Final report on the EURO Summer Institute on Online Optimization

General information about the EURO Summer Institute on Online Optimization

Aims and Scope

In online optimization, an algorithm must make its decisions based only on past events without any solid information about future data. Such algorithms are called online algorithms. Since an online algorithm makes its decisions based only on partial information, without knowing the whole instance in advance, we cannot expect it to give the optimal solution that can be produced by an algorithm that has all the necessary information. This is why the output of each of these algorithms should be compared with those produced by using optimal offline algorithms.

Contributions on closely related areas like semi-online optimization and online aspects of algorithmic game theory were also welcomed from the students. The senior keynote speakers covered the recent results and solution techniques of some special topics (bin packing, scheduling, clustering, generalizations of competitive analysis) and also discussed open problems of the area.

Requirements for participation

As it is usual at the EURO Summer and Winter Institutes only early stage researchers, who are PhD students or who have less than two years research experience since completing a PhD were eligible for applying to participate at the school. The participants had to submit their CV and an unpublished paper related to online algorithms. The scientific committee of the conference decided about the applications.

Participation and accommodation were free for the selected participants. The conference was financially supported by EURO. The participants had to pay only their travel costs, but in most cases it was covered by the participant's national OR society.

Invited Speakers and Scientific Committee

The Scientific Committee which contained the senior speakers of the ESI had the following members:

- Joan Boyar (University of Southern Denmark)
- Leah Epstein (University of Haifa, Israel)
- Sándor Fekete (TU Braunschweig, Germany)
- Gábor Galambos (University of Szeged, Hungary)
- Csanád Imreh (University of Szeged, Hungary)
- Piotr Krysta (University of Liverpool, United Kingdom)
- Jiri Sgall (Charles University Prague, Czech Republic)
- Gerhard Woeginger (TU Eindhoven, The Netherlands)

Later the list of senior speakers was extended by Jakob Krarup who gave a very interesting talk about the history of EURO and the ESI-s.

Organizing Committee

The Organizing Committee contained the following members:
- János Balogh (University of Szeged, Hungary)
- József Békési (University of Szeged, Hungary)
- János Csirik (University of Szeged, Hungary)
- György Dósa (University of Pannónia, Hungary)
- Tibor Illés (University of Budapest, HORS representative)
- Csanád Imreh (University of Szeged, Chair of the ESI)
- Miklós Krész (University of Szeged, Hungary)
- Attila Tóth (University of Szeged, Hungary)

Venue

The city of Szeged is one of the second largest cities of Hungary and it is located in the south-east corner of Hungary, quite close to the Serbian and to the Romanian borders. It is a university city, University of Szeged is one of the largest universities of Hungary. The University has eleven faculties and all together more than 20000 students. The university has no campus, all the buildings are located in the centre of the city.

The school was organized by two faculties of the university: by the Institute of Informatics from the Faculty of Science and Informatics and by the Department of Applied Informatics from the Faculty of Education. The conference was held at the main building of the Faculty of Education.

Participants

The following 18 students participated at the conference:
- Antonio Andrade (University of Huddersfield , UK)
- Kamal Al-Bawani (RWTH Aachen, Germany)
- Emese Bittner (University of Szeged, Hungary)
- Attila Bódis (University of Szeged, Hungary)
- Martin Böhm (Charles University Prague, Czech Republic)
- Sahar Bsaybes (LIMOS at Clermont Ferrand, France)
- Csongor Csehi (TU Budapest, Hungary)
- Balázs Dávid (University of Szeged, Hungary)
- Davide Duma (Universita degli Studi di Torino, Italy)
- Fabian Dunke (Karlsruher Institute of Technology, Germany)
- Lukas Folwarczny (Charles University Prague, Czech Republic)
- Matthias Hellwig (Noser Engineering AG, Switzerland)
- Caroline Jagtenberg (CWI Amsterdam, The Netherlands)
- Christian Kudahl (University of Southern Denmark, Denmark)
- Marc Renault (LIP6, UPMC - Paris 6, France)
- Ehecatl Antonio del Rio (University of Cambridge, UK)
- Roohollah Abbasi Shureshjani (Iran, delgated by IFORS)
- Pavel Veselý (Charles University Prague, Czech Republic)

Scientific program

School format

The scientific program of the EURO summer institute consisted of two types of lectures. The junior participants presented 30 minutes talks (plus 10 minutes discussion at the end) about the results they used to apply for participation. The senior speakers gave longer lectures about some subfields of online optimization, giving a detailed overview of the classical results and also presenting the most recent ones. At the first day the school was started by a tutorial presenting the main notions and the most fundamental results on online optimization. Besides the scientific talks we had and extra talk about the history of EURO and the Summer Institutes given by our special guest Jakob Krarup.

