

Siddhesh Khandelwal

Address : #205, 1635 W 3rd Ave, Vancouver, BC V6J 0B6

Email : skhandel@cs.ubc.ca

Mobile : +1-778-751-8172

EDUCATION

- **University of British Columbia** Vancouver, Canada
Doctor of Philosophy in Computer Science Jan 2020 - Present
- **University of British Columbia** Vancouver, Canada
Master of Science in Computer Science; GPA: 4.33/4.33; Percentage: 96.3% Sept 2017 - Nov 2019
- **Indian Institute of Technology Guwahati** Guwahati, India
Bachelor of Technology in Computer Science and Engineering; GPA: 8.65/10.0 July 2012 - June 2016

PUBLICATIONS

* Equal Contribution

- **Siddhesh Khandelwal** and Leonid Sigal, “*Iterative Scene Graph Generation*”, Conference on Neural Information Processing Systems (NeurIPS) 2022.
- **Siddhesh Khandelwal***, Mohammed Suhail*, and Leonid Sigal, “*Segmentation-grounded Scene Graph Generation*”, International Conference on Computer Vision (ICCV) 2021.
- **Siddhesh Khandelwal***, William Qi*, Jagjeet Singh, Andrew Hartnett, and Deva Ramanan, “*What-If Motion Prediction for Autonomous Driving*”, arXiv preprint [arXiv:2008.10587](https://arxiv.org/abs/2008.10587).
- **Siddhesh Khandelwal***, Raghav Goyal*, and Leonid Sigal, “*UniT: Unified Knowledge Transfer for Any-shot Object Detection and Segmentation*”, Conference on Computer Vision and Pattern Recognition (CVPR) 2021.
- **Siddhesh Khandelwal** and Leonid Sigal, “*AttentionRNN: A Structured Spatial Attention Mechanism*”, International Conference on Computer Vision (ICCV) 2019.
- Sharmistha Jat*, **Siddhesh Khandelwal***, and Partha Talukdar, “*Improving Distantly Supervised Relation Extraction using Word and Entity Based Attention*”, Automated Knowledge Base Construction Workshop, Neural Information Processing Systems (NeurIPS) 2017.
- **Siddhesh Khandelwal** and Amit Awekar. “*Faster K-Means Cluster Estimation.*” European Conference on Information Retrieval (ECIR) 2017.
- Wilson *et al.* “Argoverse 2: Next Generation Datasets for Self-Driving Perception and Forecasting”, to appear in Track on Datasets and Benchmark, Conference on Neural Information Processing Systems (NeurIPS) 2021.

EXPERIENCE

- **Computer Vision Lab, University of British Columbia** Vancouver, Canada
Research Assistant; Advisor: Prof. Leonid Sigal April 2018 - Today
 - **Iterative Scene Graph Generation** <https://bit.ly/3i9cEyr>
Propose a generalized framework for scene graph generation that facilitates joint inference of subjects, objects, and predicates, achieved by performing message passing in a Markov Random Field. A novel, intuitive, and end-to-end trainable transformer based architecture implements this message passing by unrolling it into an iterative refinement procedure. To address the long-tail nature of predicate classes, a loss re-weighting strategy is introduced, enabling flexible trade-off between dominant and underrepresented predicate classes
 - **Segmentation-grounded Scene Graph Generation** <https://bit.ly/3qAOUnr>
Propose the first framework for pixel-level segmentation-grounded scene graph generation. The idea is to endow each target object with a segmentation mask, which are generated using a lingual-similarity based zero-shot transfer mechanism. These inferred masks, along with a Gaussian masking mechanism which grounds the relations at a pixel-level within the image, allow for improved relation prediction.
 - **UniT: Unified Knowledge Transfer for Any-shot Object Detection and Segmentation** <https://bit.ly/2ZPoOQf>
This work attempts to bridge the divide between weakly-supervised and zero/few-shot object detection paradigms. We propose a novel and intuitive semi-supervised model that is applicable to a range of supervision. By learning and leveraging visual and lingual similarities between the classes, the model learns to transfer information from classes with abundant data to classes with little to no data.

