

## Otkrist Gupta

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### ACADEMIC BACKGROUND

**Ph.D., Massachusetts Institute of Technology, MIT Media Lab** 2018

- Designing neural network architectures using reinforcement learning (ICLR 2017)
- Developed new machine learning algorithms for distributed training of neural networks without sharing of raw data (SplitNN/Federated Learning)
- Developed deep learning methods for classification of facial videos using auto-encoders, and determination of physiological signals such as heart rate using thermal imaging (CVPR 2016)
- Ph.D. Dissertation title: Unlocking the potential of neural networks in resource and data constrained environments.

**M.Sc., Massachusetts Institute of Technology, MIT Media Lab** 2012

- Gave the mathematical proof of existence and uniqueness of solution for around the corner 3D shape problem (Nature Communication, 2011)
- Developed an iterative fixed point algorithm for around the corner 3D imaging using time of arrival data of photons (Optics Express, 2012)
- Thesis: Recovering 3D shape Around a Corner using Ultra -Fast Time-of-Flight Imaging

**B.Tech, Indian Institute of Technology Delhi, Comp. Science** Rank #1, 9.6/10.0 (2009)

- Coursework (selected) – Data structures, Analysis and Design of Algorithms, Programming Languages, Artificial Intelligence
- Awarded **President's Gold Medal** for highest academic achievement in IIT among all graduating students

### INDUSTRY EXPERIENCE

**V.P. of Research and Development, Lendbuzz (Pre-IPO Unicorn)** 2021 - Present

- Promoted to lead multiple teams, led scale up both operations and infrastructure
- Lead hiring of 16 engineers and team leads, on both research and development fronts
- Leading development of computer vision models for automated ID verification, bank statement parsing, MRZ extraction, image manipulation and fraud detection (IJDAR 2021, EURASIP 2022)

**V.P. of Datascience, Lendbuzz** June 2018 - June 2021

- Developed the financial risk scoring model, used for underwriting in sale of approx. billion dollar worth of car loans and 400 million dollar risk amortized securitization
- Hired and led a team of 6 people including 3 Ph.D.s to research, build and deliver 20+ ml models for various business use cases (and published research papers)
- Architect and lead developer of AutoML platform for hyperparameter optimization
- Developed the in-house MLOps platform for automated model optimization, tracking, reporting, deployment, testing and auditing
- Scaling up deployment of models using both RESTful apis and asynchronous queues

**Software Engineer, Google** May 2013 - August 2014

- Developed new speech infrastructure for Google Search NLP to improve the quality of voice responses

- Developed Google Now actions such as “What’s on my Chromecast ?” featured in Google I/O 2014

#### **Software Engineer, LinkedIn**

June 2012- May 2013

- Architect and owner of recruiter typeahead service to provide ultrafast searches over millions of member names
- Worked in a team to develop CheckIn app for sourcing millions of job applicants all over the country
- Built a notifications and alerts platform using Hadoop to store and retrieve information on a cluster

#### **Software Developer, Tower Research Capital**

June 2009 - August 2010

- Developed servers (in C++) for trading and market data acquisition on LSE, NYSE Euronext and other exchanges
- Designed and developed UI (Django and MySQL) to administer trader risk limits and positions
- Developed a library of scripts to track positions, check database, send alerts, and debug server messages

#### **SELECT PUBLICATIONS**

Cited 3700 times, h-index **20**, i10-index **25**, see also my [Google Scholar](#) page.

27. Liu, Y., James, H., Gupta, O. and Raviv, D., 2022. MRZ code extraction from visa and passport documents using convolutional neural networks. *International Journal on Document Analysis and Recognition (IJDAR)*.
26. James, H., Gupta, O. and Raviv, D., 2022. Learning Document Graphs with Attention for Image Manipulation Detection. In *International Conference on Pattern Recognition and Artificial Intelligence*.
25. Dubey, A., Gupta, O., Raskar, R. and Naik, N., 2018. Maximum-entropy fine grained classification. *Advances in neural information processing systems (NeurIPS)*.
24. Dubey, A., Gupta, O., Guo, P., Raskar, R., Farrell, R. and Naik, N., 2018. Pairwise confusion for fine-grained visual classification. In *Proceedings of the European conference on computer vision (ECCV)*.
23. Gupta, O. and Raskar, R., 2018. Distributed learning of deep neural network over multiple agents. *Journal of Network and Computer Applications*
22. Gupta, O., Raviv, D. and Raskar, R., 2018. Illumination invariants in deep video expression recognition. *Pattern Recognition*.
21. Gupta, O., Das, A.J., Hellerstein, J. and Raskar, R., 2018. Machine learning approaches for large scale classification of produce. *Nature Scientific reports*.
20. Dubey, A., Gupta, O., Raskar, R., Rahwan, I. and Naik, N., 2017, December. Regularizing Prediction Entropy Enhances Deep Learning with Limited Data. In *Proceedings of the Neural Information Processing Systems (NeurIPS)*.
19. Baker, B., Gupta, O., Naik, N. and Raskar, R., 2016. Designing neural network architectures using reinforcement learning. *International conference on learning representations (ICLR)*.
18. Velten, A., Willwacher, T., Gupta, O., Veeraraghavan, A., Bawendi, M.G. and Raskar, R., 2012. Recovering three-dimensional shape around a corner using ultrafast time-of-flight imaging. *Nature communication*.
17. Gupta, O., Willwacher, T., Velten, A., Veeraraghavan, A. and Raskar, R., 2012. Reconstruction of hidden 3D shapes using diffuse reflections. *Optics express*.

