Structured and Unstructured Data Sciences and Business Intelligence for Analyzing Requirements Post Mortem

Naval Postgraduate School

Objectives

- Navy systems may have unexpected significant cost growth for many reasons.

- The objectives are to apply advanced analytics to understand the common elements, patterns, and deep causes of significant cost growth from historical data, which include structured and unstructured data such as Program Elements or Budget Exhibits (BEs, unstructured/structured mixed, unclassified), Initial Capability Documents (ICD, unstructured, classified), Key Performance Parameters (KPP, structured, classified), or Key-Systems Attributes (KSA, structured, classified) from Capability Development Documents (CDD, unstructured, classified).


An Example of BE Data

Results

- Showed the feasibility to apply the classic data sciences and business intelligence tools and artificial general intelligence (AGI) framework to address the common elements and deep causes of Navy programs and systems that create excessive cost growth.

- Demonstrated the potential to enable a knowledge system of unstructured and structured data that can effectively learn from historical data and environment and make discovery and prediction.

Methods
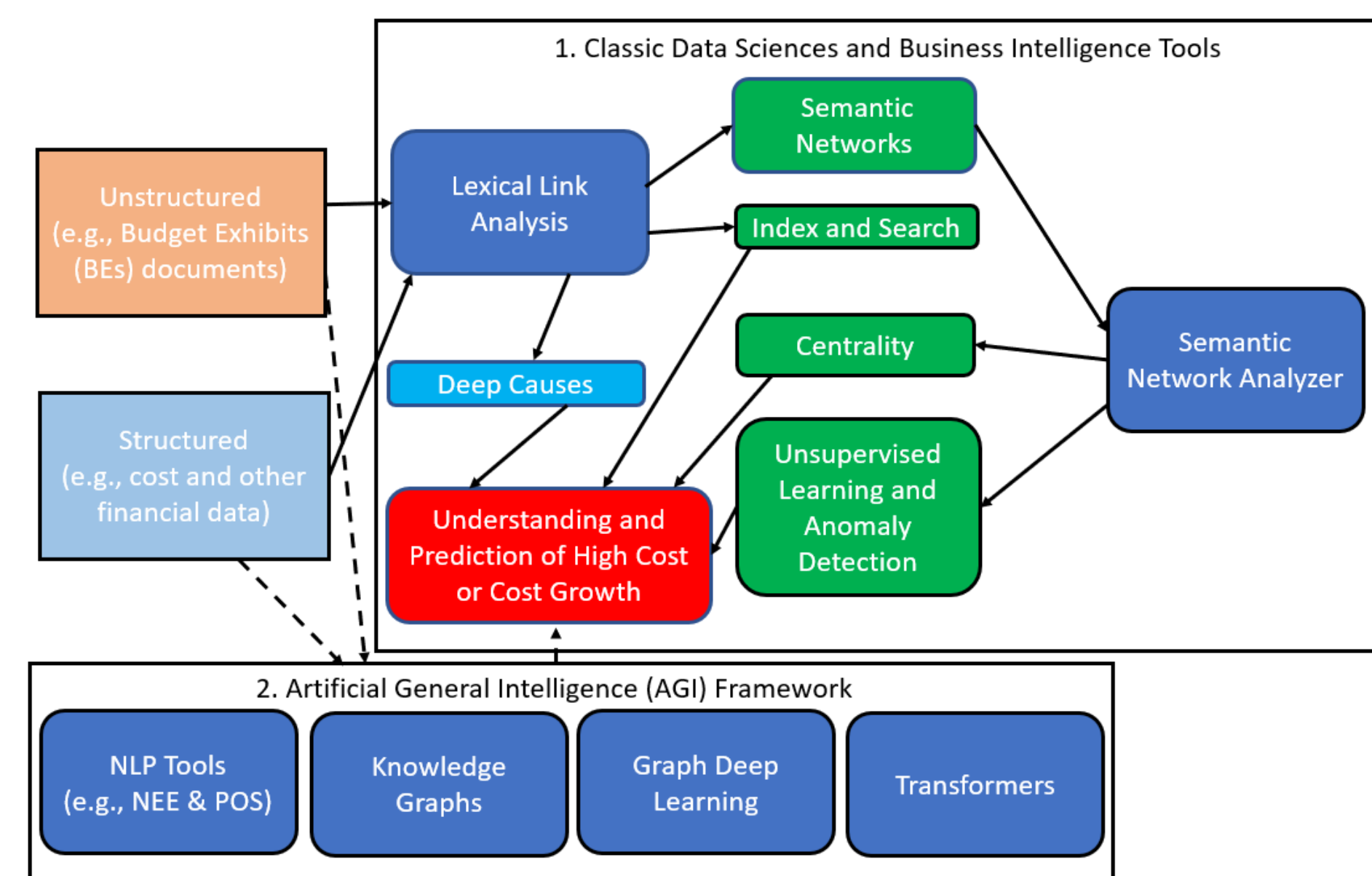
Classic Data Sciences, Business Intelligence and AGI Applied

