

# Haibin Yu

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## Education

- 2014.8–2019.9 **PhD, Computer Science**, *National University of Singapore*, Singapore.  
Supported by Singapore MIT Alliance Research and Technology
- 2017.2–2017.8 **Visiting Student**, *Massachusetts Institute of Technology*, Cambridge.  
Invited and supervised by Prof. Patrick Jaillet
- 2010.9–2014.6 **Bachelor, Mechanical Engineering and Automation**, *Beihang University (BUAA)*, Beijing, China.  
Ranked 6 out of 187 graduates in 2014; 1st Prize of BUAA Scholarship for 3 consecutive years; Outstanding Student of BUAA for 2 consecutive years; Outstanding graduate

## Computer skills

- Basic Shell, Git, SQL
- Intermediate Linux, Microsoft Windows
- Advanced Python, Matlab,  $\text{\LaTeX}$
- Deep learning libraries: Tensorflow, Pytorch
- Machine learning libraries: Scikit-learn, GPflow, LightGBM, Xgboost
- Data processing library: Pandas

## Research Interests

Machine learning, with particular interests in Bayesian non-parametric, specifically Gaussian process regression models. Deep learning, especially in adversarial learning and Bayesian deep learning

- 2015–2017 **Bayesian Sparse Gaussian Process Regression.**  
We developed a fully Bayesian sparse Gaussian process regression model which could nicely incorporate the stochastic learning, hence enable Gaussian process regression model to deal with big data.
- 2017–Current **Adversarial Variational Bayes: A universal approach to tackle Bayesian inference.**  
Inspired by the idea of generative adversarial network, we adopt this adversarial training to generate posterior samples which could resolve variational Bayes issues (e.g. multi-modal) and MCMC issues (e.g. implicit prior). We apply this technique in single layer Gaussian process model and deep Gaussian process model, achieving the best results to the best of our knowledge.

## 2018-Current **Bayesian Compression for Neural Networks.**

While deep neural networks have become extremely successful in a wide range of applications, often exceeding human performance, they remain difficult to apply in many real world scenarios. Especially it is very painful for storing the billions of parameters as well as doing real-time prediction. We target the neural network in Bayesian manner which using the uncertainty to sparsify the neural networks. Under most scenarios, the sparsity ration could be up to 90%.

## Publications (\* indicates equal contribution)

- [1] [Haibin Yu](#), Trong Nghia Hoang, Kian Hsiang Low and Patrick Jaillet. **Stochastic Variational Inference for Bayesian Sparse Gaussian Process Regression**. In *Proceedings of the International Joint Conference of Neural Networks (IJCNN-19)*.
- [2] Zhongxiang Dai, [Haibin Yu](#), Kian Hsiang Low and Patrick Jaillet. **Bayesian Optimization Meets Bayesian Optimal Stopping**. In *Proceedings of the 36th International Conference of Machine Learning (ICML-19)*, submitted.
- [3] [Haibin Yu](#)\*, [Yizhou Chen](#)\*, Kian Hsiang Low and Patrick Jaillet. **When Generative Adversarial Network Meets Deep Gaussian Process**. In *Proceedings of the 35th Conference on Uncertainty Artificial Intelligence (UAI-19)*, submitted.

## Competitions

### 2018.7 **NUS-MIT Datathon, Medical Imaging, Singapore, Champion.**

Our goal is to develop image analysis tools to enable the automated diagnosis of melanoma from dermoscopic images, particularly, in this datathon, our tasks are:

- Lesion Segmentation.
- Disease Classification.

For the segmentation task, we utilized **DeepLab** to train the model, which finally achieved *mIOU*: 0.84 which is higher than the 2017 challenge. As for the classification task, we implemented two models, namely, **ResNet101** and **Inception Net V4** plus **SVM**. We achieved *AUC*: 0.84 in detecting the melanoma disease and *AUC*: 0.93 in detecting Seborrheic keratosis. For more details, please refer to the datathon website: [NUS-MIT Datathon](#). For our presentation, please refer to: [Presentation](#)



### 2018.10-2018.11 **Rong360 Financial Algorithm Challenge, Multi Financial Scenario Model Training, Beijing, 44th out of 1298 teams.**

The task is to determine whether a user will be overdue or not given different financial products features. Basically this is a binary classification, in the contest, we utilized Random Forest Decision Tree (RFDT) and Xgboost methods as well as multiple feature engineering methods since the feature dimension is high (6000+ with missing values). Finally we achieve an *AUC* of 0.7264. For more details, please refer to the website: [Rong360](#).

2018.11-2019.1



**JDD-2018 Global digitalization Challenge**, *Population Dynamics*, Beijing, Global Champion (1st out of 1583 teams, 500000 rmb prize).

The task is to use the history changes of mobile device users in several cities, districts and counties transfer between users, rate of mobile communications equipment users and others analog data in different districts and cities, set up reasonable forecast model, make dynamic population change forecast in various districts and counties of the city in the subsequent 15 days. We used ARIMA, Auto-regression and Xgboost methods to solve the problem as well as spending much time on feature extraction. For more details, please refer to the media news (in Chinese): [News](#). For materials of the competition, please refer to: [Code and Presentation](#).

## Open Source Projects

CIFAR10 using Pytorch

- Implement vgg, resnet, densenet, dpn, mobilenet, pnasnet and senet in Pytorch

SeqGAN using Pytorch

- SeqGAN is considered the first paper to enable the power of GAN into NLP area by training the generator using policy gradient.

Multi-domain multi-style transfer learning

- We are proposing to acquire the domain knowledge which transfer image to particular domains using generative adversarial networks. Still to reduce the issue of saving models for different styles, we propose this single network to do multi-style transfer.

## Work Experience

2018.4–2018.7 **Advance AI**, *Data Scientist Intern*, Singapore.

Work on image re-alignment to improve the accuracy of OCR detection

- Use VGG16 network to predict the rotated degree of images.
- Top 3 accuracy( $\pm 1$  degree over 360 degrees) achieves 97%

2019.4–2018.9 **Huawei Noah's Ark Lab**, *Research Intern*, Beijing, China.

- Architecture search based on Bayesian optimization
- Mentor: Dr. Changying Du.

## Teaching Experience

2016-2017 **Teaching Assistant**, *Artificial Intelligence and Planning*.

Teaching tutorials, grading assignments, got 4.6/5 feedback

## Honors and Awards

### Awards

2010 Outstanding Student Cadre of Jilin Province

2011 Merit Student of BUAA

2012 3rd.Prize in National Mathematics Contest for College Students

2012 3rd.Prize in National English Contest for College Students

- 2012 Excellent Student Leader of BUAA
- 2014 Outstanding Graduate of Beihang University

### Scholarships

- 2011–2013 1st Prize of BUAA Scholarship for 3 consecutive years
- 2012 1st.Prize in Timken Scholarship
- 2014–2018 Scholarship of Singapore and MIT Alliance Research Technology

### Professional Training

- 2018.4–2018.5 **Deep Learning Specialization**, *Coursera*, 100% grade.
  - Neural Networks and Deep Learning
  - Improving Deep Neural Networks: Hyperparameter tuning, Regularization, Optimization
  - Structuring Machine Learning Projects
  - Convolutional Neural Networks
  - Sequence Models

### Languages

- Chinese **Mothertongue**
- English **Professional**
- Japanese **Basic** *Basic words and phrases only*

### Interests

- Swimming
- Running