Great Minds
Internship Program 2018

IBM Research – China
Great Minds Internship Program 2018
Jump Start Your Future at IBM Research – China

Introduction

IBM Research – China invites global candidates to apply for the 2018 Great Minds internship program located in Beijing and Shanghai. The Great Minds Program is an annual competitive internship lasting for two to six months. Selected students will have the unique opportunity to work with world-class scientists in an open and cultivating environment.

At IBM Research – China, our mission is to ignite scientific innovation, strengthen IBM’s leadership in cutting-edge technologies, and to become a visionary forerunner in industrial research. Established in 1995, IBM Research – China is known as the first research institute founded by a multinational company in China. In October 2008, a second research site broke ground in Shanghai to provide local partners with the best access to IBM’s solutions and capabilities.

IBM’s international reputation for world-leading research and innovation excellence attracts scientists from all over the world. Located in the heart of the emerging markets, IBM Research – China has been leading research innovation across Artificial Intelligence, Cloud Computing, Blockchain, Internet-of-Things, and Industrial Innovations for more than two decades, establishing itself as one of the most prestigious and well-recognized research institutes in China.

Program Overview

Great minds and great ideas drive innovations. As an industry-leading IT research organization, IBM Research - China has been focusing on accelerating innovative collaborations across IBM’s global labs. We strive to stay relevant to our clients
by initiating high market value projects. Our researchers collaborate with partners in academia in far reaching projects to reinvent the technological future with critical innovations.

In keeping with IBM’s continuously close relationships with universities, we are seeking the brightest minds and the hottest ideas worldwide. The Great Minds Program intends to offer candidates valuable resources and industry insights. We encourage candidates to become ambassadors of the sciences and share their experiences with their local departments and institutions.

IBM Research – China is focusing on the following areas of research inquiries. We currently offer internship positions in:

1. Artificial Intelligence: Vision, Acoustics, Conversational System
2. Environmental: Big Data Analytics & Innovation Solutions
3. Cognitive Healthcare
4. Cloud Computing
5. Internet-of-Things (IoT)
6. Blockchain

Eligibility

The program is open to all graduate students (preferably PhD candidates) from accredited universities, candidates should be in their second year of graduate studies. All majors are welcomed with preferences in the following research topics. Please refer to our JD listing for details about our current research areas and internship requirements.
Core Artificial Intelligence

1. Conversational System
3. AI Perception
4. Model Compression and Acceleration for Deep Learning
5. Cloud Computing and AIOps
6. Natural Language, Understanding and Speech

Industrial Innovation

1. Internet-of-Things (IoT)
2. AI for Healthcare
3. Environmental Research

*IBM embraces diversity. We welcome candidates from all backgrounds to apply. Qualified women scientists are highly encouraged to participate and apply.

Relocation and Stipend

Interns will be paid a highly competitive stipend compared with other leading companies in China. Additionally, IBM Research - China will provide candidates with corresponding travel and living allowances. Outstanding candidates with excellence internship performance will receive a one-year IEEE membership fee upon completion of their internships.

The exact starting time and duration of the internship will be agreed upon with each candidate individually. We will take into account the candidates' academic commitments and the availability of our IBM staffs.
How to apply

You can apply for the Great Minds Program at IBM Research - China in our Beijing or Shanghai locations. Participants must submit at least one letter of recommendation from their faculty member and their most current CV to the following link:


A committee of IBM technical experts will review all applications and qualified candidates will be notified for interviews. Finalists will start their internship in 2018 on a mutually agreed date. Please don’t forget to propose your possible starting dates and internship duration (2 - 6 months) in your CV.

Deadline for submissions is May 1, 2018
1. Conversational System and AI solutions

In IBM Research – China (CRL), we focus on the research of key conversational AI technologies: next generation conversational AI platform, knowledge discovery and management, natural language understanding for conversation, deep learning/reinforcement learning based conversation generation, etc. Our research assets have became the technical foundations of IBM Watson products and IBM Global Services. We also conducted conversational AI solutions linking with for key industries like finance, telecom, retail, healthcare, etc.

Desired skill:

We are looking for Ph.D or Master students in Computer Science, Electronics Engineering, Linguistics, Information Science, Applied Mathematics, or related areas, with the following qualifications to strengthen our team:

1. Experience with machine learning, natural language processing, knowledge discovery, statistics, medical informatics
2. Experience with deep learning framework like: tensorflow/caffe/theano/torch/
3. Programming skills in Java/Node.js/Python
4. Good communication and team work

In this project, we focus on designing neural network architectures and identifying a good set of hyper-parameter for different AI applications automatically. As we known, the computing time of traditional AutoML is too long to be infeasible for many custom learning services, and so more high efficient and practical approaches need to be found. IBM Research China (CRL) is focusing on developing world class technology for solving this research topic. In the project, we want to:

1. Build the optimization mechanism that reduce the searching space for different AI applications (Visual, NLP, etc.).
2. Develop high efficient machine learning/Deep learning approaches by using the share the information across different tasks.
3. Evaluate the dataset and do joint optimization for AutoML and transfer learning.
4. Publish and author high quality research papers/patents

Desired skill:

