Attacking Uncertainty: Crossing the Chasm from Theory to Reality

In his work with the Data Science Institute, Postdoctoral Researcher Orestis Papadigednopoulos has one simple goal: to employ machine learning and complex algorithms to eliminate uncertainty.

“Sometimes in life, problems cannot be solved because something is missing,” he says. “I construct methodologies to attack that.”

With Professors Assaf Zeevi and Vineet Goyal as mentors, Dr. Papadigenopoulos has dived headfirst into the fields of management science and operations research, bringing theoretical mathematics and computer science to real-world applications.

“DSI has been a very fast learning experience,” Papadigenopouolos says. “Exploring business challenges and phenomena; it’s changed everything for me.”

When he explored electrical engineering as an undergraduate, and then theoretical computer science while pursuing his doctorate, one fact would become increasingly undeniable: his passion for algorithms.

“My objective was to just be better at algorithms; to learn how to design and solve problems and write beautiful proofs. Just for the fun of it.”

After a while, though, he noticed one element consistently missing from his work.

“To just prove something and publish it, this wasn’t challenging to me anymore,” he says. “I realized what I’d rather do is let reality determine the problems.”

It was this pursuit of reality—a growing desire to use statistical and machine learning techniques to solve problems with real-world relevance—that brought Dr. Papadigenopoulos to the work he does now at DSI.

So after years of theoretical exploration, Dr. Papadigenopoulos now finds himself at the forefront of revenue management, recommendation systems, and assortment optimization; disciplines with high-impact applications across every imaginable industry from ecommerce to healthcare, entertainment to logistics.

In working with his mentors and partnering with fellow researchers, Dr. Papadigenopoulos highlights the DSI’s illuminating diversity of academic and practical experiences.

“Data science is essentially a new and multidisciplinary science,” he says. “You see so many perspectives from medical researchers, computer scientists, programmers. It’s great to see how these people interact.”

As he continues his work with DSI, Dr. Papadigenopoulos seeks to immerse himself more fully in real-world problems and solutions.

“I want to talk to people to understand the challenges they face and what data science can contribute,” he says.

“We live in an era where there’s an abundance of data, but still there are problems we don’t know how to solve. Why? Uncertainty. My job is to model this uncertainty and prove that the solutions lie in the data itself.”

His journey is emblematic of the evolving landscape of data science, where the boundary between academia and industry continues to blur. Dr. Papadigenopoulos is a data scientist seeking to understand fundamental problems in both theory and practice, using his algorithms to bridge the gap between data and reality.