Are you interested in checking out my work?

Below you can find some of the projects I am currently working on and some that I have already completed on my scientific journey. As I believe to be at the beginning of this journey, I am very excited to discover what projects await me next.

In the beginning, my work was more concerned with theoretical game theory. The mathematical intensity of this pursuit proved valuable for my later data-driven and programming-intensive projects. The initial steps of my journey were conducted in MatLab, including a program that solves games for Nash equilibria (see "Homotopy Methods for solving Non-Degenerate Bimatrix Games"), as well as a replication of an existing empirical paper using the same data set but a different programming language (see "The Effects of Walth Shocks on Health"). If you value correct and efficient programming, I strongly advise you not to check out these projects, since going through the code could cause physical pain. Fortunately, this does not apply to more recent projects.

On a more serious note, I believe that as Data Scientists we are often very well educated in econometrics, but understand too little about our everyday data analysis tools. This dangerous half-knowledge has led me to take a step back and learn more about the deep-rooted fundamentals of computer science and the programming in C. To that end, I am enrolled in several CS50x courses from HarvardX, which I expect to complete in 2022. Keep posted, I am eagerly looking forward to making the final projects available here (see "HavardX CS50x (Soon Available)").

In fact, I would like to believe that these courses and my ignited passion for style and efficiency are already paying dividends in more recent projects. One of these projects involves the data analysis underlying the working paper published in early 2022 (see "Developing a Framework for Real-Time Trading in a Laboratory Financial Market"). The analysis is performed in Python and features more sophisticated data engineering rather than complex models. Using a laboratory experiment, we collect financial market data from algorithmic trading at millisecond speed. This process takes place in an artificial market that more closely replicates the financial market mechanisms relevant to high-frequency trading in the laboratory than was previously achieved. For example, the same messages used by Nasdaq are transmitted between the broker and the artificial exchange.

The latest projects, on the other hand, are less exciting in terms of data engineering, but they involve much more sophisticated models. The three most recent projects are case studies submitted as part of a study abroad program at the Barcelona School of Economics at Pompeu Fabra University. All three projects were awarded the highest possible grade. The first project, "A Horse Race to classify Amazon Kindle Reviews," examines 1,000,000 reviews from the Amazon Kindle Book Store and conducts a race between different supervised machine learning models seeking to classify whether a previously unseen book review is positive or not. The second project, “Emojis as Labels & ROC-AUC vs. Average Precision”, uses emojis from tweets as labels for positive or negative emotions to train an Extremely Randomized Tress model. The trained model is used to predict the emotions of unlabeled tweets. In this way, it is possible to observe the change of emotions in Spain after the police brutality during the Catalan freedom movement in 2017. The focus of this project is to compare ROC-AUC and Average Precision. The third project, "Mountain Car & Neural Networks (Soon Available)," addresses a classical benchmark problem for reinforcement learning algorithms. Using neural networks, of the torch.nn module, this project attempts to solve Mountain Car, a multi-dimensional problem for which the environment is provided by the gym module.