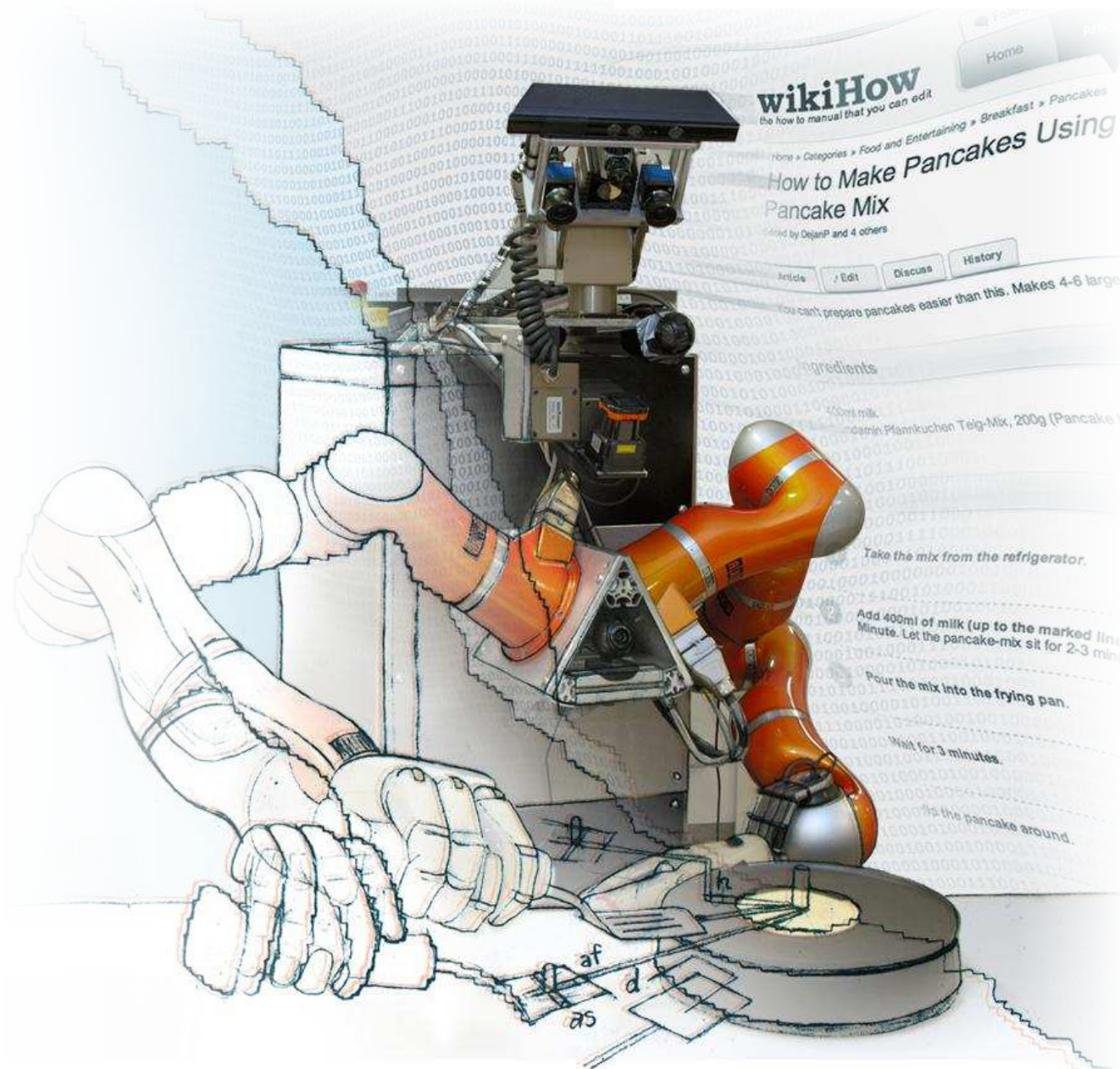


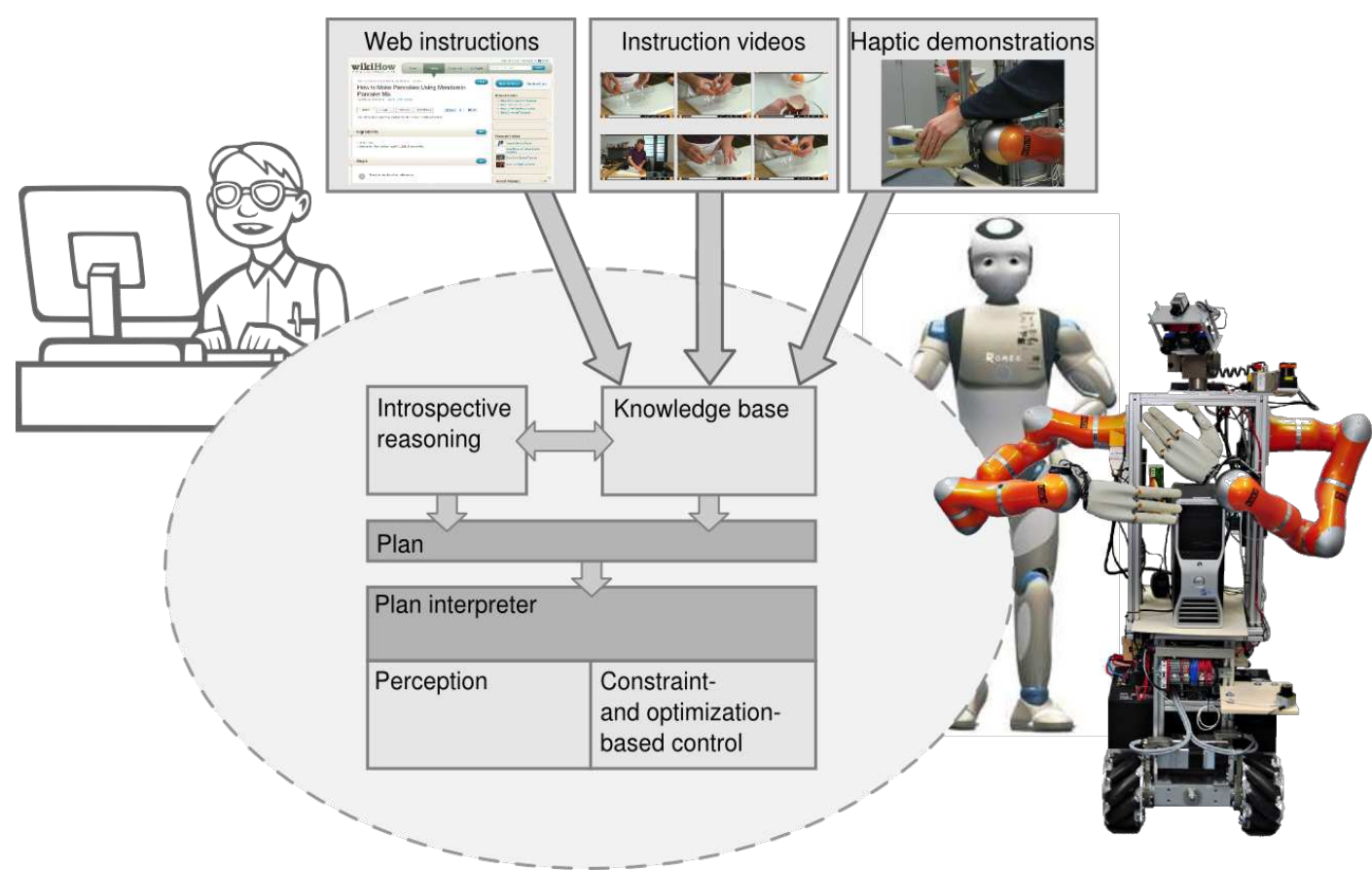
RoboHow aims at enabling robots to competently perform human-scale everyday manipulation activities in human working and living environments.

In order to achieve this goal, RoboHow pursues a knowledge-enabled and plan-based approach to robot programming and control.

The vision of the project is that of a cognitive robot that autonomously performs complex everyday manipulation tasks and extends its repertoire of such by acquiring new skills using web-enabled and experience-based learning as well as by observing humans.

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Approach

RoboHow will investigate a knowledge-enabled and plan-based approach to robot programming and control.

Knowledge for accomplishing everyday manipulation tasks is semi-automatically acquired from instructions in the World Wide Web, by visual observation of human demonstrations, and from haptic demonstrations.

The project will develop methods for constraint- and optimization-based movement specification and execution that will build a sustainable bridge between symbolic high-level control and the continuous time and space of the robots' motion and perception.

Scenarios

RoboHow will focus on two application scenarios for evaluation: Everyday manipulation for meal preparation, and a humanoid robot providing daily office service.

Cooking is one of the typical daily household activities where robots can assist people by fetching the needed items and by performing basic cooking routines that have been learned by combining web instructions with video-based observations.

For office services like cleaning a coffee machine or reloading the paper tray of a printer, a robot can make use of manuals available on the web and exploit the descriptions using the RoboHow programming methodology.

Contributions

RoboHow will establish the scientific foundations of a novel approach to programming cognition-enabled autonomous service robots that are to perform complex manipulation tasks under "open-world" conditions.

The main contributions will be techniques for translating instructions and observed activities into robot plans, imitation-based learning of competent routines for everyday manipulation activities, perception routines for observing human activities and for performing robot manipulation tasks, plan languages for specifying flexible behaviour, and constraint- and optimization-based movement specification and execution.