Patrick Xia

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EDUCATION

North Carolina State University, Raleigh, NC — Aug. 2016 - Dec. 2020
Ph.D. in Computer Science | Adviser: Dr. Tim Menzies

The University of Texas at Dallas, Richardson, TX — Aug. 2013 - Dec. 2015
M.S. in Computer Science

Nanjing University of Posts and Telecom., Nanjing, China — Sep. 2009 - Jun. 2013
B.S. in Electrical Engineering

SKILLS AND INTERESTS

• Experience in software development, machine learning, hyperparameter optimization and software analytics.
• Proficient in *Python and Java*, familiar with *C/C++ and R*, good at ML tools: Scikit-learn, Pytorch, Keras.
• Actively seeking software development internships as well as machine learning and software engineering research positions.

SELECTED PROJECTS

NSF Funded: Search-based Software Engineering Research — Aug, 2017 - Present
Research Assistant Under Dr. Tim Menzies, North Carolina State University, USA

- **Evolutionary Algorithms for Hyperparameter Optimization:** Developed a hyperparameter optimization framework called OIL (Optimized Inductive Learning), which applied evolutionary algorithms (e.g. Differential Evolution and NSGA-II) to supercharge software analytic tasks. OIL was tested on a wide range of optimizers with 945 projects data. Experimental results show that OIL improved the performance of effort estimation in terms of accuracy (won 16 out of 18 cases) and efficiency (reduced runtime from days to hours), respectively.
- **Sequential Model Optimization for Software Effort Estimation:** Applied and developed a sequential model based method (a.k.a active learning method) named "FLASH" for the first time in software effort estimation domain. With the constraints of specific computation costs, FLASH can efficiently find good configurations of machine learning methods for effort estimations (e.g. CART). Overall it can improve the performance of software effort estimation tasks by 11% on average in terms of accuracy.
- **Effort Estimation for Agile Projects on GitHub:** Proposed and developed a software effort estimation framework, ROME (Rapid Optimization Methods for Effort-estimation), for projects developed using agile methods. In this study, a group of features is defined based on traditional effort estimation study and collect data from most active projects on GitHub. According to the preliminary results, ROME works well on estimating project effort for agile projects and can achieve comparable performance with much less computing resources.

System migration for educational computer programming game — Jan, 2017 - May, 2017
Research Project, Game2Learn Lab, North Carolina State University, USA

- **Game Platform Migration:** Helped to migrate an educational purpose programming game, BOTS, from its original developing platform "Unity 4" to "Unity 5" by using JavaScript. After migration, more potential features are enabled for the game's future extension and development. BOTS is a serious puzzle game designed to teach programming fundamentals for novice computer users.

Satellite images change detection by using Gaussian Mixture Model — Jan, 2017 - May, 2017
Graduate Course Project, North Carolina State University, USA

- **Image Change Detection:** Applied and developed a Gaussian mixture model to identify landscape changes using high resolution satellite images. This grid-based method has competitive performance in Bi-temporal change detection. Given two very high resolution satellite images from the same landscape area, it can achieve, if not better, similar performance as humans in terms of landscape change detection.

SELECTED PUBLICATIONS

- **Tianpei (Patrick) Xia**, Jianfeng Chen, Rui Shu, Tim Menzies, *Sequential Model Optimization for Software Process Control*. **ICSE (Under Review)**, 2019.
- **Tianpei (Patrick) Xia**, Rui Shu, Tim Menzies, *Hyperparameter Optimization for Open Source Project Health Estimation*. **In preparation**, 2019.
- Rui Shu, **Tianpei (Patrick) Xia**, Laurie Williams, Tim Menzies, *Better Security Bug Report Classification via Hyperparameter Optimization*. **EMSE (Under Review)**, 2019.