

Task-modelling and task-based benchmarking tools

Overview

A set of tools for working with task models of media production processes and deriving business processes, as well as tools for benchmarking results of media analysis components. The available tools consist of conversion and transformation tool and a differencing tool for time-based metadata, all available as open source software, and a benchmarking service, integrating several of these components as well as the cost simulation tools described in Section 0.

In depth description

Task-modelling

In TOSCA-MP tasks in media production processes are modelled using ConcurTaskTrees (CTT). There exists a free editor for CTT models⁶. The basic structure of the model is a tree representing the breakdown of tasks into subtasks. On each level, temporal dependencies between subtasks (e.g., serial or parallel) can be modelled. The model has been extended over time and is probably the most commonly used of all task metamodelling. A task model covering the role of each actor has been defined, and cross-links (e.g., information exchange, interactions) between tasks from different roles have been described. An example of a task model is shown in Figure 7.

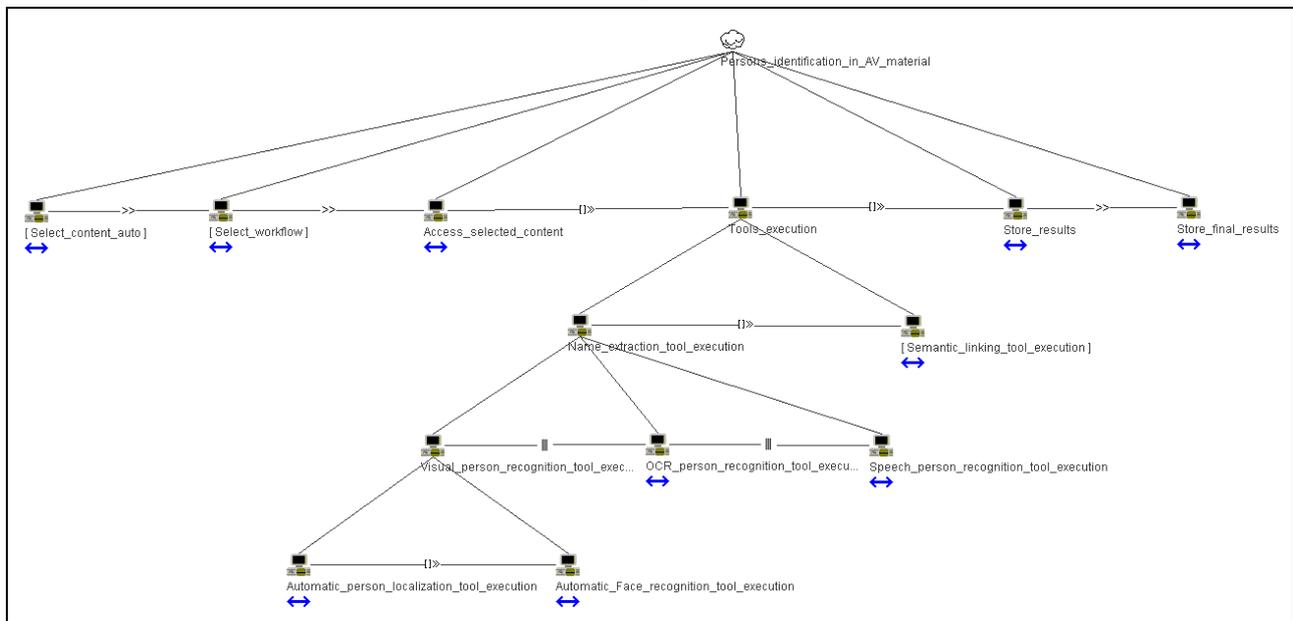


Figure 7. Task model for multimodal person recognition in video.

For execution in the Metadata Production Management Framework (MPMF) it is necessary to derive executable business processes from task models. These business processes are represented using BPMN⁷

The task models created in CTTE can be exported in an XML representation of CTT. We have developed an automatic conversion of task models from this XML representation to business processes represented in BPMN 2.0 format. The conversion has been implemented as an Extensible Stylesheet Language Transformations (XSLT). The resulting BPMN file serves as a starting point for the process definition in the MPMF. It is available at <http://tosca-mp.eu/publications/software/>.