Discovery Process

Lexical link analysis (LLA) reveals the relations of PEs and detects anomalies, i.e., PE 1,14,13,6, and 2
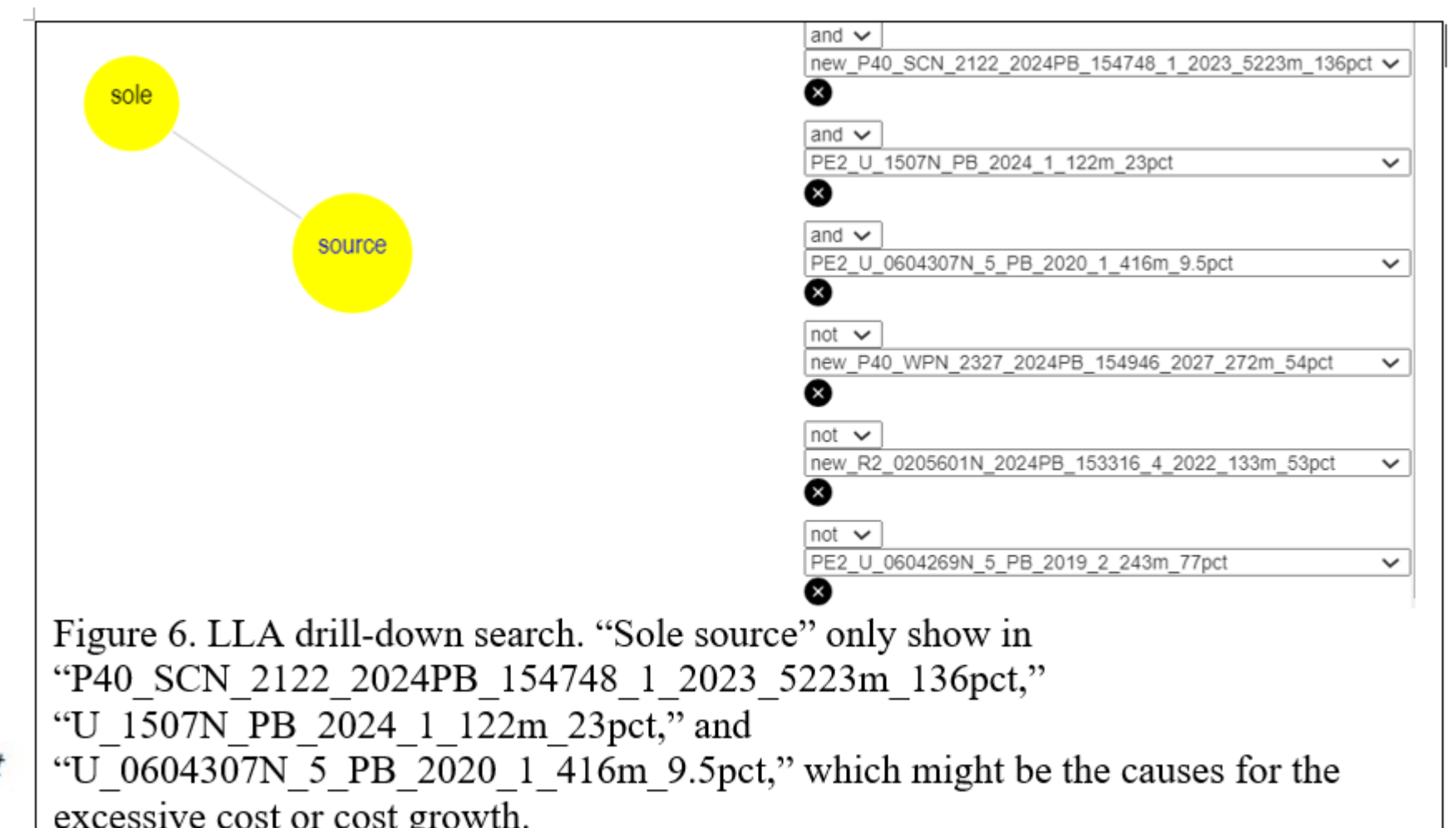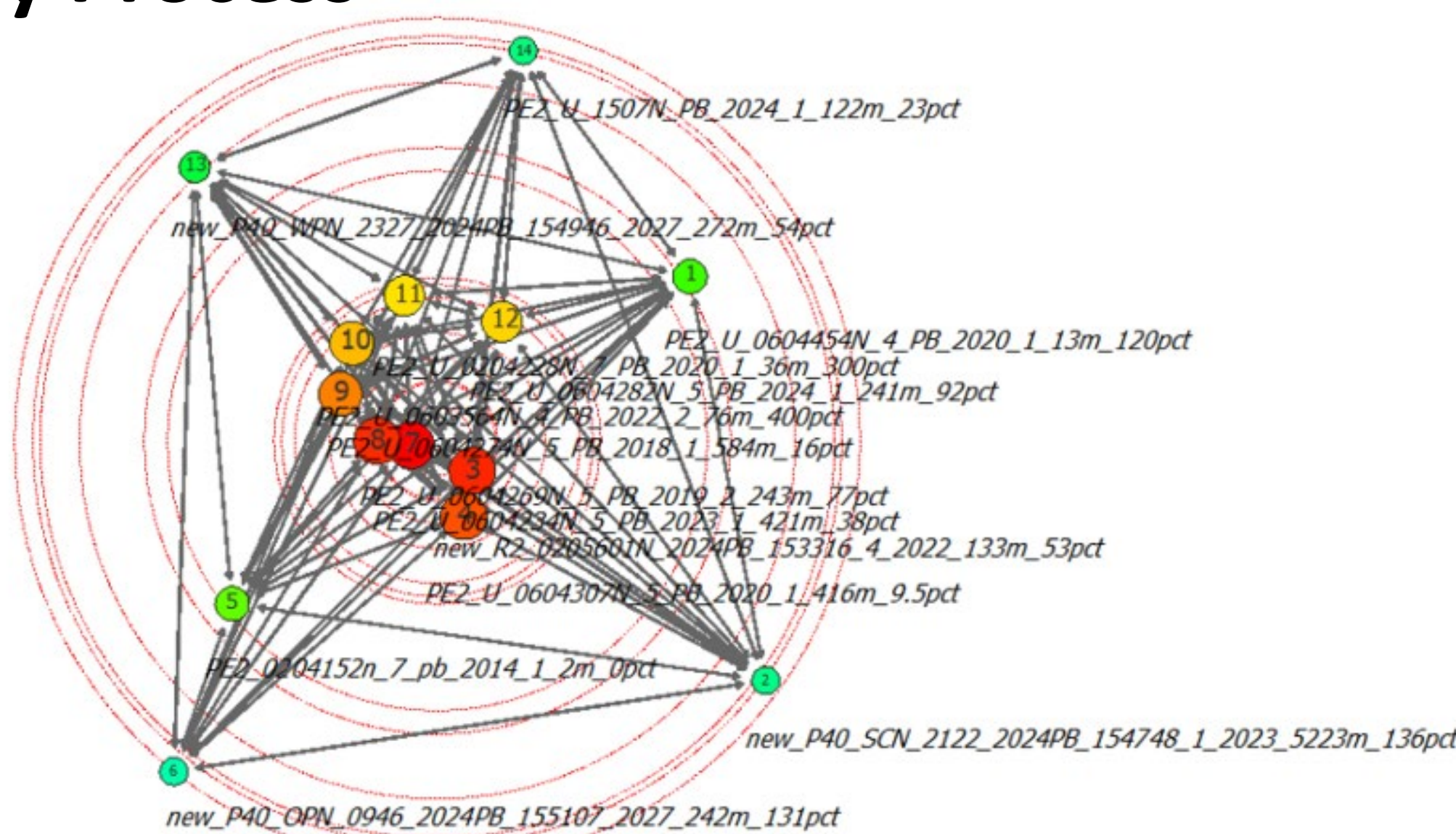

Figure 6. LLA drill-down search. "Sole source" only show in "P40_SCN_2122_2024PB_154748_1_2023_5223m_136pct," "U_1507N_PB_2024_1_122m_23pct," and "U_0604307N_5_PB_2020_1_416m_9.5pct," which might be the causes for the excessive cost or cost growth.

Recommendations

- Apply and scale up the combined analytic tools to predict the risk (likelihood and magnitude) of cost growth for future Navy Systems.

- Enable the OPNAV's Program Budget Information System (PBIS) to become a knowledge system that can effectively learn from human, data, and its surrounding environment to make good decisions for the future Program Objectives Memorandum (POM).

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