1. Ph.D. or Master Students majored in computer science, electronic engineering, automation and mathematics.
2. Strong knowledge in Bayesian optimization, reinforcement learning, bandits and deep understanding in machine learning schemes like SVM, LR, Neural network, etc.
4. Published Papers in DL/ML or ACM awards is a plus.
3. Effective Training for Small Datasets

This project is to explore the effective deep learning methods for small datasets. The proposed work divided into two parts: one is the data argumentation, and the other is transfer learning. The traditional data argumentation can reduce the overfitting. However, users only select the data argumentation methods through continuous trials. Through this work, we want to discover the relationship between data features and argumentation methods, and let the DL system can select the corresponding algorithms adaptively. The work also contains the data generation using GAN to enhance the robustness and generalization of models. For the transfer learning, we want to explore how to transfer the common features more accurately and efficiently. In this project, we expect the intern could help us on:

- Discover data features through light neural networks
- GAN for small dataset
- Transfer learning design

Desired Skills:

Ph.D. or Master Students majored in computer science or electronic engineering with the following skills or experience:
1. Computer vision using deep learning neural networks
2. Python/C++ Programming
3. Hands on skills on Caffe or TensorFlow
4. Knowledge of GAN
5. Knowledge for reinforcement learning is preferred.
4. AI Perception

AI Perception of IBM Research-China (CRL) is leading to develop world class Cognitive Internet of Things technology and cognitive solution with 2 new IBM analytics products enabled by the research innovation past 3 years. In this project, we will work together to develop “Holographic AI Sensory” technologies with acoustic analytics and multi-sensor collaborative perception by leveraging deep learning, graph theory, signal processing, etc. to discover business insights enabling industry solution innovations.

Desired skill:

Ph.D. or Master Students majored in Computer Science, Electronic Engineering, Industrial Automation or related areas with the following skills or experience:
- Deep Learning, Feature Engineering, or
- Multi-Modal Data Fusion, Graph Theory and Applications, Graph Signal Processing or
- Acoustic Signal Processing, Voice Recognition, Image Recognition, Vibration Analytics, Thermal Radiation Analytics, Industrial Sensor Data Analytics (Angular, gyroscope), etc.
- Hands-on experience on building software systems and algorithm optimization
- Experience on deep learning framework such as Caffe, TensorFlow, Theano is preferred
- Experience on real world use cases is preferred
- Creative, independent and self-motivated
5. Model compression and acceleration for deep learning

Project Description:

Model compression is an effective approach to reduce the computation of the deep neural network. It has proved that neural network is robust to the precision of activations and weights, and 8 bits integer is enough for most of the case. In this project, we will use sparse network and extremely low bit-width neural network to compress the model in various deep learning tasks, such as classification, object detection, and also the real customer case, and we will also implement this compressed model in dedicated hardware (FPGA/GPU) for acceleration.

In this project, we expect the intern could help us on one or multiple actions:

1. Algorithm or novel training approach for model compression and faster convergence.
2. Mapping the neural network computation to GPU/FPGA

Desired Skills:

1. Hands on skills on Caffe or TensorFlow
2. Good experience on FPGA or GPU development
6. Cognitive Internet of Things (IoT) Industry Solutions

The Internet of Things (IoT) research of IBM Research-China (CRL) is leading to develop world class technology and cognitive solution research innovations enabling the enterprises across industries to accelerate the transformation. In this project, we will work together to develop Cloud and Mobile end innovations to effectively processing and analyzing the physical sensors data, correlated with contextual information like weather, map, knowledge base etc. and system of record data like quality records, accident claim, blockchain transactions etc. to develop Cognitive IoT industry solution innovations focusing on connected manufacturing industry 4.0 operations, connected insurance, connected vehicle and connected machinery innovations etc.

1. Design/develop innovate machine learning algorithm, data analysis model to discover insight from multiple source IoT sensor data (visual, acoustic, vibration, cardiograph, GPS, gyroscope etc.)
2. Design/develop contextual knowledge graph model and knowledge learning algorithm leveraging Cognitive analytics (Machine Learning, Deep Learning, Natural Language Processing, etc.)
3. Publish and author high quality research papers/patents, Design/integrate with mobile application/solution.

Desired skill:

1. Ph.D. or Master Students majored in computer science, electronic engineering, industrial automation, civil engineering or related areas with the following skills or experience:
2. Data mining and machine learning skills.
3. Hands-on experience on building software systems (e.g.: Mobile, Web etc).
5. Experience in industry oriented research and development is a plus.
7. Machine learning/Environmental analytics topics

Data is the world’s new natural resource and basis of competitive advantage. The innovative industry solutions and services based on big data analytics & optimization will become the next frontier of industry transformation. The Industries and Solutions department of IBM Research-China (CRL) is one of the fastest growing groups to apply advanced business analytics & optimization technology to solve real-world industry challenges. Our mission is to become a world-class research organization creating innovative solutions and services for industries.

