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CHUWEN ZHANG

Education

The University of Texas at Austin
- **M.S. in Operations Research, June 2017**

Major fields in mixed integer programming and applications in supply chain management.
Advisor, Jonathan F. Bard

Shanghai Jiao Tong University
- **B.E. in Industrial Engineering, June 2015**

Professional Experience

Cardinal Operations, Algorithm Engineer (Operations Research)

September 2018 – Present

Large-scale MILP algorithm design for production planning
- Developed a very large-scale (17m constraints and 19m variables) planning model for a global ICT gaint to tackle difficulties in delivery requirements and to maintain a favorable service level.
- Designed an LP-based iterative framework to decompose the full problem via various pre and post processing techniques, graph-based heuristics to deal with integral and hard features. The model has been deployed and used in real production.
- Extended the model as a S&OP and APS product tailored for manufacturing industry. The product has been used in projects with other industry leaders.

Planning models for air-cargo operation
- Designed optimization algorithms for an air-cargo operation problem in a global courier company. Implemented MILP, mixed integer SOCP programs for the upper-level aircraft parking problem, and heuristic based scheduling algorithms to operate cargo trucks to minimize the total transferring distance and total operation time.
- Applied a geometric rounding scheme for the assignment constraints to achieve a 10% optimality gap comparable to 8% gaps obtained by mixed integer solvers for a static planning horizon of 24 hours.
- Established approaches for dynamic and DRO extension (under uncertain plane arrival time and transferring time) from the static assignment problem. Based on simulation results, the position assignments by DRO approach reduces total operation time to 1.4 hours compared to over 2 hours on average from the historical data in every 2-hour evaluation slice.

Other notable projects

• Designed optimization algorithms for one of China's "Big Three" airlines to decrease immense engine maintenance costs. The model is to generate optimal repair plans for engines within the entire fleet, to ensure high service levels, and to minimize zero-backup risks under stochastic damage development and uncertain failure events captured by the distributional robust approach.

• Participated in: unit commitment problem with National Grid, fabrication ordering scheduling with the COMAC, etc.

RTBAsia, Data Scientist

September 2017 – August 2018

Machine learning models for advertising fraud detection

• Developed an offline ML pipeline on the Spark platform by learning from real-time advertising bidding logs to differentiate invalid traffic.

• Created streaming models that evaluate the user behavior on the client websites by visiting graph and click or touch events generated via JavaScript. The model is able to recognize invalid traffic using disguised Ad IDs via CV-like features implemented in TensorFlow and Kafka. The JS user identification approach has then become the industry standard under regulation of GDPR in 2018.

• Researched on DL-based (CV + NLP) models to evaluate Ad context (URL, for example) for digital marketing, and to protect brands from unsafe, inappropriate, or incompatible content.

Skills   Proficient: Python, Julia, Pandoc, Scala

Past experience/collaborative use: C++, HTML5/CSS, Unix, Haskell, JavaScript, LaTeX, TensorFlow

Modeling: JuMP, Mosek, Gurobi, COPT, CLP, Spark ML

Summary: proficient in linear, conic, and mixed integer optimization, and methods for large scale applications with real-world practice. Familiar with common machine learning algorithms and experienced in modeling pipeline in big data environment.

Publications   Chuwen Zhang, Jonathan F Bard, and Rodolfo Chacon, Controlling work in process during semiconductor assembly and test operations, *International Journal of Production Research* 55, no. 24 (2017): 7251–7275