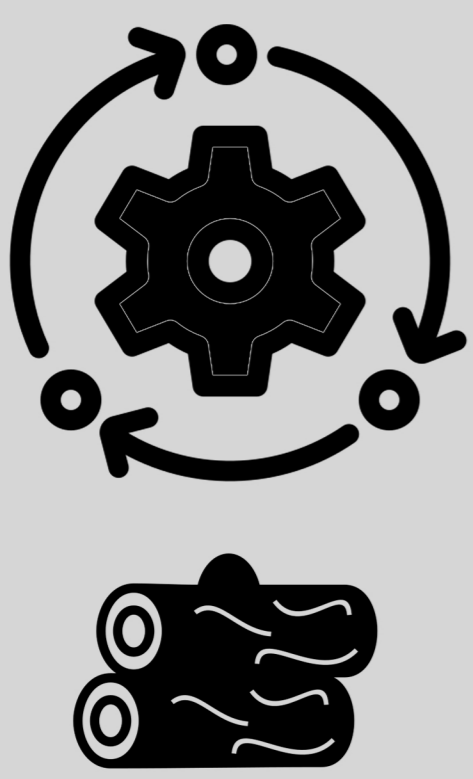# AISA

Artificial intelligence software academy
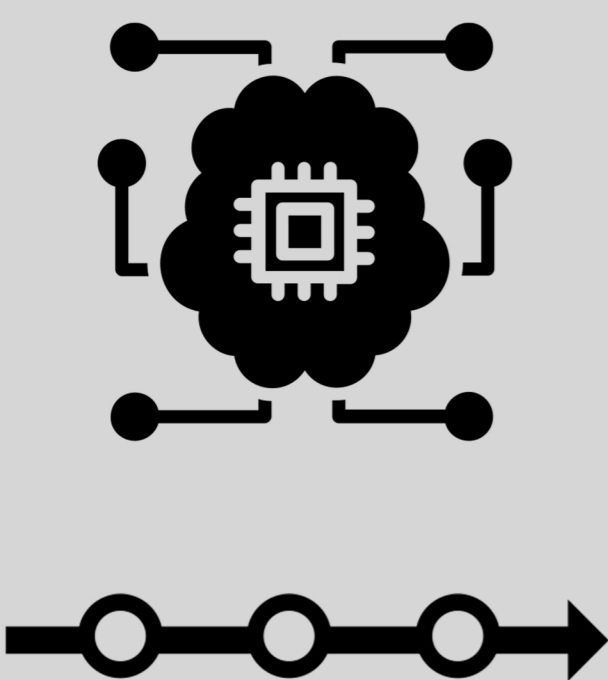
Motivation

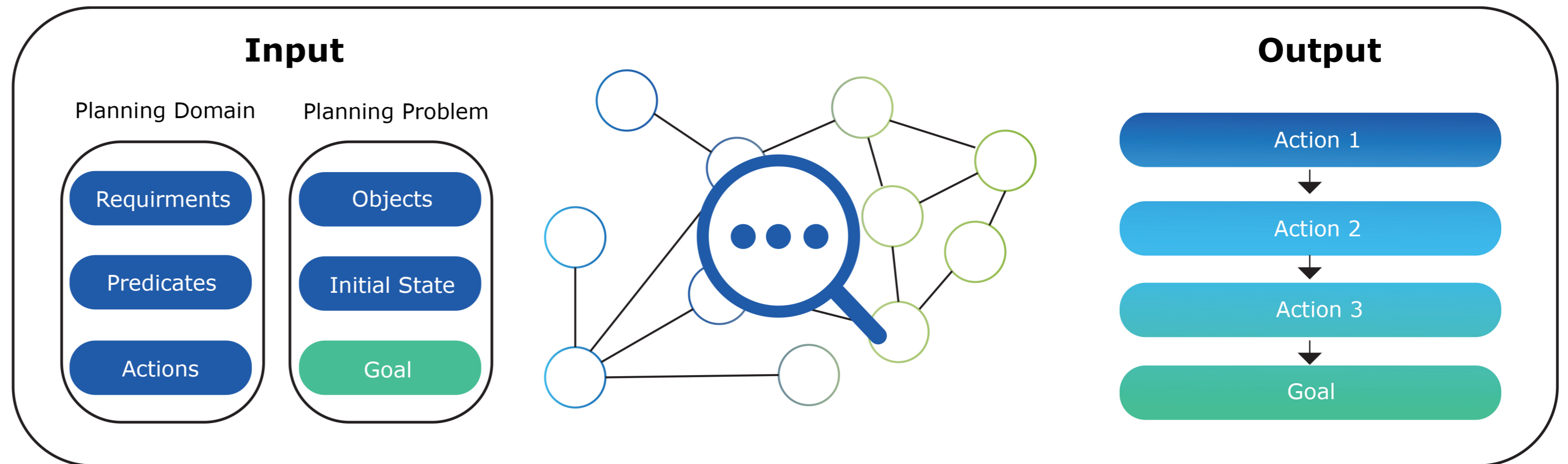Construction industry is responsible for 40% of the total CO_2 emissions