Task-based benchmarking

TOSCA-MP has developed an approach for benchmarking content analysis tools in their task context. Figure 8 shows the entire benchmarking workflow.

⁶ <http://giove.isti.cnr.it/tools/CTTE>

⁷ <http://www.omg.org/spec/BPMN/2.0/>

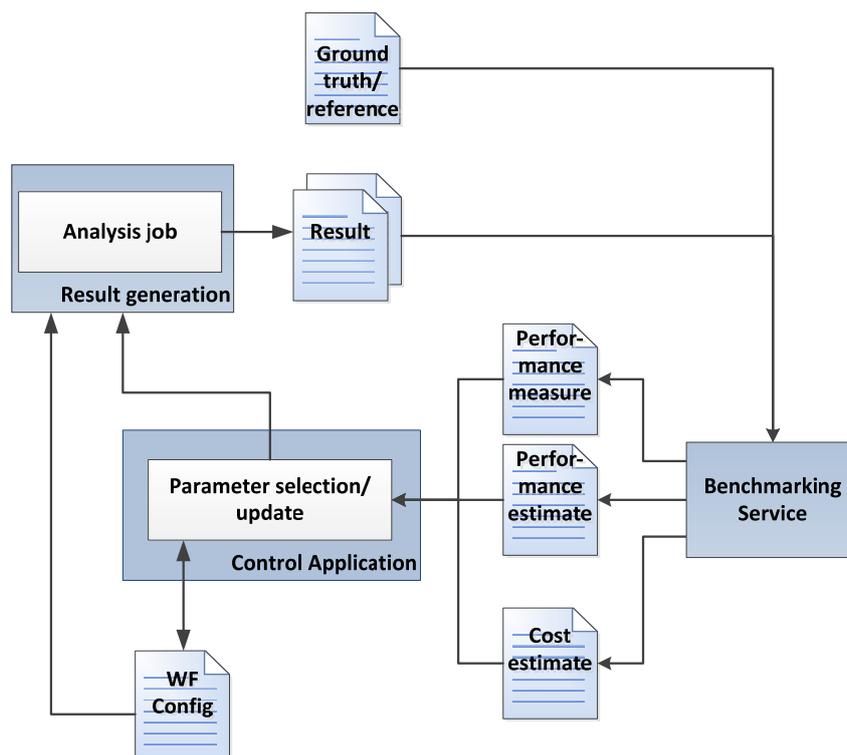


Figure 8: Benchmarking workflow.

The main functionalities are included in the benchmarking service:

- Determine differences between metadata documents. For this purpose, a differencing tool for time-based metadata called TAME-Diff and some conversion scripts for XML differencing tools are provided as open source software at <http://tosca-mp.eu/publications/software/>
- Estimate model parameters for prediction, using Bayesian networks as a model.
- Perform cost estimation (integrating the tools described in Section 0).

The functionalities around are provided by the Metadata Production Management Framework (MPMF) and the Control and Configuration UI.

Potential fields of Application

The CTT to BPMN converter can be applied in any application that involves model-based design (using a standard that has now also been adopted by the W3C for model-based UI design) and business process modelling. With the increasing use of service oriented architectures and interactive web-based applications this is a wide application area.

TAME-Diff can be applied for determining edit differences of any type of time-based metadata. Currently it processes MPEG-7 AVDP documents, but the implementation is general enough to exchange the parser with one for another format.

Possibilities for exploitation

The open source tools are published under LGPL, i.e., they can also be used in commercial applications without the need to publish any source code of the components using them.

The functionalities of the benchmarking service can serve as a basis for implementing such functionality in other applications, and will likely need to be adapted to metadata types and formats.

Further Information

Further technical information is available in TOSCA-MP public Deliverable D4.5 “Final version of benchmarking methods”.

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