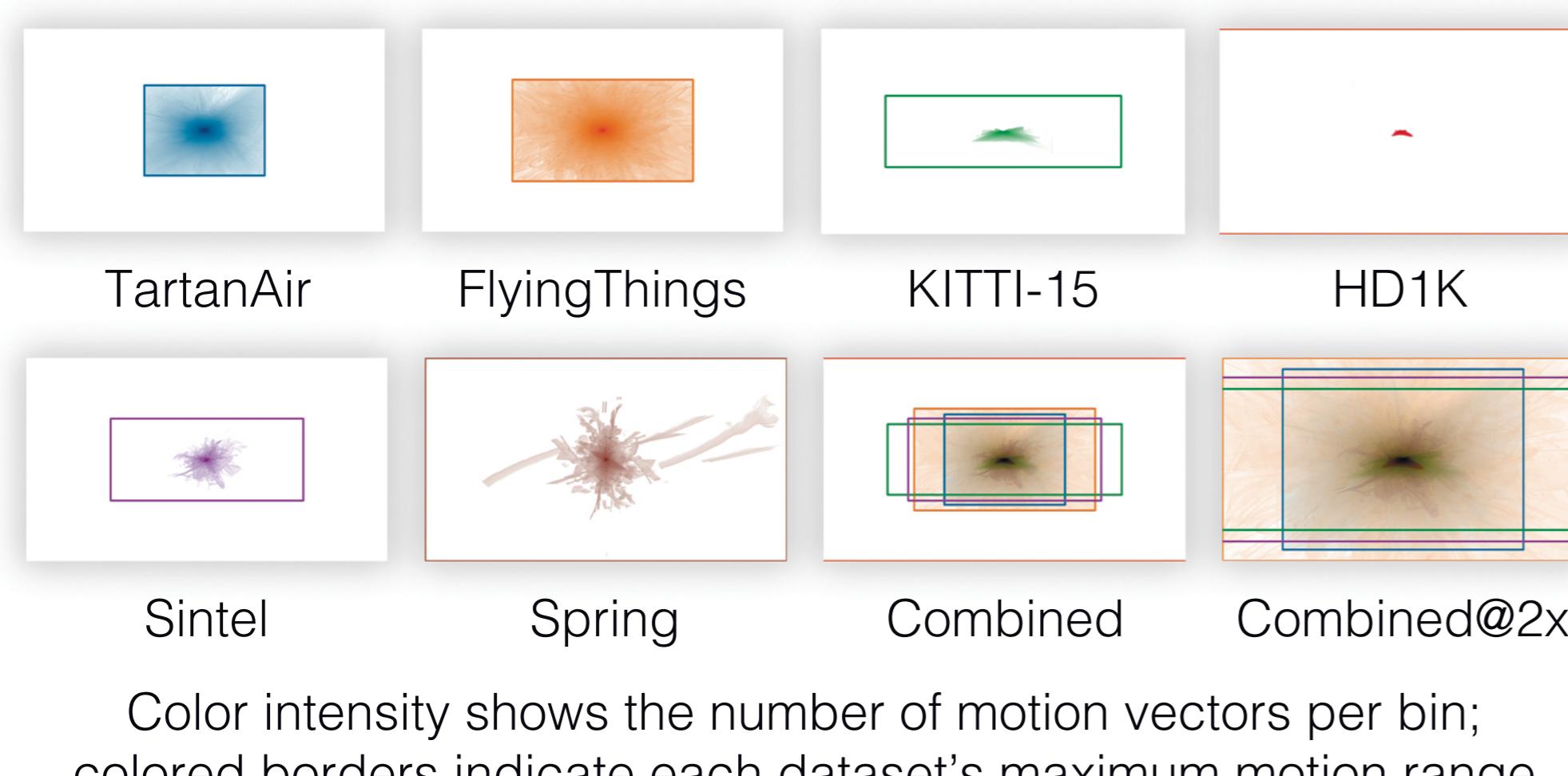
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Optical Flow Estimation

- Optical flow estimates the **motion of pixels** between consecutive video frames
- It is widely used in **video analysis, action recognition, and motion-based video processing**

