Model-driven engineering to the rescue

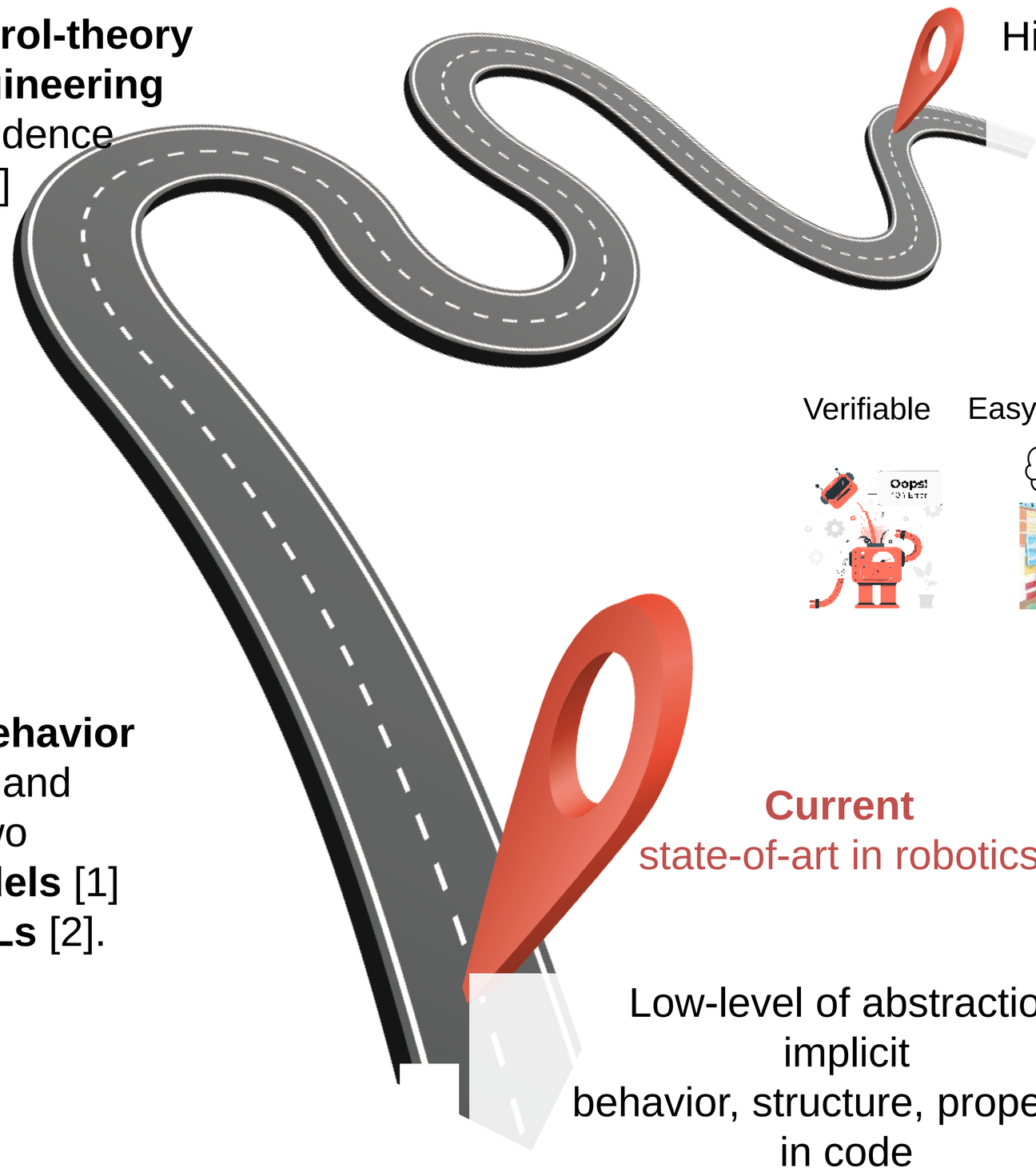
A tale on adoption of software practices in robotics

What have we done to **support MDE** in **robotics**?

Create **mapping** between **control-theory properties** and **software engineering properties** to reaffirm confidence of system behavior [4]

Build knowledge about the needed **characteristics** of a light-weight **support tool for structural Model** [3]

Build knowledge about **behavior tree DSLs** in practice and compare them to two **standardized UML models** [1] and **state machine DSLs** [2].



Future
robotics using MDE

High-level of abstraction
explicit
behavior models,
structure models,
properties

Why?

Verifiable

Easy to communicate

Reusable

Current
state-of-art in robotics

Low-level of abstraction
implicit
behavior, structure, properties
in code

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Publications:

[1]. Ghzouli, Razan, et al. "Behavior trees in action: a study of robotics applications." ACM SIGPLAN International Conference on Software Language Engineering, 2020.

[2]. Ghzouli, Razan, et al. "Behavior Trees and State Machines in Robotics Applications" (under review) IEEE Transactions on Software Engineering, 2022.

[3]. Bergel, Alexandre, et al. "Featurevista: Interactive feature visualization." ACM International Systems and Software Product Line, 2021.

[4]. Caldas, Ricardo, et al. "Towards Mapping Control Theory and Software Engineering Properties using Specification Patterns." 2021 IEEE International Conference on Autonomic Computing and Self-Organizing Systems Companion, 2021.

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