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Establishing DT Information Requirements for Road Maintenance

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Background & Motivation

- Current workflows lack autonomy – Laborious
- Data Silos and Inconsistency – Inefficient
- Reactive Maintenance Practices – Unsafe

Digital Twins (DT) Technology holds huge potential for revamping road asset maintenance.
- No Defined set of requirements for generating a minimum viable DT.

Objectives

1. Map the current states of processes and identify specific challenges in road asset maintenance.
2. Develop a framework for the Digital Twin Information Requirements (IR) Model.
3. Define stages and influencing factors and determine the corresponding information requirements for each road asset.

Research Summary

- Developed a specific methodology for establishing information requirements.
- Defined a framework for the architecture of a highway DT based on the information Requirements.
- Established Overgrown Vegetation DT Information Requirements and demonstrated a use case on a real-world dataset using computer vision technology [1].
- Established Traffic Signs Data Requirements and used it to model the traffic signs for a submitted work.

Architecture of Highway Digital Twin
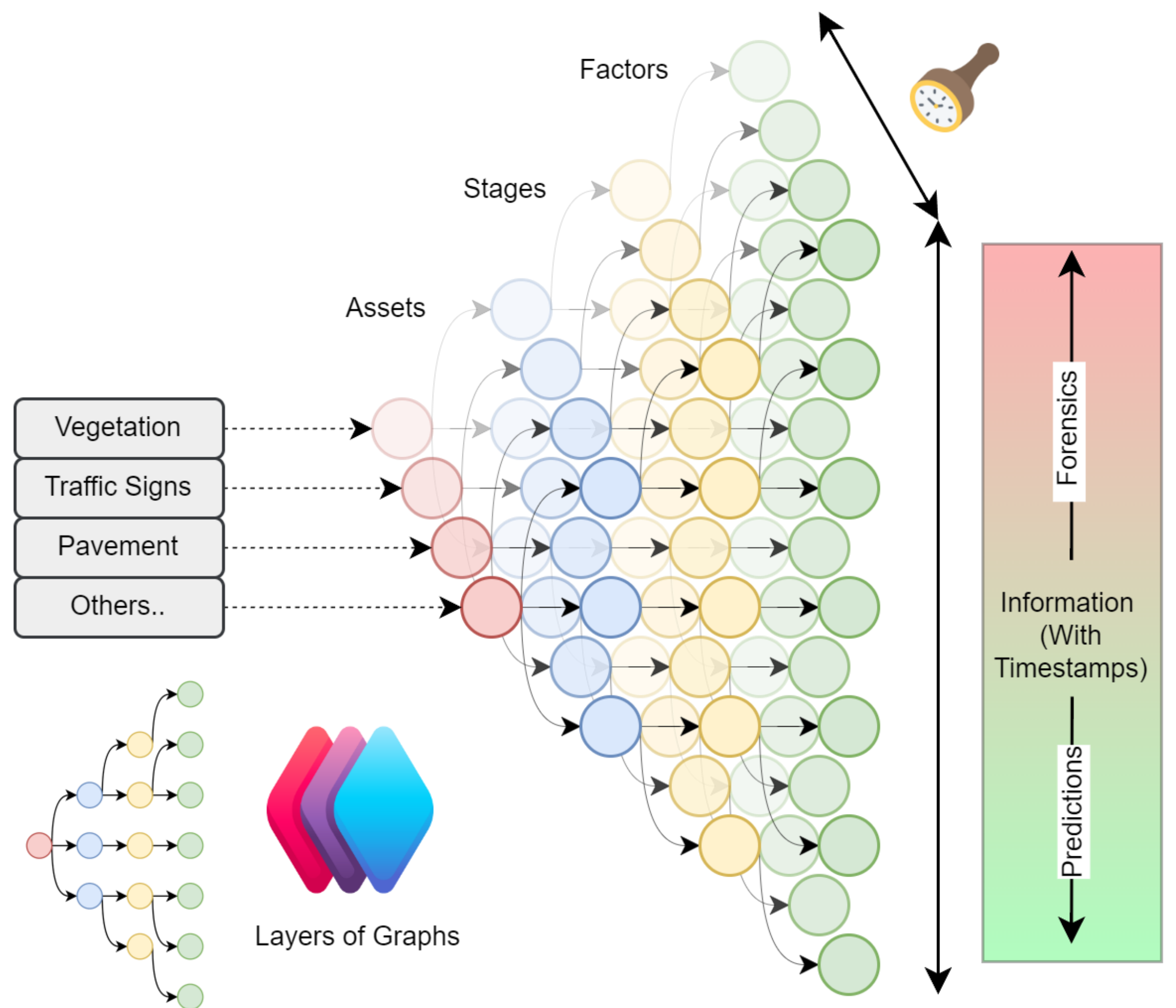
What next?

Establish IR for the following Assets:
1. Roadside Vegetation (Completed)
2. Traffic Signs (Completed)
3. Pavement (In Progress)
4. Road Markings
5. Road Lights
6. Drainage

Acknowledgements

References

1. **V.K. Reja**, D. Davletshina, M. Yin, R. Wei, Q. F. Adam, I. Brilakis, F. Perrotta, A Digital Twin Based Approach to Control Overgrowth of Roadside Vegetation, Proceedings of the 41st International Symposium on Automation and Robotics in Construction (ISARC 2024), 3-5 June 2024, Lille, France.