

**CPS:Medium:Safe Learning-Enabled Cyberphysical Systems, CNS-2038493, October 2020**

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**Challenge:**

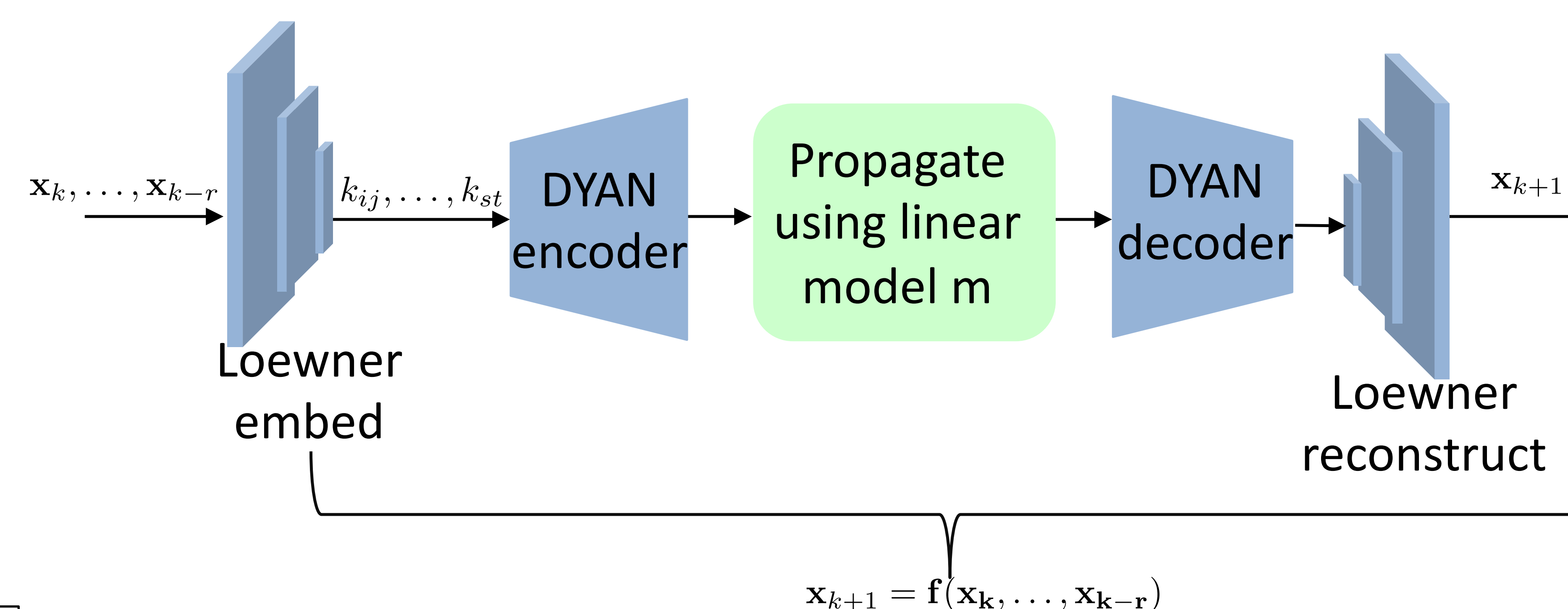
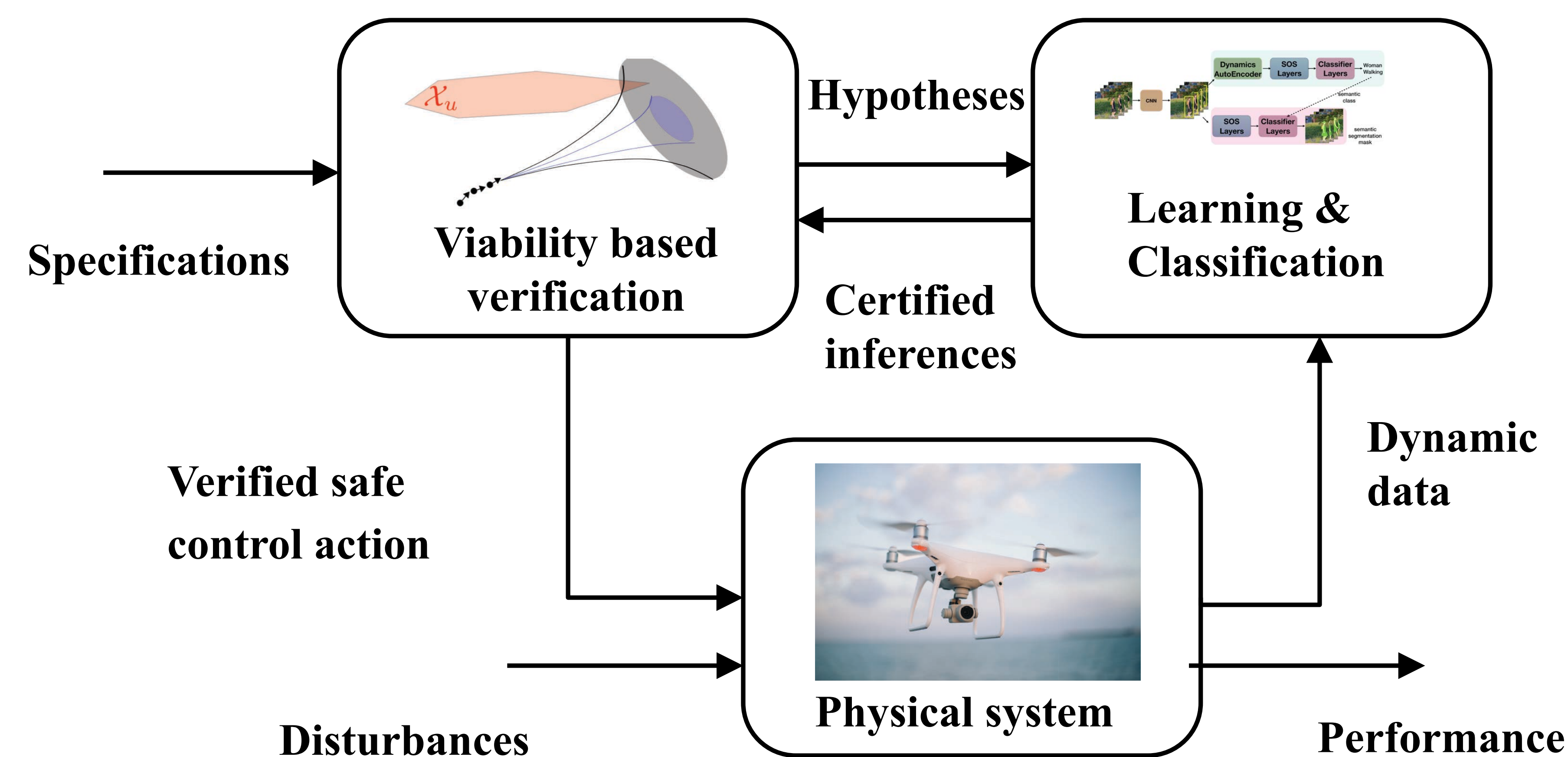
- Design CPS capable of safe operation in previously unseen scenarios.

**Barriers:**

- Lack of training data (single execution).
- Learning while acting.

**Solution:**

- A density based “guard”.
- A new learning architecture motivated by Koopman operators.
- Supported by new sparse SDP algorithms.



**Scientific Impact:**

- Rapprochement of Systems Theory, ML and Viability.
- Efficient extraction of actionable information from large data sets.
- Frugal, explainable, learning architectures.

**Broader Impact:**

- Enhanced, certified safe systems that can operate in close proximity to humans.
- Applications: health care, infrastructure monitoring, public space safety.
- Education and Outreach: through NEU UPLIFT program: so far two undergrads involved.