- **Structured Spatial Attention Mechanism** <https://bit.ly/2tuslHD>
Proposed a novel spatial attention mechanism that generates consistent attention masks by explicitly modelling structure among the attention variables. It involves sequentially predicting attention values, where each value depends on the local image context and the previously generated attention values. The proposed mechanism is end-to-end trainable and can be integrated with any feed-forward convolutional neural network.
- **Amazon Go** Seattle, USA
Research Intern; Advisor: Behjat Siddique June 2022 - Sept 2022
 - Worked as a Research Intern at Amazon Go on the problem of zero-shot object detection. Developed a simple but effective approach to tackle the problem that can act as a competitive baseline for future research.
- **Microsoft Research** Redmond, USA
Research Intern; Advisor: Hamid Palangi May 2021 - Sept 2021
 - Worked as a Research Intern at Microsoft Research on the problem of mitigating errors in neural models. Explored ways of coming up with a black-box mitigation technique for problems in computer vision like object detection.
- **Argo AI** Pittsburgh, USA
Research Intern; Advisor: Andrew Hartnett May 2019 - September 2019
 - **What-If Motion Prediction for Autonomous Driving** <https://bit.ly/3ln6DLD>
This work proposes a recurrent graph-based attentional approach for conditional forecasting. It deals away with the need for image rasterization by leveraging geometric polylines like lane centerlines. The proposed approach generates diverse and accurate predictions, while readily supporting investigations of hypothetical or unlikely scenarios.
- **Borealis AI** Vancouver, Canada
Research Intern; Advisor: Prof. Greg Mori January 2019 - April 2019
 - Worked as a Research Intern at Borealis AI on generative models. Explored the use of attention mechanisms and iterative feedback in the discriminator to generate better quality images.
- **Machine and Language Learning Lab (MaLL), Indian Institute of Science** Bangalore, India
Research Assistant; Advisor: Prof. Partha Pratim Talukdar June 2016 - June 2017
 - **Relation Extraction** <https://bit.ly/2S1Fh1f>
Worked on deep Neural methods for relation extraction from text in a distantly supervised setting. Proposed a new GRU based word attention mechanism to identify relevant parts of the text. This work was presented at the AKBC workshop at NIPS 2017.

PROJECTS

- **Evaluation Based Inference for Generative Adversarial Networks** Vancouver, Canada
Course Project; Advisor: Prof. Frank Wood Oct 2018 - Dec 2018
 - Developed a framework to support automatic inference over arbitrary composition of GANs. Proposed language constructs that enable a user to easily express such compositional models. Formulated a novel loss function that decomposes over the constituent GANs of a composition to enable automatic inference.
- **Cooperative Visual Dialog** <https://goo.gl/pFQNuJ> Vancouver, Canada
Course Project; Advisor: Prof. Leonid Sigal Jan 2018 - Apr 2018
 - Looked at the task of cooperative visual dialog, wherein two agents have a natural language conversation about a particular image. Proposed an fully-differentiable deep neural framework with multi-modal attention for this task.
- **Multi-Armed Bandits for Influence Maximization** <https://goo.gl/fWx3yp> Vancouver, Canada
Course Project; Advisor: Prof. Laks V.S. Lakshmanan Sept 2017 - Dec 2017
 - Proposed a bandits framework to learn probabilities for influence maximization in Independent Cascade and Topic-Aware Independent Cascade models. Used a variant of Online Expectation Maximization algorithm to scale the framework to larger networks.
- **Faster K-Means Cluster Estimation** <https://goo.gl/npqaJG> Guwahati, India
Bachelor Thesis; Published in Proceedings of ECIR 2017; Advisor: Prof. Amit Awekar Aug 2015 - Apr 2016
 - Proposed a faster heuristic which can be augmented to existing variants of K-means to obtain considerable speed-up. Significantly reduced the number of distance computations by looking at only a subset of clusters for each point. Achieved speed-up of around 3 times when augmented to existing fast variants of K-means.