We demonstrate **XAI**'s role in revealing unknown relationships in video data and enhancing **Perovskite Solar Cell** quality.

Understanding Scalable Perovskite Solar Cell Manufacturing with Explainable AI

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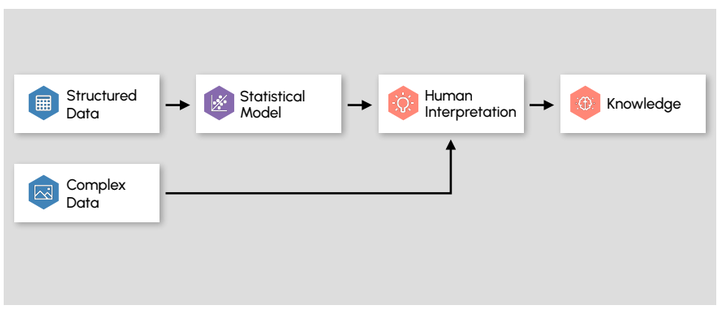
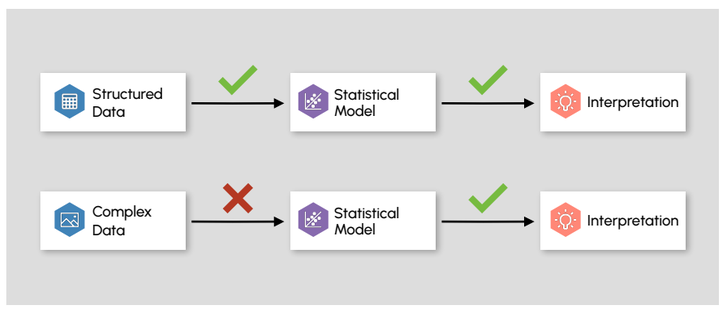
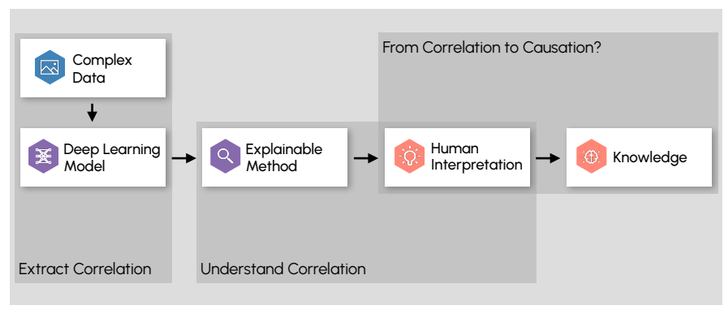
Methodology & Motivation



1. Knowledge discovery traditionally done via trial-and-error approaches and statistical models.



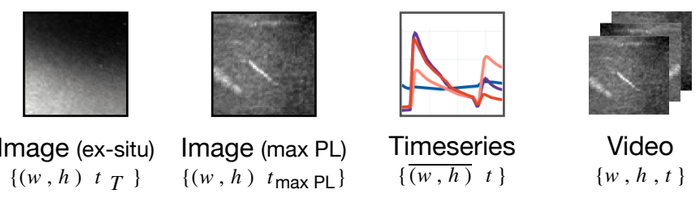
2. Statistical models are interpretable models, but fail to model more complex data such as images or videos.



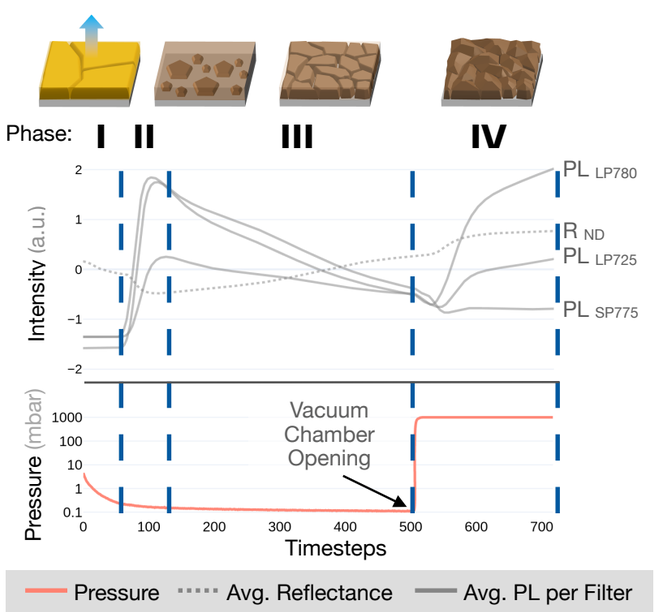
3. Solution: Using deep learning and XAI to extract and understand relationships from complex data.

