PortFolio of Decision Aiding Team

Our portfolio comprises seven elements, with each project contributing at least one element, which can be a theoretical result exemplifying our research (points 2, 3, 4, 5), a real-life application (point 6), an outreach action (point 7), or an international implication (point 1).

1. **A DR CNRS as the Program Chair of IJCAI 2018 (click for the web page)**

   IJCAI is one of the leading conferences on AI. Each year it receives between 3000 and 5000 submissions (in 2018: 3470), from which around 20% are accepted (in 2018: 709). The role of the program chair is, among other tasks, to hire the program committee (in 2018: around 50 area chairs, 500 senior program committee members and 2000 program committee members), manage the review process, choose invited speakers and special tracks. All this had impacts on the future research directions of IA. Jérôme Lang's selection as the chair, and his inclusion on the IJCAI board of trustees (2015-2020), contributed to the international visibility of LAMSADE.

2. **Athenan : Minimax Strikes Back (gold medals in Computer Olympiads 2020, 2021, 2022)**

   Athnan uses Minimax-based search algorithm called Descent, as well as different learning targets. For multiple games it is much more efficient than the re-implementation of AlphaZero: Polygames. We won many gold medals with Athénan in the 2020, 2021 and 2022 Computer Olympiads.

3. **Honorable Mention at IJCAI 2019 : Portioning Using Ordinal Preferences: Fairness and Efficiency ([1])**

   A public divisible resource is to be divided among projects. We study rules that decide on a distribution of the budget when voters have ordinal preference rankings over projects. Examples of such portioning problems are participatory budgeting, time shares, and parliament elections. We introduce a family of rules for portioning, inspired by positional scoring rules (click for the web page).

4. **THeory and Evidence to Measure Influence in Social structures ([2])**

   The article [2] is one the of the first articles of Themis ANR project which brings insights based on techniques from multi-agent systems, compact representation, algorithmic game theory, computational social choice, and social network analysis. The project opens a new research domain proposing an ordinal framework for power indices and has inspired colleagues around the world to publish their own results within our framework.

5. **Nondominated Set for Multiobjective Discrete Optimization ([3])**

   The article presents the current best algorithm to generate the Pareto front of multiobjective discrete optimization problems.

6. **Prison Life Index**

   This multidisciplinary project involves computer science, economics, law, and sociology and partnerships with NGO Prison Insider, ULB, CNAM, and SciencePO de Grenoble. It aims to evaluate incarceration conditions across different countries (see for instance an article in the journal "Le Monde" : (click for the article) or this intervention on France3 tv channel: (click for the video) or [4] for the modeling of the problem).

7. **A serious game: PollutionSolutions**

   "PollutionSolutions" is a serious game highlighting the practical application of "complex systems" modeling. Its primary objective is to raise awareness among the appropriate age group about the underlying mechanisms of collective action and encourage more effective public action against pollution. It has been used with middle school students with the Aix-Marseille rectorate. Click (here) to see an article on the website of IGPDE (Institut de la gestion publique et du dÃⒸveloppement ÃⒸconomique) and (here) for an interview realized by IGPDE .

References

[1] Stéphane Airiau, Haris Aziz, Ioannis Caragiannis, Justin Kruger, Jérôme Lang, and Dominik Peters. Portioning Using Ordinal Preferences: Fairness and Efficiency. In *Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence, IJCAI 2019*, Macao, China, August 2019.

[2] Tahar Allouche, Bruno Escoffier, Stefano Moretti, and Meltem Ozturk. Social Ranking Manipulability for the CP-Majority, Banzhaf and Lexicographic Excellence Solutions. In Christian Bessiere, editor, *Twenty-Ninth International Joint Conference on Artificial Intelligence and Seventeenth Pacific Rim International Conference on Artificial Intelligence {IJCAI-PRICAI-20}*, pages 17–23, Yokohama, Japan, January 2021. International Joint Conferences on Artificial Intelligence Organization.

[3] Satya Tamby and Daniel Vanderpooten. Enumeration of the Nondominated Set of Multi-objective Discrete Optimization Problems. *INFORMS Journal on Computing*, 33(1):72–85, 2021.

[4] Lola Martin-Moro, Meltem Öztürk, and Florence Laufer. Modelling the Prison Life Index with Value Focused Thinking Methodology. working paper or preprint, November 2022.