

# Megh Shukla

## Research Beyond Publications

<https://meghshukla.github.io/>

Advisor: Prof. Alexandre Alahi ([Homepage](#))

Visual Intelligence for Transportation Lab

École Polytechnique Fédérale de Lausanne

✉ [megh.shukla@epfl.ch](mailto:megh.shukla@epfl.ch)

## Education

Since Jul '22 **Ph.D.** *École Polytechnique Fédérale de Lausanne*, Electrical Engineering.  
Jul '17 - '19 **M.Tech.** *Indian Institute of Technology Bombay*, Geoinformatics Engineering GPA: 9.98.  
Jul '13 - '17 **B.E.** *University of Mumbai*, Electronics and Telecommunication Engineering GPA: 9.00.

## Major Achievements

Nov '21 **Rising Star Award.** *Mercedes-Benz Research and Development India.*  
- 25 of 6000+ engineers awarded to commemorate Silver Jubilee (25 years) of Mercedes-Benz R&D India  
- *Published* [1, 2, 4], *Patented* (Innovation Award: top 5% inventions - 2020), *Engineered* active learning in production  
Aug '19 **Institute Silver Medal.** *Indian Institute of Technology Bombay.*  
- M.Tech. Class of 2019: Secured *Department Rank 1, Institute Rank 3* (in 2018)  
- AP grades for exceptional performance (top 2%): Machine Learning EE769 and Satellite Image Processing GNR602

## Research

- [1] **Bayesian Uncertainty and Expected Gradient Length - Regression: Two Sides Of The Same Coin?**  
[WACV link](#) Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision 2022  
Author(s): Megh Shukla
- [2] **A Mathematical Analysis of Learning Loss for Active Learning in Regression.**  
[CVPRW link](#) Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops 2021  
Author(s): Megh Shukla, Shuaib Ahmed
- [3] **LEt-SNE: A Hybrid Approach to Data Embedding and Visualization of Hyperspectral Imagery.**  
[ICASSP link](#) Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing 2020  
Author(s): Megh Shukla, Biplab Banerjee, KM Buddhiraju
- [4] **VL4Pose: Active Learning Through Out-Of-Distribution Detection For Pose Estimation.**  
[Preprint link](#) Publication under peer-review, patent for derived work filed by Mercedes-Benz AG, India Patent Office (2020, 2022)

## Work Experience

Aug '19 – **Computer Vision Research Engineer.** *Mercedes-Benz Research and Development India.*  
May '22 - Module owner: Responsible for end-to-end R&D in active learning for pose estimation, MBUX Intelligent Interior  
- Active Learning intelligently selects images for annotation, costs and model deployment time reduced by 30-50%  
- Analyzed, implemented and optimized existing research for active and incremental learning pipeline  
- Designed algorithms to improve: a) Overall performance b) Pre-empting failures c) Explainability in active learning  
(a) *EGL++* [1] theoretically explores a connection between Bayesian Uncertainty and Expected Gradient Length  
(b) *LearningLoss++* [2] provides a mathematical background for Learning Loss to pre-empt failure cases in production  
(c) *VL4Pose* [4] models simple skeletal constraints with a Bayesian Net to perform out-of-distribution detection  
- Miscellaneous: Interviewer for IIT on-campus hiring; provided mentorship for research interns and campus recruits  
May '18 – **Research Intern.** *HARMAN India, a Samsung Company.*  
Jul '18 - Explored Capsule Networks and Whitebox/Blackbox techniques for Adversarial Learning in autonomous driving  
- Experimented with reconstruction and dithering using TensorFlow to prevent white box attacks on the model  
- Parallelized the serial implementation of gradient computation in *cleverhans*: Jacobian augmentation function  
- Devised PCA augmentations to increase similarity between Substitute and Oracle (blackbox) from 92% to 95%

## GitHub

Since Mar'20 *Open-source library*, Optimized implementation of active learning algorithms for human pose estimation.  
Apr '18 *Numba-CUDA*, Implemented GPU accelerated algorithms using thread-level control in Python.

## Miscellaneous

Since Mar'21 **Board of Studies Member.** *Electronics and Telecommunication, Dwarkadas J Sanghvi CoE.*  
Feb '22 **Speaker, WADLA IIIT SriCity.**, Presented trends in keypoint estimation and active learning.  
Jul '18 – '19 **Teaching Assistant**, IIT Bombay: 1. Satellite Image Processing and 2. Machine Learning.  
Jul '18 – '19 **Department Technical Secretary**, CSRE, IIT Bombay: Handled skill enhancement of 50+ students.