## PUBLICATIONS CONTD.

15. James, H., Gupta, O. and Raviv, D., 2022. Printing and scanning investigation for image counter forensics. *EURASIP Journal on Image and Video Processing*.
14. Vepakomma, P., Singh, A., Zhang, E., Gupta, O. and Raskar, R., 2021, December. NoPeek-Infer: Preventing face reconstruction attacks in distributed inference after on-premise training. *IEEE International Conference on Automatic Face and Gesture Recognition (FG)*.
13. James, H., Gupta, O. and Raviv, D., 2020. Printing and Scanning Attack for Image Counter Forensics. *arXiv preprint arXiv:2005.02160*.
12. Gupta, O. and Raskar, R., Massachusetts Institute of Technology, 2020. Secure training of multi-party deep neural network. U.S. Patent 10,755,172.
11. Ilanchezian, I., Vepakomma, P., Singh, A., Gupta, O., Prasanna, G.N. and Raskar, R., 2019. Maximal adversarial perturbations for obfuscation: Hiding certain attributes while preserving rest. *arXiv preprint arXiv:1909.12734*.
10. Singh, A., Vepakomma, P., Gupta, O. and Raskar, R., 2019. Detailed comparison of communication efficiency of split learning and federated learning. *arXiv preprint arXiv:1909.09145*.
9. Vepakomma, P., Gupta, O., Dubey, A. and Raskar, R., 2019. Reducing leakage in distributed deep learning for sensitive health data. *arXiv preprint arXiv:1812.00564*.
8. Vepakomma, P., Gupta, O., Swedish, T. and Raskar, R., 2018. Split learning for health: Distributed deep learning without sharing raw patient data. *arXiv preprint arXiv:1812.00564*.
7. Vepakomma, P., Swedish, T., Raskar, R., Gupta, O. and Dubey, A., 2018. No peek: A survey of private distributed deep learning. *arXiv preprint arXiv:1812.03288*.
6. Baker, B., Gupta, O., Raskar, R. and Naik, N., 2017. Accelerating neural architecture search using performance prediction. *International conference on learning representations (ICLR)*.
5. Satat, G., Tancik, M., Gupta, O., Heshmat, B. and Raskar, R., 2017. Object classification through scattering media with deep learning on time resolved measurement. *Optics express*.
4. Rana, A., Yauney, G., Wong, L.C., Gupta, O., Muftu, A. and Shah, P., 2017, November. Automated segmentation of gingival diseases from oral images. In *2017 IEEE Healthcare Innovations and Point of Care Technologies (HI-POCT)*.
3. Gupta, O., Raviv, D. and Raskar, R., 2017. Multi-velocity neural networks for facial expression recognition in videos. *IEEE Transactions on Affective Computing (TAC)*.
2. Gupta, O., McDuff, D. and Raskar, R., 2016. Real-time physiological measurement and visualization using a synchronized multi-camera system. In *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition Workshops*.
1. Gupta, O., Raviv, D. and Raskar, R., 2016. Deep video gesture recognition using illumination invariants. *arXiv preprint arXiv:1603.06531*.

## SPECIAL ACHIEVEMENTS

- Semi-Finalist in MIT 100K (founding member Convexic – job matching for companies and users)
- Awarded Rajiv Bambawale, B.N. Bhardawaj, Raman Subramaniam awards for academic excellence in IIT
- Secured percentile of 99.4 in CAT out of 2,50,000, and accepted into IIM Ahmedabad and Bangalore (2009)