

INTRODUCTION

Caterpillar's Large Engine Center (LEC) currently uses a Visual Factory website (Figure 1) to track engine production across hundreds of workstations. However, locating engines or workstations where production is slowing down requires time-consuming manual searches.

CAT's Need

A faster solution to:

- Identify engines spending excessive time at specific stages
- Detect workstations frequently causing delays
- Monitor production flow and support on-time engine delivery

Project Goal

To develop an interactive dashboard that visualizes engine lifecycle data, highlights stages with abnormal time durations, and enables employees to monitor engine progress more efficiently.

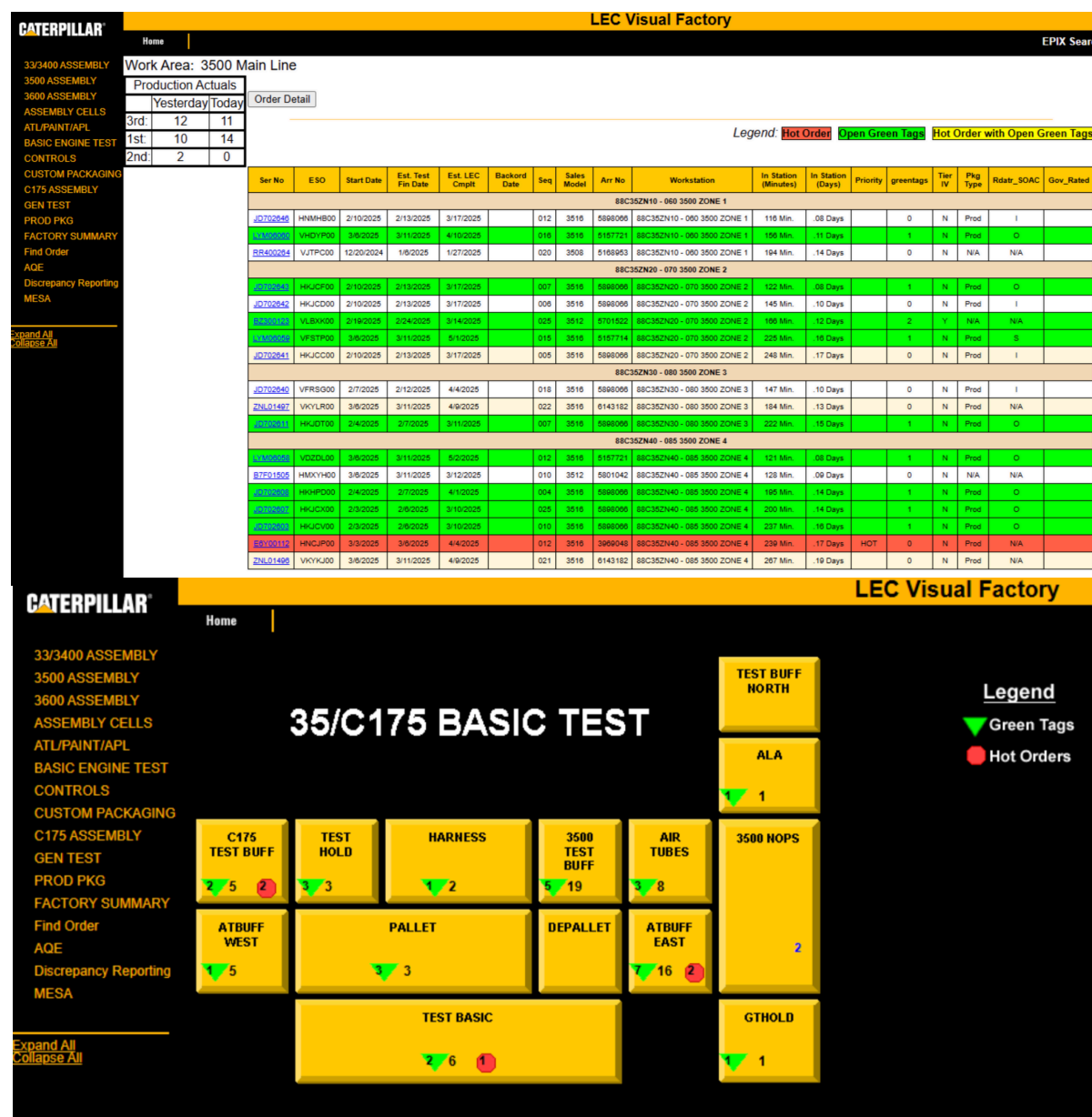


Figure 1. Lafayette Visual Factory

REFERENCES

- Parry, Aaron. (2024). Microsoft Power BI: PL-300 Certification Prep (Data Analyst) [MOOC]. Retrieved from <https://www.udemy.com/course/microsoft-power-bi-certification-da-100-exam-prep/>
- Purdue University Data Mine. (2024). The Examples Book. <https://the-examples-book.com>

