Weichen Ke

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Education

- **Peking University, Ph.D. student** 2016.09 – Present
  GPA: 3.85/4.0, TA of Algorithm Analysis and Complexity Theories
- **Beijing University of Technology, Bachelor in Computer Science** 2012.09 – 2016.07
  GPA: 3.93/4.0, Rank: 1/44, TOEFL: 112 (Speaking 26), GRE: 329+4.5 (Q 170)

Experience

- **Didi Research** 2017.07 – Present
  Research Intern at Big Data Strategy Group
  - Designed a strategy of order dispatching with reinforcement learning, which boosted $20k in daily total driver income and 3% in order finish rate in simulations.
  - Designed and trained a DQN with Keras and learned a value function estimator for order-driver pairs.
  - Constructed pipeline of spatiotemporal features using Hive on PySpark.
  - Organized and presented several company-wide tutorials on deep RL topics like A3C, TRPO, and DDPG etc.
- **Microsoft Research Asia** 2015.07 – 2016.07
  Research Intern at Software Analytics Group
  - Leader of project BigIn4, the big data analyzing backend of Quick Insights in Microsoft Power BI.
  - Proposed a novel algorithm for interactive approximate query processing on big data based on Tree Augmented Bayesian Network, and implemented it on Spark with Scala and Java.
  - Deployed the platform to production cluster running on Hadoop, and analyzed more than 1TB data per day.
  - Constructed preprocessing pipeline for complex structural data with SparkSQL.

Awards

- **"Star of Tomorrow" Title** (For MSRA interns with outstanding performance) 2016
- **Silver Medal of EC-Final Round of ACM-ICPC contest** 2015
- **IBM Scholarship and National Scholarship** (For top 3 students in the dept.) 2013 – 2014
- **Global Rank 18/1000+, China Rank 2/50+ in IEEExtreme Programming Contest** 2013
- **Meritorious Winner of MCM** 2013

Projects

- **Flappy Bird AI based on Deep Reinforcement Learning with Raw Pixels Input** 2017.06
  - Designed the network architecture (combined actor and value convolution network) with Tensorflow.
  - Implemented A3C algorithm from scratch, with asynchronous exploration and model updating using Python.
  - Applied frame stacking and background removal that leads to faster convergence and better results.

  The AI achieved human-level performance after self-playing for 4 hours on a single GPU.
- **Parameter Server based on C++ and MPI** 2017.06
  - Designed the master-coordinator-worker architecture and the communication protocol with Protobuf.
  - Implemented the architecture with MPI that supports adding/removing workers dynamically.
  - Implemented sparse parameter transmission to reduce messaging overhead.

  The PS can train 1 million parameters with 2GB data in 20 seconds with 4 workers running on 4 machines.
- **Real-time Online Game: Bomber Man Online on C++ and Direct2D** 2015.04
  - Designed messaging protocol under IOCP and managed development process with Git.
  - Implemented the game core from scratch and efficient game data access using STL with Visual Studio.
  - Implemented lockstep multiplayer synchronization model with a mutex based thread scheduler.

  The game runs steadily at 60 fps and achieved synchronized gameplay experience among players.