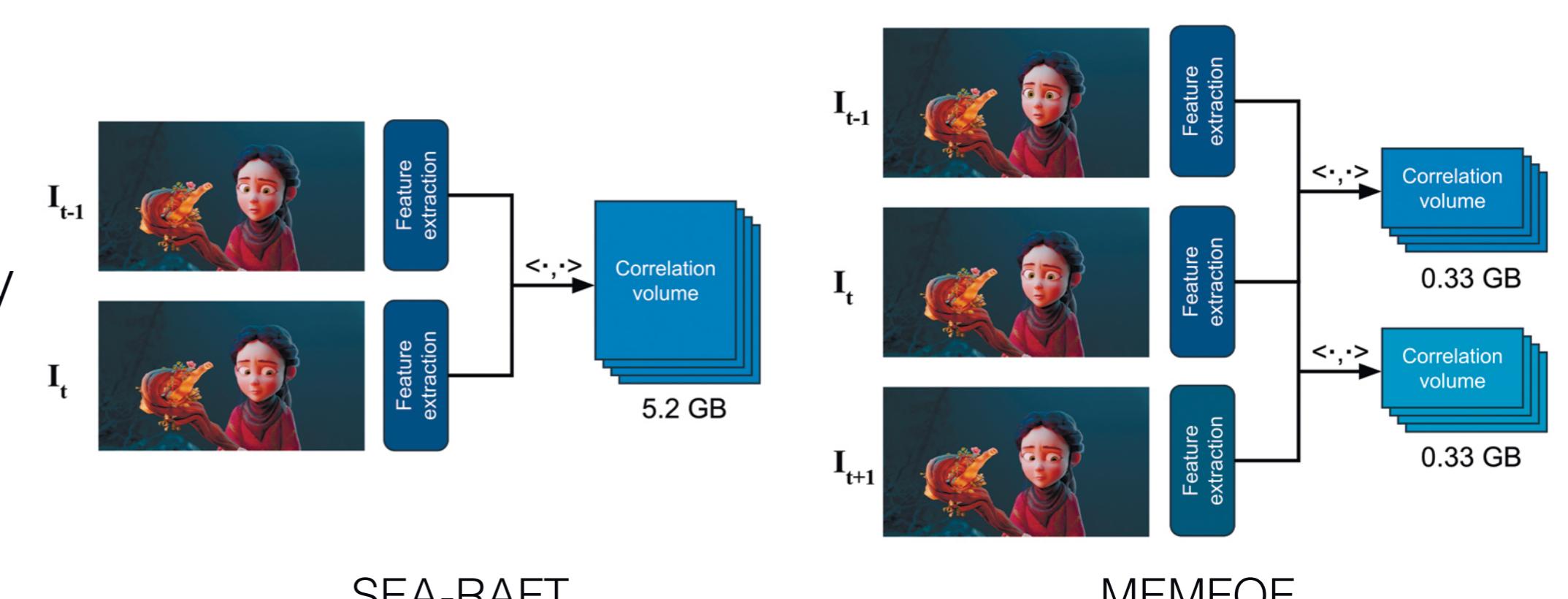
Motivation & Key Results

- State-of-the-art optical flow models already deliver high-quality results but demand **excessive GPU memory**
- MEMFOF achieves **even higher quality** while enabling Full HD (1080p) flow estimation **using only 2.09 GB** of memory, allowing native processing without cropping, tiling, or downsampling



Memory Efficiency and Multiple Frames

- Reducing the **correlation volume resolution** (2x) frees memory for multi-frame processing, which improves **temporal stability** and optical flow quality
- Even with **two correlation volumes**, our approach requires much less memory than many other RAFT-based methods, enabling native **Full HD** training and inference



Project page



GitHub

Conclusion

- We show that **Memory-Efficient Multi-Frame Optical Flow** is achievable without sacrificing accuracy
- We establish a **strong baseline** for future research on multi-frame correlation methods
- MEMFOF can be **Integrated into your project** in just **5 minutes**, check out our GitHub repository