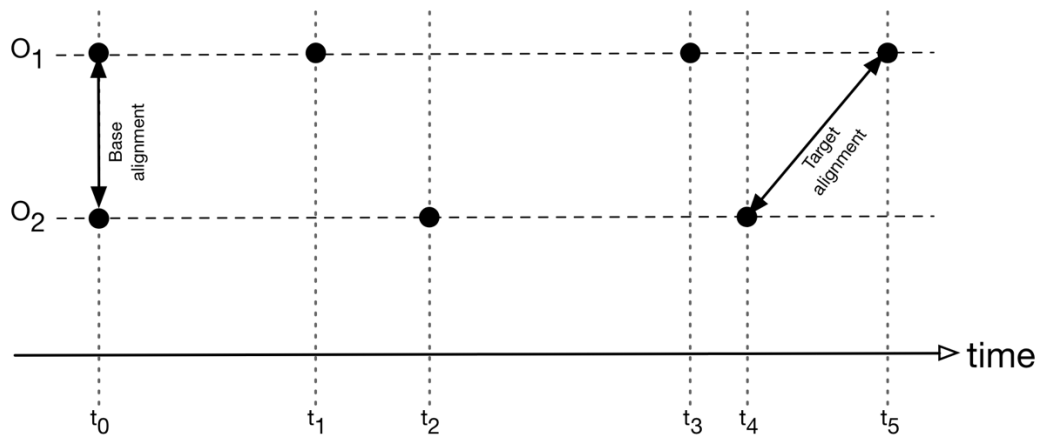


**Project title:** Methods of managing the evolution of ontology.

In recent years, ontologies have become a convenient and flexible structure for processing knowledge in computer systems. They have found a wide range of applications: from weather forecasting models to knowledge management systems. The ontologies can be treated as a tool for decomposing a modeled fragment of reality (also referred to as a universe of discourse). This decomposition contains a description of elementary objects, their intrinsic qualities, and the relationships between them. These objects are a convenient tool for creating abstract classifications of real objects. Such an approach, in addition to the obvious advantages, also creates the problem of heterogeneity of ontologies. Unfortunately, there are no formal methods that guarantee consistency between two independent ontologies, either at the level of their definition or their contents. The above issues also entail the need of updating ontologies over time due to changing requirements or new knowledge that must be included within ontologies.

The main objective of the project is therefore developing a coherent methodology to track changes made to ontologies maintained under the knowledge management system. These modifications are forced by a new knowledge required for introduction to the ontology. Therefore, the question arises whether the existing mappings between two evolving ontologies are still valid and if not, is it necessary to restart the ontology mapping procedure on whole ontologies or only on the selected fragments that have been modified? This is illustrated on the diagram below:



The expected result will be a theoretical model that will allow effective tracking of changes in ontologies (so called ontology logs that allow to express all the changes introduced to the evolving ontologies along with their timetable). Another result of the research will be a set of heuristic rules describing changes made to ontologies at all levels of abstractions and granularity (namely level of attributes, classes, relationships, and instances). Additionally, a set of criteria for detecting the need for updating ontology mappings and the algorithm for such update will be developed.

The developed solutions will primarily focus on the methods of applying ontology in real applications as opposed to solutions known from literature that focus on fulfilling only benchmarks using raw experimental data without any reference to practical requirements.