The program of the conference

14 of June arrivals
15 of June (Monday)
10.00- 10.45 Opening Section (introduction of University of Szeged)
11.00-11.45 Introduction section (the participants introduce themshelves telling a few words about their research interest)
14.00-17.00 Tutorial on online algorithms
18.00 Welcome dinner
16 of June (Tuesday)
10-10.40 **Kamal al Bawani** Comparison based online buffer management.
10.40-11.20 **Lukáš Folwarczný** General caching is hard: even for small pages.
11.20- 12.00 **Roohollah Abbasi Shureshjani** Solving generalized fuzzy data envelopment analysis model: A parametric approach
14.00- 15.40 **Sándor Fekete** Online navigation (senior talk)
16.00 -16.40 **Csongor Csehi** Truck routing and scheduling
16.40-17.20 **Davide Duma** Optimal management of elective and nonelective patients
17 of June (Wednesday)
10.00-11.40 **Sándor Fekete** Online navigation (senior talk)
14.00- 14.40 **Matthias Hellwig** Semi-online minimum makespan scheduling with restricted machines
15.00-17.30 **Joan Boyar** Advice complexity, relative worst order analysis (senior talk)
18 of June (Thursday)
9.00-11.30 **Joan Boyar** Advice complexity, relative worst order analysis (senior talk)
14.00 – 15..40 **Jiri Sgall** Randomization in online algorithms (senior talk)
16.00- Museum of Informatics
19 of June (Friday)
9.00-9.40 **Marc Renault** Online algorithms with advice for the dual bin packimg problem
10.00-11.40 **Jiri Sgall** Randomization in online algorithms (senior talk)
14.00-16.00 **Gerhard Woeginger** Scheduling and covering (senior talk)
16.00-16.40 **Caroline Jagtenberg** Benchmarking online dispatch algorithms for Emergency Medical Services using Constraint Programming
16.40-17.20 **Martin Böhm** A Tighter Lower Bound for Online Bin Stretching on Three Bins
17.20-18.00 **Christian Kudahl** On Online Idependent Set, Vertex Cover, and Dominating Set
20 of June (Saturday)
Excursion to Opusztaszer National Heritage Park
21 of June (Sunday)

Free day or Aquapolis Szeged
22 of June (Monday)
9.00-9.40 **Sahar Bsaybes** Fleet management of autonomous vehicles: VIPA FLEEt
10.00- 12.00 **Gerhard Woeginger** Scheduling and covering (senior talk)
14.00- 15.40 **Gábor Galambos** Online bin packing (senior talk)
16.00-16.40 **Attila Bódis** Bin packing with directed stackability conflicts
16.40- 17.20 **Pavel Vesely** Complexity of Online Coloring with Constant Precoloring
23 of June (Thuesday)
9.00-9.40 **Antonio del Rio-Chanona**, On-line Biohydrogen Production Optimization via Adaptive Data-Based Modeling and Model Predictive Control
10.00 -12.00 **Gábor Galambos** Online bin packing (senior talk)
14.00-15.00 **Jakob Krarup** On the origins of OR and its institutions (senior talk)
15.00-16.40 **Leah Epstein** Online problems with rejection (senior talk)
17.00 Natural Museum of Faculty of Education
24 of June (Wednesday)
10.00-11.40 **Leah Epstein** Online problems with rejection (senior talk)
14.00-15.40 **Piotr Krysta** Algorithmic Mechanism Design (senior talk)
16.00- boat excursion
25 of June (Thursday)
10.00- 11.40 **Piotr Krysta** Algorithmic Mechanism Design (senior talk)
14.00-15.40 **Csanád Imreh** Online clustering (senior talk)
16.00-16.40 **Balázs Dávid** Bus rescheduling as an online problem
16.40-17.20 **Antonio Andrade** Online Optimization of braking actions in a railway train under imprecise adhesion profiles
17.20 -18.00 **Emese Bittner** Paging problem with buying and rejection
18.30 Farewell dinner
26 of June (Friday)
9.00-9.40 **Fabian Dunke** Evaluating the Quality of Online Optimization Algorithms by Discrete Event Simulation
10.00-12.30 **Csanád Imreh** Online clustering (senior talk)
27 of June (Saturday) departures

Special issue

A special issue at Central European Journal on Operations Research is organized for the papers submitted by the students participating at the conference. The costs related to the special issue is financed by the Hungarian Operations Research Society.

Social programs
The participants could take part in the following social programs.
- 15 of June (Monday): welcome dinner at the assembly hall of the Faculty of Teacher Training
- 18 of June (Thursday): visit at the Museum of Informatics
- 20 of June (Saturday): Excursion to Ópusztaszer National Heritage Park. There we first visited the famous Festy panorama, and after a traditional Hungarian lunch, we visited a Skansen and a Nomadic park where the participants could show their archery abilities.
- 21 of June (Sunday): visit to Aquapolis Szeged, which is the largest wellness and adventure pool center of the region.
- 23 of June (Thuesday): visit at Natural Museum of Faculty of Education

- 24 of June (Wednesday): a boat excursion on the river Tisza which is ended with a dinner at a fish restaurant on the riverside
- 25 of June (Thursday): Farewell dinner the assembly hall of the Faculty of Teacher Training

Financial report

Income:

Support from EURO: 17.000
Support from Institute of Informatics, University of Szeged 1.000
Total: 18.000

Expenses:

Acommodation of students: 5.075
Invited speakers travel: 3.625
Accomodation invited speakers and non local organizers: 1.240
Lunches and dinners : 3.810
Social programs: 2.950
Organization and others (secretary, conference materials, T-shirts for participants, etc.) 1.300
Total: 18.000

Szeged 07.04.2016   Csanád Imreh
                                                         chair of the ESI

Appendix: Some photo pictures about the event