

Ontology-based data integration in a distributed context of coalition air missions

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Abstract. The IBC (Knowledge Base Integration) project addresses an issue of ontology-based data integration. It aims at combining data residing in different actors (aircraft, drone, satellite...) during an air mission scenario and providing users with a unified view of all available data, in a communication constrained environment. We describe the solution we have implemented based on mediation. We use rule languages to process queries using an OWL2 domain ontology and RDF triples to store data. We also give a performance analysis of our prototype.

1 Introduction

Within the MMT (Man Machine Teaming¹) program launched by DGA (Direction Générale de l'Armement) and animated by Dassault Aviation and Thales, the IBC (Knowledge Base Integration) project is part of the "Virtual Assistant and Smart Cockpit" axis and focuses on the management of multiple knowledge and databases in a non-centralized environment. The study is about accessing and exploiting data from distributed platforms during coalition air operations. In the field of ontology-based data access (OBDA), this is the issue of ontological mediated query answering (OMQA) Bienvenu et al. (2020) in a distributed context, i.e. how to obtain answers to a query built using many data sources through the use of an ontology in a distributed environment. In the military air mission context, user queries are asked by actors involved in an air mission (fighter jets, drones, satellites, ...). Each actor can be viewed as a data source. The system must face the constraints of being able to generate real time answers to queries, with possible communication interruptions (either voluntarily or involuntarily) and limited storage capacities. In this paper, we propose a solution, its theoretical principle and its implementation.

In section 2, we present the architecture, followed by its components in section 3. Sections 4 and 5 give insights on performances and related works. We then conclude.

1. Cf. <https://man-machine-teaming.com>