

Kshitij Dwivedi

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Education

- 2018–present **PhD Student**, *Information Systems Technology and Design, SUTD*, Singapore, Supervisor: Dr. Gemma Roig.
Research Interests: Neuroscience inspired computer vision, Lifelong learning in vision models
- 2009–2014 **M.Tech**, *Electrical Engineering*, IIT Kanpur, Kanpur, India.
- 2009–2014 **B.Tech**, *Electrical Engineering*, IIT Kanpur, Kanpur, India.

Publications

- [1] K. Dwivedi and G. Roig, "Representation similarity analysis for efficient task taxonomy transfer learning," in *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.
- [2] K. Dwivedi and G. Roig, "Task-specific vision models explain task-specific areas of visual cortex," *bioRxiv*, p. 402735, 2018.
- [3] K. Dwivedi and G. Roig, "Navigational affordance cortical responses explained by scene parsing model," *European Conference on Computer Vision Workshop (ECCVW) on Brain Driven Computer Vision (BDCV)*, 2018.
- [4] G. Shen*, K. Dwivedi*, K. Majima, T. Horikawa, and Y. Kamitani, "End-to-end deep image reconstruction from human brain activity," *bioRxiv*, p. 272518, 2018.
- [5] K.-H. Lee, P. P. Prabhudesai, S. R. Shanmugam, N. Jin-Hee, K. Dwivedi, S. Deshmukh, S. R. Malreddy, and H. Jong-Min, "Electronic device for processing image and method for controlling the same," Nov. 17 2016. US Patent App. 15/154,615.
- [6] K. Dwivedi, P. Prabhudesai, and S. R. Shanmugam, "A hybrid method for long term moving object tracker," in *Signal Processing and Communications (SPCOM), 2016 International Conference on*, pp. 1–5, IEEE, 2016.
- [7] B. Ghosh and K. Dwivedi, "Micromagnetic analysis of a double-barrier synthetic antiferromagnetic mtj stack," *Applied Nanoscience*, vol. 5, no. 7, pp. 771–775, 2015.
- [8] B. Ghosh and K. Dwivedi, "Micromagnetic analysis of heusler alloy-based perpendicular double barrier synthetic antiferromagnetic free layer mtjs," *Journal of Theoretical and Applied Physics*, vol. 9, no. 3, pp. 207–212, 2015.

Conference abstracts

- K. Dwivedi, M.F. Bonner, G. Roig, "Explaining Scene-selective Visual Area Using Task-specific and Category-specific DNN Units ", Vision Science Society, 2019.

- K. Dwivedi, G. Roig, "Importance of object selection in Relational Reasoning tasks", NeurIPS Workshop on Relational Representation Learning, 2018.
- A. Murakami, K. Dwivedi, Y. Kamitani, "Decoding of depth information from human brain activity", Annual meeting of the Japan Neuroscience Society, 2018
- K. Dwivedi, G. Roig, "Evaluation of plug and play modules for multi-domain learning ", ECCV workshop on Interactive and Adaptive Learning, 2018.

Technical Skills

Programming **Python, C, C++, Matlab.**
 Frameworks **pytorch, tensorflow, caffe, torch.**

Experience

- 2019– present **Visiting student**, *FU*, Berlin, Germany, Supervisor: Dr. Radoslaw Martin Cichy.
 Spatial and temporal emergence of scene visual representations
- 2017– 2017 **Research Engineer**, *ATR*, Kyoto, Japan, Supervisor: Dr. Yukiyasu Kamitani.
 Reconstruction of perceived images from brain activity
- Evaluated the possibility of training generative models on fMRI activity
 - Preprint: **End-to-end deep image reconstruction from human brain activity**
- 2014–2017 **Senior Software Engineer**, *Samsung R&D Institute India*, Bangalore.
 Development of computer vision applications for Samsung smartphone cameras
- Portrait segmentation
 - Modeled humans and background using Gaussian Mixture Models as a post processing step to estimate probability of a pixel belonging to foreground, thus improving segmentation output.
 - Implemented HOG to extract features of the segmented region for training.
 - Initial segmentation map was generated from the optical flow of two captured images
 - US Patent granted:
Electronic device for processing image and method for controlling the same
 - Long term object tracking
 - Implemented a fast hybrid object tracking algorithm using multiple features to complement each other for improved tracking performance.
 - The method used color histogram and a model feature template as the object model and was on par with then state of the art method Kernel Correlation Filters
 - Paper titled **A hybrid method for long term moving object tracker** published in IEEE SPCOM 2016.
 - Visual saliency detection.
 - Developed a multiscale residual network for saliency detection task and trained the model on SALICON and LSUN saliency datasets.
 - Our model "Deepattent" won the **1st place** in the **Large Scale Scene Understanding (LSUN) saliency** challenge held in **CVPR 2016**
 - Patent filed: **Suggestive zoom: Encodes more information at the salient region of an image for better zoom quality at salient positions.** Application number:201641022595
- 2012–2012 **Intern**, *Mercedes-Benz Research & Development North America*, Palo Alto, USA.
 Worked on vehicle detection part of a project which was aimed to provide driver assistance functions

Awards

- SUTD President's Graduate Fellowship (January,2018 – Present)
- First place in LSUN Saliency Challenge, CVPR 2016. Team name: Deepattent, **Leaderboard**
- Samsung Employee of the month award for contributing to object tracking project
- Bronze award at Samsung Best Paper Award Conference 2016 for technical report describing visual saliency model, given to 8 out of 132 papers submitted by Global Multimedia Samsung R & D centers
- Best demonstration award at NIPUN 2016, an intra-Samsung competition for the demonstration of saliency and style transfer applications for smartphone cameras.