Job Description:

The Industries and Solutions department aims to establish the industry thought leadership and innovative solutions through the synergy of advanced technologies and deep industry insights. It focuses on advanced analytics, mathematical optimization and data mining.
1) The focused industries include but are not limited to:
   - Green Horizon Program (one of the highlight programs in IBM China).
     http://business.sohu.com/20151216/n431554372.shtml
     http://www.pvtech.org/news/china_taps_ibm_for_green_horizon_renewable_energy_program
   - Big data analysis in environment, renewable energy, electrics to solve realistic problems for customer.
2) Deep research in big data analysis, artificial intelligence, statistics, data mining, machine learning, spatial analysis and optimization algorithm.
7. Machine learning/Environmental analytics topics

The qualifications include:

This position requires passion, creativity, and industry insight to perform independent research and solve real-world client problems, and the successful candidates should have strong analytical, leadership, and excellent communication skills. We are looking for candidates with PhD or Master in Operation Research, Statistics, Artificial Intelligence, Machine Learning, Computer Science or related areas with the following qualifications:

- Experience in the areas of data analytic, optimization, simulation, or related areas, with strong publications.
- Excellent programming and system development skills (Java, C/C++, R, Matlab).
- Self-motivated, responsible, good team-work and communication skill.
- Industry experience, especially in energy and environment, is a plus.
- Experience in data analytics tool, big data analytics or cloud computing is a plus.
8. Cloud Computing and AIOps

CRL focuses on platform-as-a-service technology (Docker, micro-services) and AI for cognitive cloud operation and analytics. The preferred candidates should possess sufficient specialist knowledge in prototyping, development and operation new cloud technologies.

Join us if you want to be:

Research Scientist
You have:
1. Enormous enthusiasm in scientific innovation and intellectual curiosity
2. Sufficient knowledge in domains to develop research projects and methodologies including but limited to: Artificial Intelligence, Distributed Systems, Operations Research, Statistical Analysis
3. Demonstrated proficiency as least in one of the programming languages
4. Doctoral or Master candidates in Computer Science, Electrical Engineering, Statistics, Automation or other related areas from top universities

Software Engineer/Super Hacker
You have:
1. Enormous enthusiasm in software engineering and intellectual curiosity
2. Experience of the development in domains including but not limited to: Artificial Intelligence, Distributed Systems, Operations Research
3. Demonstrated proficiency as least in one of the following programming languages: Java, Python, R, SPSS.
4. Bachelor degree or above
9. AI for Healthcare

AI for Healthcare research aims to develop and apply AI technologies on the whole life-cycle of disease management process, including disease prevention, disease diagnosis, disease treatment and patient engagement. Our research work greatly help physicians retard disease progression, improve productivity of image screening, empower physicians for precision medicine, and distill insights from medical records and literature for continuous patient follow-up and education.

We are looking for Ph.D or Master students majoring in Medical Informatics, Information Science, Computer Science, Statistics, Applied Mathematics, or related areas, with the following desired skills:

- Strong in machine learning, data mining and statistics.
- Strong in software development, proficiency in at least one advanced programming language, such as Python and Java.
- Familiar with data analysis tools and libraries, such as SPSS, Weka, R and/or scikit-learn, etc.
- Knowledge of clinical/genomic/behavior data is a plus.
- Familiar with big data platforms and tools, such as HDFS, Hadoop, Mahout and Spark is a plus.
10. Natural Language and Machine Learning

Natural Language and Machine Learning research team are working on
cognitive systems to interact more naturally with people and provide insight
through big data analytics to enhance human cognition and improve business
decision making. Our technologies have been successfully applied to many
applications/solutions to solve real-world client problems of cross industries
such as consumer products, retail, banking, and electronics. Our research
directions include (but not limited to)

Chinese Natural Language Processing/Understanding and Dialogue
Management,
Product Recommendation,
Knowledge Representation and Reasoning,
Machine Learning/Deep Learning,
User Interaction and Visualization

Job Requirements:

- Ph.D/Master students in Linguistics, Information Science, Computer Science,
  Electronics Engineering, Applied Mathematics, or a related area;
- Outstanding researcher with a proven track-record on both conceptual and
  empirical aspects in the areas of NLP and HCI
- Strong analytical skill, familiar with big data platforms and tools, and good
  software development experience and programming skills
- Creativity, dexterity, and technical depth to solve real-world problems
- Self-motivation, team-work and good Chinese/English communication skill
11. Speech & Medical NLP

Project Description:

With long-term research on multimodal interaction technologies, including speech recognition, speech synthesis, and question answering, we strive to apply multimodal interaction technologies to develop innovative solutions on speech-aware and emotion-aware solutions, typical examples include spoken language assessment, emotion analysis for next generation call center, and question answering for medical patient engagement.

We are looking for Ph.D or Master students in Computer Science, Electronics Engineering, Linguistics, Information Science, Applied Mathematics, or related areas, with the following qualifications to strengthen our team:

Desired skills:

- Experience with machine learning, deep learning, data mining, statistical modeling
- Experience with at least one of the following topics: speech recognition, speech synthesis, natural language processing, question answering, or dialogue systems
- Strong programming skills in at least one of the following languages: C, C++, Java, Python
- Experience with deep learning toolkits, such as Tensorflow, PyTorch, Caffe, MXNet, Theano, is a plus
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