

# Gurkirt Singh

Xovis AG – Bern, Switzerland

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## Experience Academia: 4+ years, Industry 4+ years

<b>Xovis AG</b> , Bern, CH, <i>Senior ML &amp; CV Engineer</i>	<i>Since Oct 23, 2 years</i>
Distillation: Led the design and development of model distillation pipeline.	
– Distilled Transformer models (ViT) to embedded deployment friendly models.	
Object Detection: Spearheaded the design and development of multi-task object detection and tracking models.	
– Achieved three times reduction in false positive rate.	
Quantization: Engineered QAT for WinogradConvs to enable deployment on 250K+ embedded devices with FPGA.	
Auto-labeling: Led efforts to optimize and semi-automate the labeling pipeline.	
Multi-modal foundation models: Implemented SSL techniques to train multi-modal foundation models using large quantity unlabeled videos.	
<b>ETH</b> , Zurich, CH, <i>Postdoctoral Fellow</i>	<i>Feb 20, 3.5 years</i>
Responsible for research support for startups with problems such as monocular depth estimation, 3D reconstruction, 3D human pose estimation, and MRI classification.	
<b>BorealisAI</b> , Vancouver, CA, <i>Research Intern</i>	<i>Feb 19, 4 months</i>
Developed human-object relation detection algorithm for videos.	
<b>Disney Research</b> , Pittsburgh, US, <i>Research Intern</i>	<i>Feb 17, 6 months</i>
Developed action-detection method for meta-data generation of ABC's tv-episodes.	
<b>Siemens Research</b> , Bangalore, IN, <i>Research Engineer</i>	<i>Oct 13, 2 years</i>
Support research team with implementation of algorithms such as optical-flow and object-tracking.	
<b>INRIA</b> , Grenoble, FR, <i>Research Intern</i>	<i>Feb 13, 8 months</i>
Researched on gesture recognition method for RGB-D cameras.	
<b>University of Edinburgh</b> , UK, <i>Research Intern</i>	<i>Jan 10, 4 months</i>
Worked on anomalous trajectory detection with GMMs.	

## Education

<b>Oxford Brookes University</b> , UK <i>PhD Computer Vision</i>	<i>Sep 15, 4 years</i>
<b>ENSIMAG, INP</b> , Grenoble, FR <i>MSc Informatics</i>	<i>Sep 12 - 1.2 years</i>
<b>VIT University</b> , Vellore, IN <i>B.Tech Electronics</i>	<i>Aug 06 - 4 years</i>

## Selected Publications 18+ in TPAMI, ICCV, CVPRW, ECCVW, WACV, ACCV, BMVC, ICPR

**Gurkirt Singh**, Vasileios Choutas, Suman Saha, Fisher Yu, Luc Van Gool, **Spatio-Temporal Action Detection Under Large Motion**, *IEEE/CVF Winter Conference on Applications of computer Vision (WACV), 2023*

**Gurkirt Singh**, Stephen Akrigg, Manuele Di Maio, .... others &, Fabio Cuzzolin, **ROAD: The ROad Event Awareness Dataset for Autonomous Driving**, *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022*

Suman Saha, **Gurkirt Singh**, Michael Sapienza, Philip HS Torr, Fabio Cuzzolin **Spatio-Temporal Action Instance Segmentation and Localisation Book Chapter: Modelling Human Motion**, 2020

**Gurkirt Singh** and Fabio Cuzzolin, **Recurrent Convolutions for Causal 3D CNNs**, *Workshop on Large Scale Holistic Video Understanding, ICCV, 2019*

Silvio Olivastri, **Gurkirt Singh** and Fabio Cuzzolin, **An End-to-End Baseline for Video Captioning**, *Workshop on Large Scale Holistic Video Understanding, ICCV, 2019*

**Gurkirt Singh**, Suman Saha and Fabio Cuzzolin, **TraMNet - Transition Matrix Network for Efficient Action Tube Proposals**, *Asian Conference on Computer Vision (ACCV), 2018*

