Avoiding "Decision Paralysis" Integrative Data Science for Critical Decision Making Client:

Pending Several Possibles Options Project Sponsor: David Wild, Kyle Stirling Status: New

Subject: The human brain excels at constructing, acquiring, organizing, analyzing, and summarizing diverse information to support decision-making. However, with the massive amount of data now force fed to everyone, decision-makers often experience "decision paralysis" when faced with making critical choices. While data science and AI can help process information at a very large scale, traditional methods that handle large volumes of homogeneous data have limitations, especially when decision-making requires integrating heterogeneous data. This project will explore how we can use computing, particularly data science and AI, can support and maybe replicate the brain’s ability to "fuse" and "integrate" diverse types of information.

The goal is to develop systems that process and present this data in a way that enables humans to make decisions effectively, either independently or in collaboration with computers. Background: Many decisions today—whether in personal life, politics, medicine, disaster response, or competitive intelligence—require the integration of heterogeneous data types, from the environment, the infosphere, structured databases to unstructured text and images. Current data science methods often fall short when handling these diverse data forms, leading to incomplete analyses or decision delays. In the worst case decision makers face complete overwhelm. This project will explore technologies like knowledge graphs for data fusion and visualization techniques for human comprehension. There will be a chance to consider other options since this is a new project. Objectives: The objectives of this project are to:

● Research and identify technologies that enable the integration and fusion of heterogeneous data.

● Develop an architecture outlining how these technologies could work together to support critical decision-making.

● Explore visualization methods that allow decision-makers to process complex information quickly and effectively.

● Investigate potential applications in fields such as medicine, disaster response, and competitive intelligence.

● (Stretch Goal) Create a prototype demonstrating the feasibility of these technologies.

Students will have the opportunity to work with cutting-edge data science tools, engage with experts in relevant fields, and develop a comprehensive understanding of decision making and decision-support systems. The project sponsor will provide resources and potential introductions to professionals in these industries. These could turn into clients.