Subhajit Chaudhury

CONTACT INFORMATION	Corporate L'Espoir Bldg B-104, 1 Chome 51-1 Suenaga, Kawasaki, Japan **Website**: https://ibm.biz/subhajit	**Phone** : +81 7021837790 **Email** : subhajitiitb14@gmail.com

<small>RESEARCH
INTEREST</small>

Currently, I am working as a researcher at IBM Research-Tokyo and pursuing my Ph.D. at the University of Tokyo. My interests lie in computer vision and reinforcement learning. At IBM, I am working on robust reward estimation for imitation learning from videos. In my Ph.D. work, I am focusing on exploring interpretability in neural networks for computer vision.

<small>EDUCATION</small>

The University of Tokyo, Japan   April 2018 - Present
Ph.D., Information Science and Technology
Advised by Prof. Toshihiko Yamasaki

Indian Institute of Technology, Bombay, India   July 2012 - June 2014
M.Tech, Department of Electrical Engineering
GPA : **9.81 out of 10**
Advised by Prof. Subhasis Chaudhuri

Jadavpur University, India   July 2008 - June 2012
B.E.(Hons.) Department of Electrical Engineering
GPA - **8.90 out of 10** (**Rank: 3rd/125**)
Advised by Prof. Amitava Chatterjee

<small>PUBLICATIONS</small>

1) Daiki Kimura, *Subhajit Chaudhury*, Ryuki Tachibana and Sakyasingha Dasgupta, **Internal Model from Observations for Reward Shaping**, International Conference of Machine Learning(ICML), Adaptive Learning Agents Workshop (ALA), 2018

2) Phongtharin Vinayavekhin, *Subhajit Chaudhury*, Asim Munawar, Don Joven Agravante, Giovanni De Magistris, Daiki Kimura and Ryuki Tachibana, **Focusing on What is Relevant: Time-Series Learning and Understanding using Attention**, International Conference on Pattern Recognition (ICPR), 2018

3) Tadanobu Inoue, *Subhajit Chaudhury*, Giovanni De Magistris and Sakyasingha Dasgupta, **Transfer learning from synthetic to real images using variational auto-encoders for robotic applications**, IEEE International Conference on Image Processing (ICIP), 2018

4) *Subhajit Chaudhury*, Sakyasingha Dasgupta, Asim Munawar, Md. Salam Khan and Ryuki Tachibana, **Conditional generation of multi-modal data using constrained embedding space mapping**, International Conference on Machine Learning (ICML), Implicit Models Workshop, 2017

5) *Subhajit Chaudhury*, Sakyasingha Dasgupta, Asim Munawar, Md. Salam Khan, Ryuki Tachibana, **Text to image generative model using constrained embedding space mapping**, IEEE International Workshop on Machine Learning for Signal Processing (MLSP), 2017 (**Oral**)

6) *Subhajit Chaudhury*, Gaku Nakano, Jun Takada, Akihiko Iketani, **Spatial-temporal motion field analysis for crack detection on concrete surfaces**, IEEE Winter Conference on Applications of Computer Vision (WACV) 2017

7) *Subhajit Chaudhury* and Hiya Roy, **Can fully convolutional networks perform well for general image restoration problems?**, Intl. Conf. on Machine Vision Applications, 2017

8) Vijay Daultani, *Subhajit Chaudhury*, Kazuhisa Ishizaka, **Convolutional Neural Network Layer Re-ordering for acceleration**, 20th Workshop on Synthesis And System Integration of Mixed Information (SASIMI), Kyoto, Japan, 2016

9) Sourav Saha, Pritha Ganguly, *Subhajit Chaudhury*. **Vision based human pose estimation for virtual cloth fitting**. Proceedings of the 2014 Indian Conference on Computer Vision Graphics and Image Processing (ICVGIP)

10) *Subhajit Chaudhury*, Subhasis Chaudhuri, **Volume preserving haptic pottery**, 2014 IEEE Haptics Symposium (HAPTICS), Houston, TX, 2014, pp.129-134. (**Oral**)

PROFESSIONAL
ACTIVITIES

- Reviewer for International Conference on Robotics and Automation (ICRA), 2018
- Reviewer for International Conference on Intelligent Robots and Systems (IROS), 2018
- Reviewer for IEEE Transactions on Multimedia, 2018.