RESEARCH METHODOLOGY

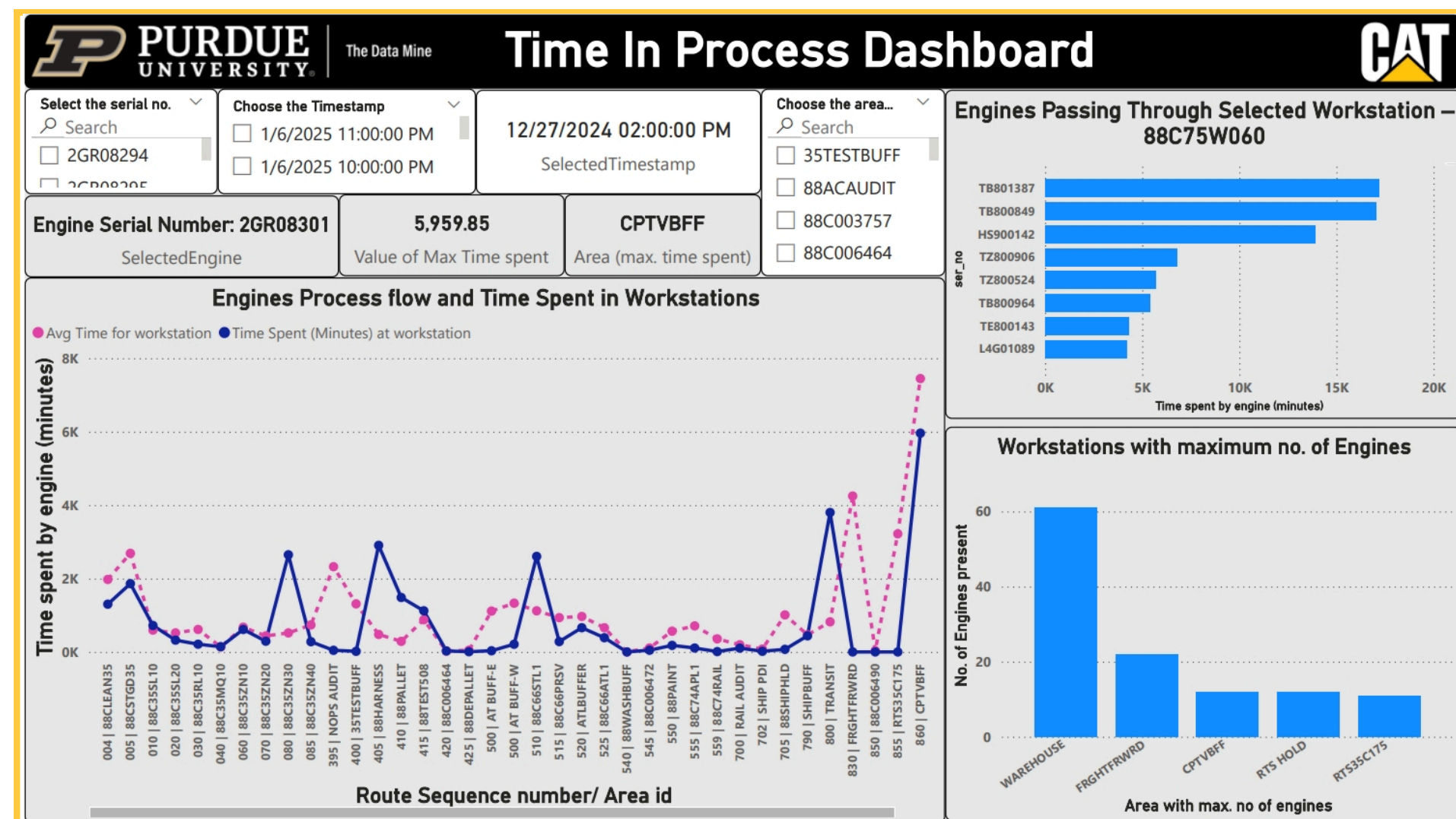
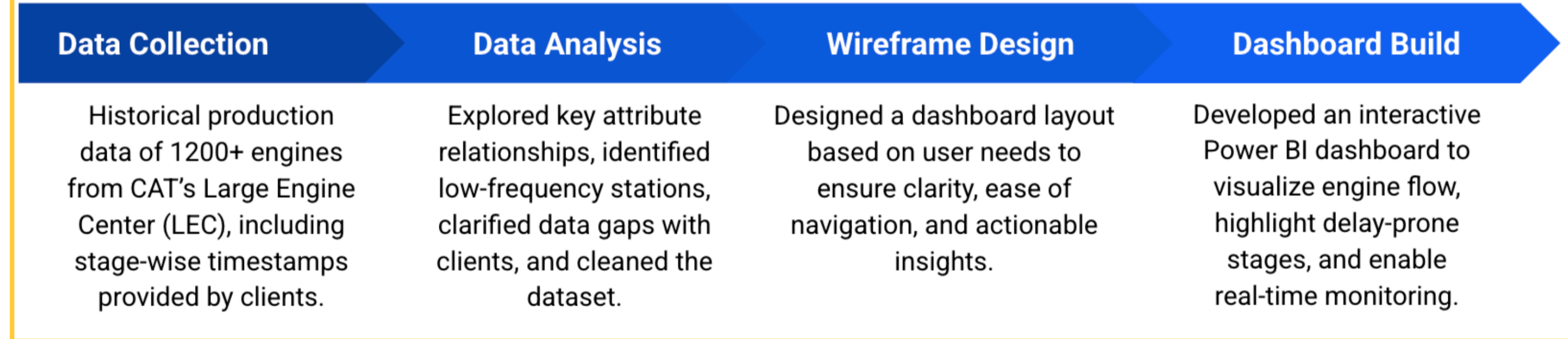