Problem

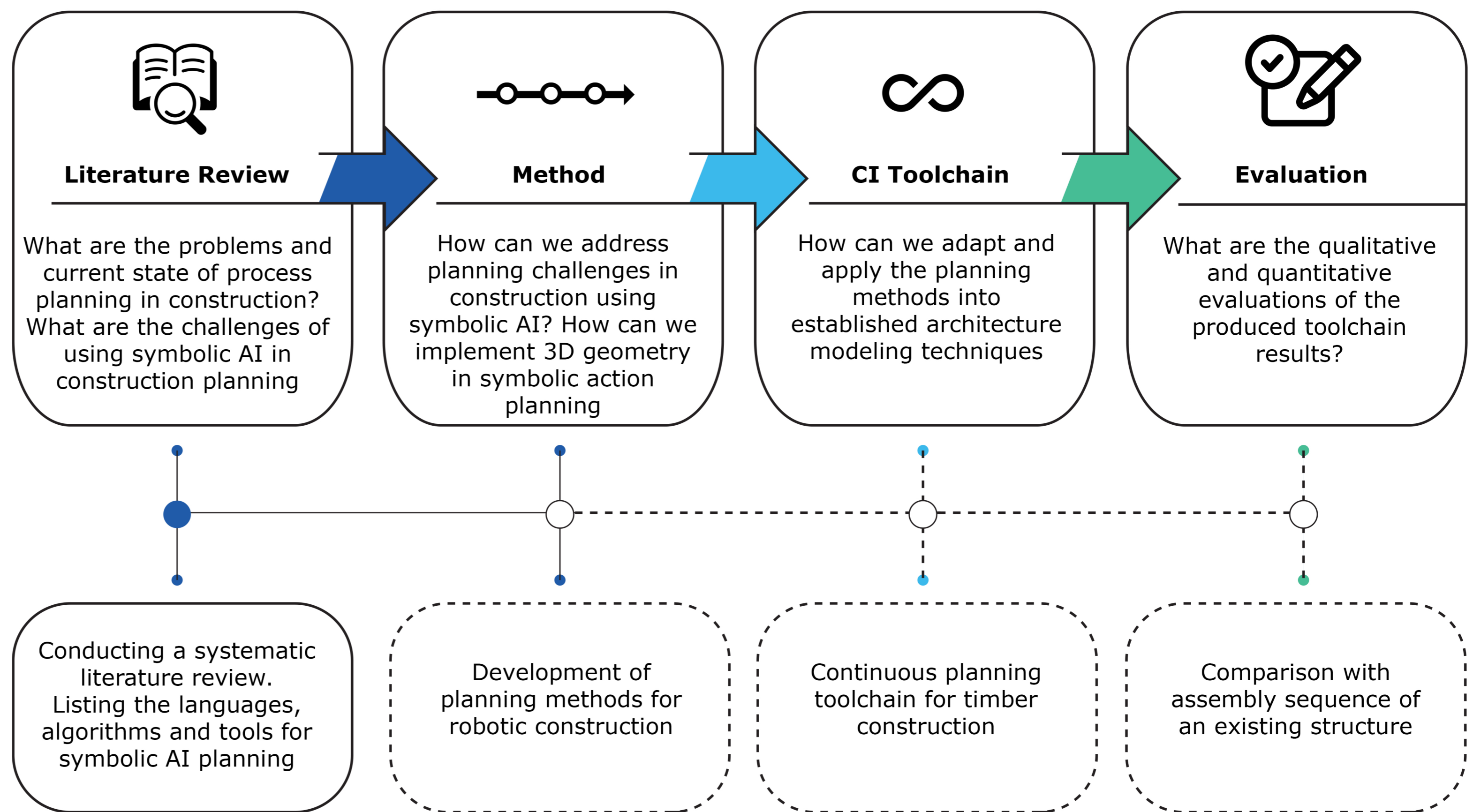Planning robotic assembly for timber buildings construction

Methodology

Using symbolic AI planning techniques for construction process planning

AI-Based Sustainable Timber Construction Process Planning

Team: **Tenure-Track Prof. Andreas Wortmann**
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Shermin Sherkat (ICD/ISW)

Tenure-Track Prof. Thomas Wortmann
Chair for Computing in Architecture,
Institute for Computational Design and
Construction (ICD), University of Stuttgart

■ Symbolic AI and AI planner

Question → Knowledge base → **Inference engine** (Search | Reasoning) → Answer

Input

Planning Domain
- Requirments
- Predicates
- Actions

Planning Problem
- Objects
- Initial State
- Goal

Output
- Action 1
- Action 2
- Action 3
- Goal

■ Research questions and current state

Literature Review
What are the problems and current state of process planning in construction? What are the challenges of using symbolic AI in construction planning

Method
How can we address planning challenges in construction using symbolic AI? How can we implement 3D geometry in symbolic action planning

CI Toolchain
How can we adapt and apply the planning methods into established architecture modeling techniques

Evaluation
What are the qualitative and quantitative evaluations of the produced toolchain results?

Conducting a systematic literature review. Listing the languages, algorithms and tools for symbolic AI planning

Development of planning methods for robotic construction

Continuous planning toolchain for timber construction

Comparison with assembly sequence of an existing structure

■ Expected outcome