RESEARCH
EXPERIENCE

IBM Research-Tokyo, Japan   April 2017- Present
Topic : *Robust reward estimation for imitation learning from videos*
Position : **Staff Researcher**, *Cognitive Robot Innovation Laboratories*

- **Imitation learning from state trajectories** : Developed an imitation learning method that learns action policies from expert trajectories consisting of only observations. Our initial method shows comparable performance to model-free RL even with learning in the absence of true reward.

- **Transfer learning from synthetic to real images using VAEs for robotic applications** : Developed a method to transfer object detection learned in a simulation environment to the real world by performing a two-stage training on variational auto-encoders (VAE). The proposed method is 6 to 7 times more precisely than baseline methods and robust to lighting conditions.

- **Conditional generation of multi-modal data using constrained embedding space mapping** : Developed a multi-modal generative method that maps multiple data modalities to a common latent space enabling simple cross modal inference. Proposed method can synthesize images from text and raw audio input while producing better PSNR values than baseline methods.

NEC Central Research Labs, Japan   Oct 2014- March 2017
Topic : *Deep learning based predictive infrastructure maintenance*
Position : **Researcher**, *Predictive Infrastructure Maintenance group*

- **Spatial-temporal motion analysis for invisible crack detection** : Developed a crack detection algorithm that identifies internal cracks by finding discontinues in dense 2D motion fields using energy minimization on a Conditional Random Fields (CRF). Improved F1 score by 0.22 compared to state-of-the-art image based methods.

- **Deep learning for image-based crack detection** : Developed a fully convolutional network based system for pixel-level crack localization from raw images. Collaborated with Texas Department of Transportation (TxDOT) for application on real captured road videos with real-time performance (16fps for VGA images) with similar localization accuracy to state-of-the-art methods.

- **Accelerating convolutional neural nets by layer re-ordering** : Obtained computational speed-up of 4x in activation units with 5% overall improvement, in convolutional neural networks inference by rearranging pooling and activation layer ordering.

ACADEMIC RESEARCH PROJECTS	**Indian Institute of Technology (IIT), Bombay** *Master of Technology (M. Tech) thesis*, India	July 2012- June 2014 Prof. Subhasis Chaudhuri

- **Volume preserving haptic pottery** : Developed a realistic deformation model for interactive rendering of semi-solid clay based virtual pottery with volume preservation. Proposed model enabled real time visual feedback at 25 fps and tactile feedback at 1000 Hz which is much faster than prior works.

- **Feel Chat : 3D interactive virtual chat room with touch** : Developed a virtual reality chatting system using virtual reality headsets and wearable tactile suit where users can touch the surrounding virtual environment by tactile feedback.

- **Web-cam based virtual trial room** : Developed a real-time virtual cloth fitting using generic web camera input by structurally aligning the input garment to the skeletal joints using OpenCV.

Jadavpur University, India   July 2008 - June 2012
Undergraduate (B.E.) project   Prof. Amitava Chatterjee

- **Vision based door detection** : Developed a door detection algorithm for mobile robot navigation by generating proposals for candidate door-like structures based on geometric features.

AWARDS AND ACHIEVEMENTS

- Secured All India Rank **33 out of 110,125** students in Electrical Engineering, GATE-2012.
- Secured All India Rank **125 out of 72,680** students in Electrical Engineering, GATE-2011.
- Secured rank **86/80,000** in West Bengal Joint Entrance Examination, 2008 for Engineering.
- Received academic excellence award for **1st** position in high school for both class 10 (ICSE-2006) and class 12 (ISC-2008) national board exam.
- Awarded **1st** position prize for winning Don-Bosco Inter-School coding competition.
- Achieved **2nd** position in All-Bengal spelling competition.

RELEVANT COURSES

Electrical Engineering: Wavelets, Statistic Signal Processing , Applied Linear Algebra , Digital Signal Processing, Number Theory and Cryptography, Digital Message Transmission

Computer Science: Computer Vision, Foundations of Machine Learning, Computer Graphics, Advanced Computer Graphics

COMPUTER SKILLS

- **Programming Languages** : *Python, C++, C, Java*
- **Tools** : *Matlab, ROS, Gazebo, OpenCV, CUDA, OpenGL,*
- **Machine learning Tools** : *Tensorflow, Keras, Pytorch, scikit-learn*

EXTRA CURRICULAR ACTIVITIES

- Executive Council member of IIT Bombay Alumni Association in Tokyo from 2015.
- Passed Japanese Language Proficiency Test, N4 level.(Ability to follow general conversations)
- Involved in Japanese to English document translation website creation for new coming foreign students to Japan