NCKU RESEARCH TEAM WON THE HONORABLE MENTION AWARD IN 2013 INFORMS RAS PROBLEM SOLVING COMPETITION

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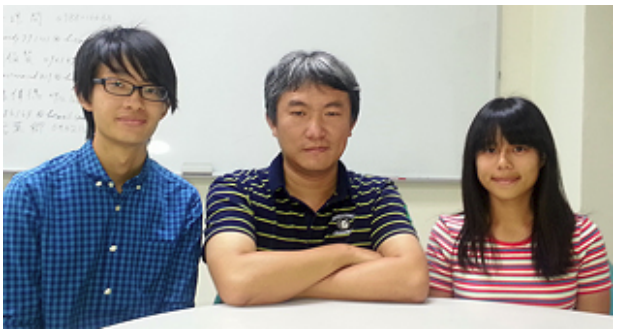

A research team led by Associate Prof. I-Lin Wang of the Department of Industrial and Information Management at National Cheng Kung University (NCKU), Tainan, Taiwan, has won the Honorable Mention in the 2013 Problem Solving Competition held by Railway Application Section (RAS), Institute for Operations Research and the Management Sciences (INFORMS), United States.

The NCKU research team includes Associate Prof. I-Lin Wang and undergraduate students Wei Lee and Chiao-Yu Liao, who just become junior in the same department this summer.

The Institute for Operations Research and the Management Sciences (INFORMS), established in 1995, is the largest professional society in the world for professionals in the fields of operations research (OR), management science (MS), and business analytics. The Railway Applications Section (RAS) is one of the INFORMS sub-groups that facilitates productivity improvements and growth in the rail industry through appropriate application of ORMS techniques.

Since 2010, RAS has held its fourth Problem-Solving Competition this year. The purpose of this competition is to draw the public attention by offering high-value awards, USD$3,750 in total, so that more new hands can participate in railway related research.

There were 45 teams registering for the 2013 competition and 12 of them, mostly composed by professors or doctoral students from several renowned universities worldwide, including Massachusetts Institute of Technology, U.S., have submitted their final reports. Team NCKU might very likely be the only semi-finalist team composed by junior undergraduate students as team members.

The 2013 competition problem is a hard yard operational problem that seeks an operational plan that minimizes the total waiting time of railcars in the yard and maximizes the total number of railcars processed during a certain period. Building a classification yard operations plan is challenging as it covers many interrelated operations and decisions, such as the sequence of inbound trains' disassembly, the sequence of out-bound trains' assembly, sorting plans at the hump, block-to-train assignment plan for classification tracks, etc. Optimizing the operations plan of a classification yard is very important for a railroad company as it helps fully utilize the limited resources of its rail network.

Prof. Wang and his team members spent about 2 months in implementing generic dispatching rules such as FIFO or longest-first heuristics toward this problem. They did not have good progress until the last 2 weeks, when they started to analyze the relationship between total waiting time and sequences of processing humping and pulling-back operations. In particular, they have shown the longest-first rule that processes a train or track containing the most railcars with higher priority guarantees an optimal sequence within some short time interval. Then, they derived criteria for judging whether it pays to wait for humping an incoming train, or pulling back a track. Their greedy heuristics are straight forward, efficient, and effective.

Due to the limited research experience of the team members, the NCKU research team suffered in the implementation for quite a while, but fortunately enough, they managed to resolve most difficulties encountered and submitted a 10-page report by the last minute of the deadline. Because most teams were quite strong, the judge committee had a hard time to decide which team did better than others. After intensively debating for a few weeks, the judge team selected 3 honorable mentioned teams, which includes NCKU, University of Southern California, and University at Buffalo. The final list includes 3 teams: MIT Ph.D. students, MIT master students, and Central South University from China.

Since 2003 fall, Associate Prof. I-Lin Wang has supervised students in winning 24 awards in master thesis or paper competitions and 4 awards in undergraduate student projects or paper competitions hosted by the OR Society of Taiwan (ORSTW), Chinese Institute of Industrial Engineering (CIIE) or DHL. He has also received the best poster award in the OR subdivision of the NSC Industrial Engineering division in 2009, the Youth Medal in Management by Chinese Management Association in 2012, and is also a grantee of NSC outstanding young researcher fund of the IE division in 2013. Since the first RAS competition held in 2009, Prof. Wang has lead team NCKU to won 2 honorable mentioned awards (2010, 2013), and a 3rd place award (2011). Team NCKU is the first team ever continuously received 3 awards from this competition. As a faculty member in the Department of Industrial & Information Management and a member of the Railway Research Center of NCKU, Prof. Wang's achievements proved that National Cheng Kung University and researchers in Taiwan do have the capability and potential to conduct in-depth research.

For more details, please refer to the following links:
RAS 2013 problem solving competition : http://tinyurl.com/mxt76k4
Department of Industrial & Information Management : http://www.iim.ncku.edu.tw/
Prof. I-Lin Wang's homepage : http://ilin.iim.ncku.edu.tw