Ombretta Strafforello

Computer Vision Scientist

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Professional Summary

Researcher in computer vision, with a passion for deriving insights from data. 5+ years experience in developing and implementing deep learning-based models, as well as in collecting, processing and visualizing data. Currently engaged in investigating how to model human aesthetic perception with state-of-the-art computer vision. Previously, Ph.D. Candidate in deep learning for long-term video understanding.

Experience

2023 - curr. **Postdoctoral Researcher at KU Leuven - Brain & Cognition unit**, Belgium.
Part of prof. Johan Wagemans' ERC GRAPPA interdisciplinary project. I investigate how computer vision can be used to model human aesthetic perception of natural and artistic images. My work focuses on adapting and extending state-of-the-art models, such as vision transformers and large vision-language models, to predict aesthetic appreciation. Additionally, I explore how theories from visual perception, particularly regarding the impact of color, symmetry, grouping, and composition, can be integrated into these models. As part of this project, I also coordinate a group of five PhD students working on computational aesthetics.

2019-2023 **Ph.D. Candidate at TU Delft & Researcher at TNO**, Netherlands.
Thesis: *Rethinking the Objectives of Computer Vision Systems*. Supervisors: dr. Jan van Gemert (Computer Vision lab, TU Delft), dr. Klamer Schutte (Intelligent Imaging, TNO). My main research topics included **(long-term) action recognition**, **video summarization**, (video) **object detection** and **human evaluation** of computer vision systems. I published and presented research findings in top-tier international conferences.
I **supervised M.Sc. and B.Sc. students projects**, including group equivariant video action recognition, self-supervised automatic event detection in sport videos, object detection, segmentation and tracking in event-based videos.
I **gave lectures on Action Recognition** in the M.Sc. course *Computer Vision by Deep Learning* (CS4245) at TU Delft, Netherlands.

2018-2019 **Research Intern at IBM Centers for Advanced Studies Benelux**, Netherlands.
I developed a deep learning model that extracts highlights from videos, based on a multimodal system of LSTMs. For this, I collected a novel multi-modal dataset, with extracted features, including GloVe word embeddings from the speech transcripts, COVAREP audio features and OpenFace descriptors for facial expression and head pose.

Education

2019 – 2023 **Ph.D. Candidate in Compute Vision**, TU Delft and TNO, Netherlands.

2017 – 2019 **M.Sc. Computer Science - Data Science and Technology**, TU Delft, Netherlands.
Thesis: *Multimodal information extraction from videos - Automatic creation of highlight clips from political speeches*, supervised by dr. Neil Yorke-Smith (TU Delft).

2014 – 2017 **B.Sc. Computer Engineering**, Politecnico di Torino, Italy.

Skills

Computer Vision	Image processing and classification, object detection and segmentation, action recognition, detection and localization, color theory, etc.
Machine Learning	Supervised, un/weakly-/self-supervised and transfer learning.
Deep Learning	Expert of 2D/3D-CNNs and Vision Transformers. Familiarity with LLMs, VLMs, GANs, diffusion models, NeRFs.
Libraries/frameworks	OpenCV, PyTorch, TensorFlow, Keras, Scikit-learn, NumPy, SciPy, Pandas.
Data Handling	Data pre-processing, visualization, and management in large-scale projects.
Tools and Platforms	HPC; MLOps: MLflow, DVC; Google Cloud and Amazon Web Services.
Coding	Python, MATLAB, Wolfram Mathematica, Java, C, Bash, SQL, LaTeX.
Web Dev	HTML, CSS, JavaScript.
Languages	Fluent in Italian and English, intermediate in Dutch and French.

Selected Publications

1. **Strafforello, O.**, Kayhan, O., Inel, O., Schutte, K., & van Gemert, J. (2024). Aligning object detector bounding boxes with human preference. In *Proceedings of the European Conference on Computer Vision (ECCV) Workshops*.
2. Lengyel, A., **Strafforello, O.**, Bruintjes, R.-J., Gielisse, A., & van Gemert, J. (2023). Color equivariant convolutional networks. In *Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*.
3. **Strafforello, O.**, Liu, X., Schutte, K., & van Gemert, J. (2023). Video BagNet: Short temporal receptive fields increase robustness in long-term action recognition. In *Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops (ICCVw)*.
4. **Strafforello, O.**, Schutte, K., & van Gemert, J. (2023). Are current long-term video understanding datasets long-term? In *Proceedings of the IEEE/CVF International Conference on Computer Vision Workshops (ICCVw)*.
5. **Strafforello, O.**, Rajasekar, V., Kayhan, O., Inel, O., & van Gemert, J. (2022). Humans disagree with the IoU for measuring object detector localization error. In *IEEE International Conference on Image Processing (ICIP)*. IEEE.

Other Experience

Volunteering Work

- **Reviewer** for journals and conferences, including CVPR, ECCV, ICCV and CVIU.

Certificates

2022 **IRDTA 5th International School on Deep Learning** Attendee.

2022 **Lorentz Center workshop *ICT with Industry 2022*** Attendee in the RTL Nederland case.

2021 **ASCI-EDL Winter School on Efficient Deep Learning** Attendee.

Honors and Awards

2018 **Newcraft 24 Hour Data Challenge hackathon** Winning team of #Whatsnext LeasePlan.