Figure 2. Time-In Process Dashboard (Screen 1)

DASHBOARD FEATURES

- Identify engines spending significantly more time than average at a specific stage (Figure 2)
- Detect stages that consistently delay production across multiple engines (Figure 2)
- Visualize engine movement and stage-wise time duration in an interactive view (Figure 3)

KEY DATA INSIGHTS

- Different engine types spend varying amounts of time in the same stage
- Engine stage sequences differ based on engine type and production requirements
- 100+ unique stages exist in the production process at LEC

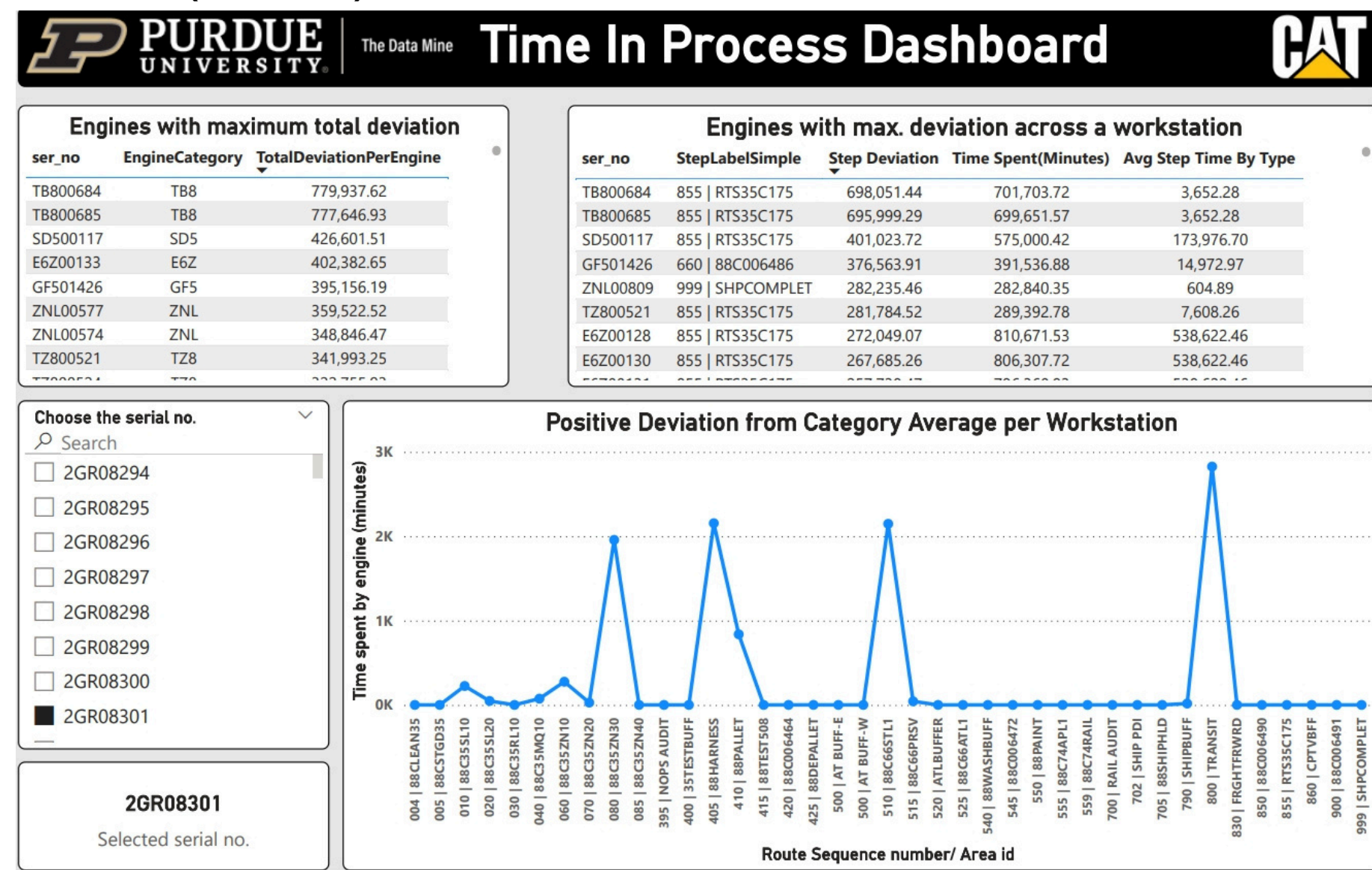


Figure 3. Time-In Process Dashboard (Screen 2)

KEY ATTRIBUTES

- Engine Number
- Stage Number
- Arrival Time
- Departure Time

TOOLS USED



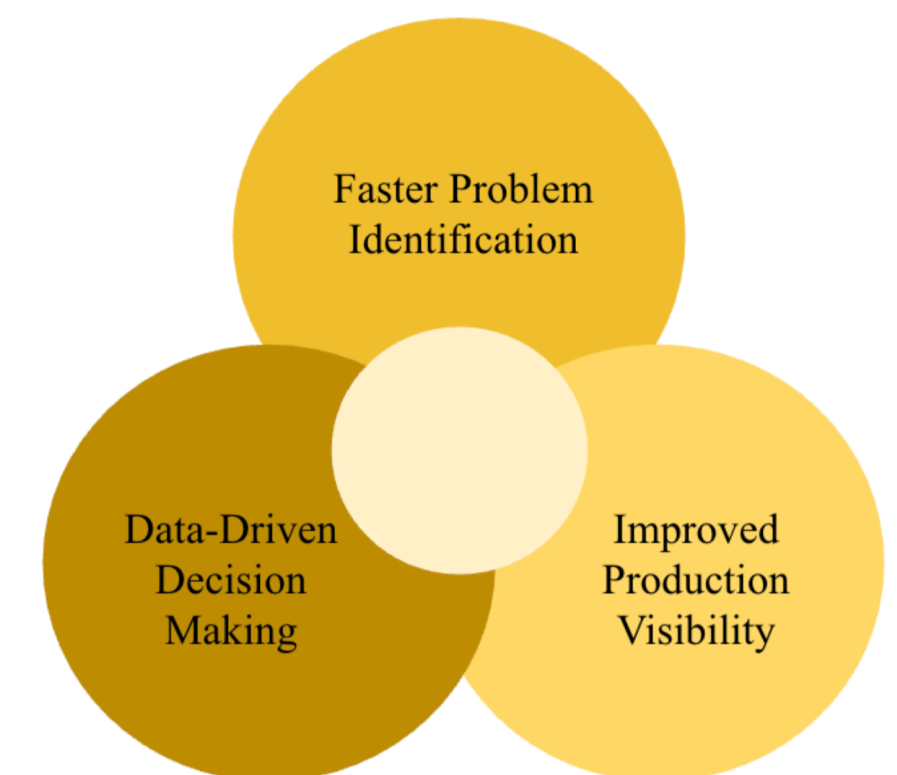
FUTURE GOALS

- Integrate real-time production data for up-to-date engine tracking
- Expand dashboard to cover all manufacturing lines at LEC
- Implement predictive models like neural networks to identify stages likely to cause delays
- Analyze user feedback to improve dashboard usability and features

CONCLUSIONS

- This project provides Caterpillar with a customized dashboard solution to track engine production efficiently.
- By visualizing engine movement and highlighting engines and stages with delays, employees can quickly identify where production is slowing down — reducing manual search time and improving overall process visibility.
- This tool enables faster decision-making and supports Caterpillar's goal of optimizing manufacturing operations.

Advantages



ACKNOWLEDGEMENTS

- We thank our corporate mentors Gregory Stambaugh and Andreas Lehmann, our TA Manasa Nagineni, as well as Kali Lacy, Maya Mishra, Jessica Elise Gerlach, and the rest of the Data Mine staff who supported this project.