**Gurkirt Singh**, Suman Saha, Michael Sapienza, Philip Torr and Fabio Cuzzolin, **Online Real-time Multiple Spatiotemporal Action Localisation and Prediction**, *International Conference on Computer Vision (ICCV), 2017*

**AMTnet: Action-Micro-Tube Regression by end-to-end Trainable Deep Architecture**, Suman Saha, **Gurkirt Singh** and Fabio Cuzzolin, *International Conference on Computer Vision (ICCV), 2017*

Suman Saha, **Gurkirt Singh**, Michael Sapienza, Philip Torr and Fabio Cuzzolin, **Deep Learning for Detecting Multiple Space-Time Action Tubes in Videos**, *British Machine Vision Conference (BMVC), 2016*

Georgios Evangelidis, **Gurkirt Singh**, Radu Horaud, **Skeletal Quads: Human action recognition using joint quadruples**, *International Conference on Pattern Recognition Vision (ICPR), 2014*

## Awards & Challenges

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<b>Multisports-Challenge, DeeperAction ECCV'22:</b> Winner of Action Detection Track	2022
<b>Doctoral Consortium:</b> Selected for Doctoral Consortium Award ICCV-2019	2019
<b>Best Reviewer:</b> Selected as the best reviewer for ICCV-2019	2019
<b>PhD Scholarship:</b> 150th Anniversary PhD Scholarship, Oxford Brookes University	2015
<b>Charades-Challenge 2017:</b> Action Recognition and Segmentation tasks (Rank: 2/10 and 3/6)	2017
<b>ActivityNet-Challenge 2017:</b> Classification tasks (Rank 3/29)	2017
<b>ActivityNet-Challenge 2016:</b> Classification and Detection tasks (Rank 10/24 and 2/6)	2016
<b>Chalearn-Challenge 2014:</b> Looking at People Challenge (Gesture Detection Task Rank 7/17)	2014

## Skills

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**Programming:** Python, Matlab, C/C++, Lua

**Deep Learning Platforms:** PyTorch, JAX, Torch, Caffe, TensorFlow, Keras

**Libraries:** Numpy, Scipy, Scikit-Learn, OpenCV, Eigen, Kinect SDK, Wandb

**Operating Systems:** Linux, macOS, Windows

## Teaching Experience

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**Machine Learning:** Teaching Assistant (Postgraduate) 2018

**Computer Vision and Machine Learning:** Guest lecturer (Postgraduate) 2016, 2017, 2018

**Understanding Programming:** Lab Assistant (Undergraduate) 2015, 2016, 2017

## **Community Contributions**

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Co-cognised workshop on The ROAD Challenge ICCV 2023.

Co-cognised workshop on The ROAD Challenge ICCV 2021.

Co-cognised workshop on ESAD challenge for surgeon action detection, MIDL 2020.

Best reviewer award ICCV 2019

Reviewer: TPAMI 2017, 2018, ICCV 2019, 2021, ECCV 2020, 2022 CVPR 2018,2019,2020,2021,2022  
BMVC 2018,2019 and IJCIA 2017, 2018, 2019

## **Languages**

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English (C1), German (A2) Punjabi (Maternal), Hindi (Maternal)

## **References**

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Professor Luc Van Gool, ETH Zurich, Switzerland.

Professor Fabio Cuzzolin, Oxford Brookes University, UK.

Professor Leonid Sigal, University of British Columbia, Canada.

Professor Philip Torr, University of Oxford, UK.

Dr. Georgios Evangelidis; Snap, Vienna, Austria.

Dr. Andreas Lehrmann, BorealisAI, Vancouver, Canada.

Professor Bob Fisher, University of Edinburgh, UK.

Dr. Amit Kale, Bosch Research, India.

## **More Information**

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**Google Scholar:** <https://scholar.google.com/citations?user=w8XHUMIAAAJ&hl=en>

**Homepage:** <http://gurkirt.github.io/>

**Github:** <https://github.com/gurkirt>

**LinkedIn:** <https://www.linkedin.com/in/gurkirt/>