

# YUTA SAITO

Phone: (+81)9031151920 ◇ EMail: [saito.y.bj@m.titech.ac.jp](mailto:saito.y.bj@m.titech.ac.jp) ◇ Website: <https://usaito.github.io>

## EDUCATION

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**Tokyo Institute of Technology, Tokyo**

Bachelor of Engineering

Industrial Engineering and Economics.

*Apr 2016 - Present*

Overall GPA (current): 3.75 / 4.50

## RESEARCH INTERESTS

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My research is at the intersection of Machine Learning and Causal Inference called Counterfactual Machine Learning. I am interested in the counterfactual nature of logged bandit feedback obtained from interactive systems.

## PUBLICATIONS

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1. **Yuta Saito** and Shota Yasui, “[“Counterfactual Cross-Validation”](#). ACM Recsys Workshop on Reinforcement and Robust Estimators for Recommendation (REVEAL), Copenhagen, Denmark, Sep. 20, 2019.
2. **Yuta Saito**, Hayato Sakata, and Kazuhide Nakata, “[Doubly Robust Prediction and Evaluation Methods Improve Uplift Modeling for Observational Data](#)”. In Proceedings of the SIAM International Conference on Data Mining (SDM19), Calgary, Alberta, Canada, May 2-4, 2019.

## PREPRINTS

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1. **Yuta Saito** and Shota Yasui, “Counterfactual Cross-Validation: Effective Causal Model Selection from Observational Data”.
2. **Yuta Saito**, Suguru Yaginuma, Yuta Nishino, Hayato Sakata, and Kazuhide Nakata, “Relevance Matrix Factorization”.
3. **Yuta Saito**, “Eliminating Bias in Recommender Systems”.
4. **Yuta Saito**, Hayato Sakata, and Kazuhide Nakata, “[Cost-Effective and Stable Policy Optimization Algorithm for Uplift Modeling with Multiple Treatments](#)”.

## WORK & INTERNSHIP EXPERIENCES

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**CyberAgent, Inc. AI Lab**

*Research Internship*

*Jun 2019 - present*

- **Model selection methods of causal inference models:** Developed an evaluation metric that ranks the performance of the treatment effects prediction models accurately with high confidence. The proposed metric allows one to conduct valid model selection and hyper-parameter tuning of causal inference models (in collaboration with Shota Yasui).
- **Offline learning algorithms for delayed feedback data in display advertising:** Developed a new algorithm for the problem of the offline conversion rate prediction. The proposed method is the first of its kind of solving the two well-known difficulties of the delayed feedback problem in a theoretically principal way (in collaboration with Shota Yasui and Gota Morishita).

**Nakata Lab, Tokyo Institute of Technology**

*Research Assistant*

*Apr 2019 - present*

- **Treatment allocation optimization methods:** Developed a cost-effective and stable treatment allocation algorithm. The proposed method is the combination of the tree-based uplift modeling method and the doubly robust estimator in the context of causal inference.

**So-net Media Networks Corp. a.i lab.**  
*Research Internship*

*Dec 2017 - Sep 2019*

- **Debiasing methods of recommender systems:** Developed an estimator for the loss function of interest in the biased implicit recommendation problem. The proposed estimator is the first unbiased estimator in the field of implicit recommendation solving the positive-unlabeled and the missing-not-at-random problems simultaneously (in collaboration with Suguru Yaginuma, Yuta Nishino, and Hayato Sakata).
- **Offline prediction methods of uplift modeling:** Developed an easy to implement and scalable prediction method in uplift modeling. The proposed method can be used to effectively personalize advertising allocations (in collaboration with Hayato Sakata).

**Cancer Scan**  
*Data Science Internship*

*Oct 2017 - Feb 2019*

- **Public health treatments optimization:** Optimized the leaflet design to push up the medical examination rate using tools of statistics and causal inference.

## PERSONAL RESEARCH PROJECTS

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**Unsupervised Domain Adaptation Meets Offline Recommender Learning.** *2019*

- Constructed a new theory of recommendation using missing-not-at-random feedback using the theoretical framework of unsupervised domain adaptation. The proposed method can alleviate bias and solve the limitations of previously proposed causality-based approaches. (In submission to CausalML Workshop at NeurIPS2019)

**Eliminating Bias of Recommender Systems via Pseudo-Labeling.** *2019*

- Applied a well-performing asymmetric tri-training framework in unsupervised domain adaptation to the missing-not-at-random recommendation. I also conducted a theoretical analysis of the strength of the proposed prediction method in the recommendation setting. (In submission to WSDM2020)

**Unbiased Pairwise Learning from Implicit Feedback.** *2019*

- Developed an unbiased pairwise loss function and a corresponding ranking algorithm. The proposed algorithm empirically outperforms the existing baseline methods, including matrix factorization and bayesian personalized ranking. (In submission to CausalML Workshop at NeurIPS2019)

## INVITED TALKS AND PRESENTATIONS

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**“Interaction between Causal Inference and Machine Learning: An Overview”** *Oct 2019*  
*@ Mitsubishi UFJ Research and Consulting and Metrics Work Consultants Inc.*

- An overview talk on the recent interaction between causal inference and machine learning techniques.

**“Predicting Heterogeneous Causal Effects using Machine Learning”** *Oct 2019*  
*@ 2019 Japanese Economic Association Autumn Meeting*

- An introduction to the recent developments of prediction methods of heterogeneous causal effects

**“Recent Topics on Counterfactual Machine Learning”** *Jul 2019*  
*@ Sony Corporation*

- A broad overview of the field of Counterfactual Machine Learning, including causality-based personalization and debiasing of interactive systems.

**“Debiasing Recommender Systems using Methods of Causal Inference”** *Jul 2019*  
*@ 1st Seminar on Counterfactual Machine Learning*

- An introduction of the causality-based debiasing methods for the missing-not-at-random recommendation.

**“Recent Topics on Unbiased Learning to Rank”**

*Jun 2019*

*@ Recruit, Data Science Team*

- Basic concept of the unbiased learning-to-rank and a recently proposed interesting algorithm.

**“Unsupervised Domain Adaptation and Its Application to CTR Prediction”**

*May 2019*

*@ CyberAgent, Inc., AI Lab*

- An introduction to the theory of unsupervised domain adaptation and its potential application to the click-through rate prediction.

## AWARDS

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**2nd place: DATA DEMOCRACY DAYS**

*Feb 2019 - Apr 2019*

*@ Culture Convenience Club Co., Ltd.*

- Proposed a relationship app using matrix completion techniques (in collaboration with Teppei Kanayama and Hirotaka Nishimura).

## COMPETENCES

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**Programming and Libraries:** Python, R, Matlab, MySQL, L<sup>A</sup>T<sub>E</sub>X, Tensorflow, EconML

**Languages:** English, Japanese