Data

Data Representations

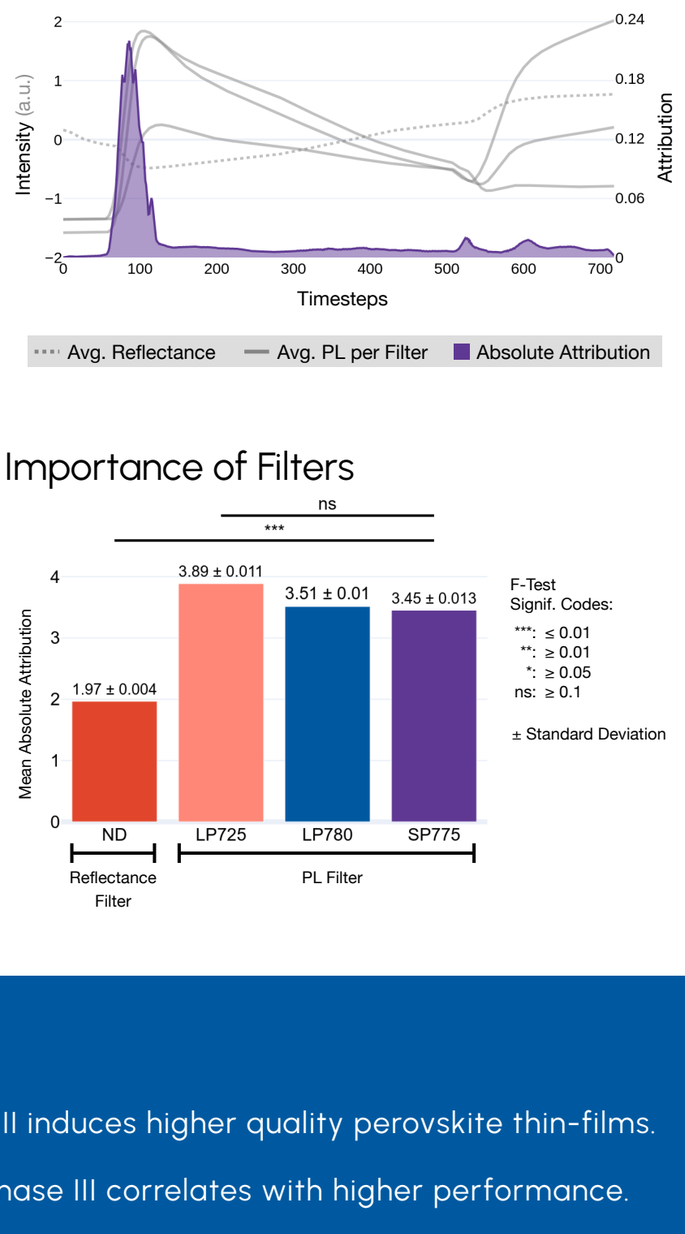


Phases of thin-film Formation



What is important?

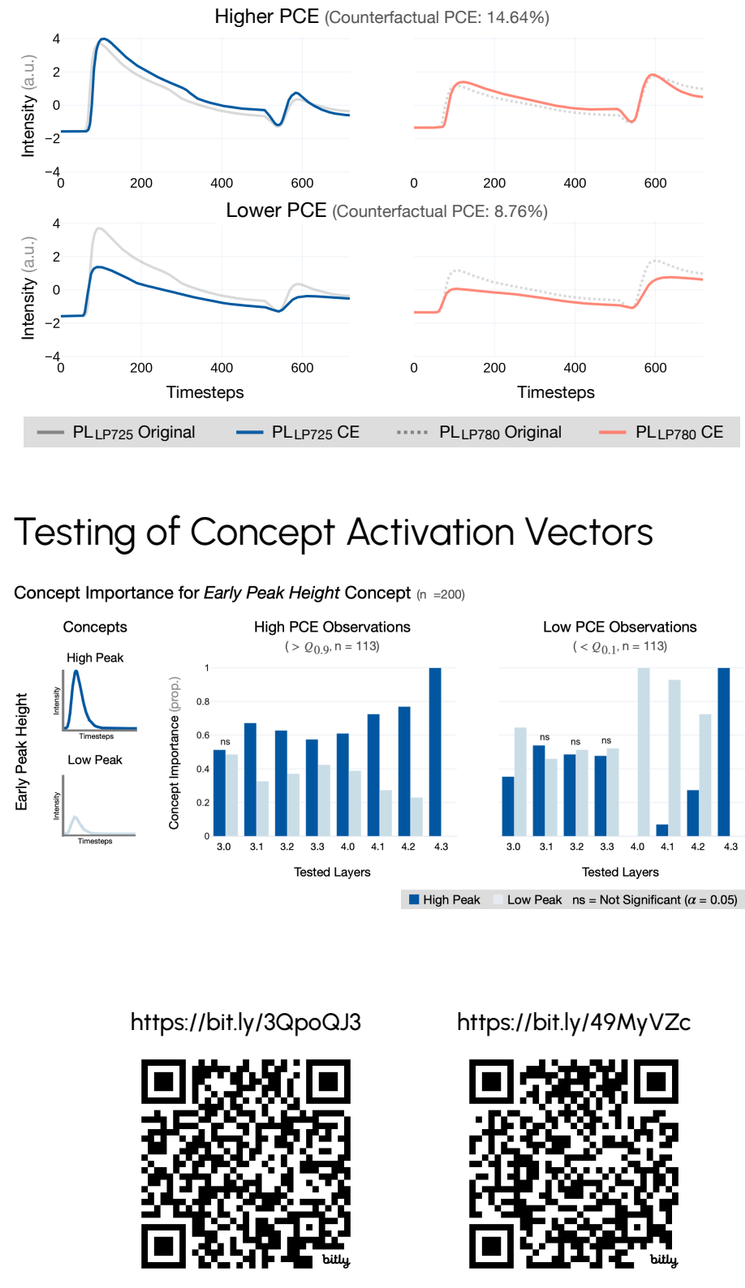
Importance of Timesteps



Importance of Filters

Why is it important?

Counterfactual Examples



Testing of Concept Activation Vectors

Discovered Knowledge

- High photoluminescence (PL) intensity at Phase II induces higher quality perovskite thin-films.
- Fast superlinear decay of the PL signal during Phase III correlates with higher performance.
- High PL intensity at the start of Phase IV induces thick and rough perovskite thin-films.

https://bit.ly/3QpoQJ3

Paper

https://bit.ly/49MyVZc

Code