Towards Reproducible Science: A Few Building Blocks from my Personal Experience

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Abstract

It is well understood that achieving Reproducible Science across all scientific disciplines is an extremely ambitious goal that will be really difficult to achieve. However, as far as it could be, there are many small steps that can be taken towards improving our way of doing, communicating and advancing Science, by making the experiments that we describe in our scientific papers easier to reproduce.

In this talk, I will talk about some of the efforts that we have been working on in the context of our research group, focused on achieving a more Reproducible Science.

First, our work on ontologies for the representation of wetlab laboratory protocols (for plant genomics). We have been working for a few years on analysing manually papers describing laboratory protocols, deriving a representation for them, understanding how Instruments, Reagents, Outputs, etc., have to be identified and annotated, and working on an annotation tool for those creating lab protocols. Finally, we are now in the process of publishing this laboratory protocols as Linked Data. All this work is also related to other works that we have been doing in the past in collaboration with other institutions for the description of research objects and for the description of scientific in-silico workflows.

Second, the work that we are doing in the context of the STARS4ALL EU project, where we are trying to provide support to the research (and activists) community working on light pollution and the negative effects of artificial light at night. More specifically, we are working on making research data available as open data, including the deployment of a research data hub for the community, as well as creating ontologies that can be used by public institutions in order to release data about public lighting.

Finally, I will discuss on what I believe that is still needed in order to achieve the broader goal of Reproducible Science and will open a discussion on the current barriers to achieve this goal.

Biography

Oscar Corcho is Full Professor at Departamento de Inteligencia Artificial (Facultad de Informtica , Universidad Politcnica de Madrid), and he belongs to the Ontology Engineering Group.

His research activities are focused on Semantic e-Science and Real World Internet, although he also works in the more general areas of Semantic Web and Ontological Engineering. In these areas, he has participated in a number of EU projects (DrInventor, Wf4Ever, PlanetData, SemsorGrid4Env, ADMIRE, OntoGrid, Esperonto, Knowledge Web and OntoWeb), and Spanish R&D projects (CENITS mIO!, Espaa Virtual and Buscamedia, myBigData, GeoBuddies), and has also participated in privately-funded projects like ICPS (International Classification of Patient Safety), funded by the World Health Organisation, and HALO, funded by Vulcan Inc.

Previously, he worked as a Marie Curie research fellow at the University of Manchester, and was a research manager at iSOCO. He holds a degree in Computer Science, an MSc in Software Engineering and a PhD in Computational Science and Artificial Intelligence from UPM. He was awarded the Third National Award by the Spanish Ministry of Education in 2001.

He has published several books, from which Ontological Engineering can be highlighted as it is being used as a reference book in a good number of university lectures worldwide, and more than 100 papers in journals, conferences and workshops. He usually participates in the organisation or in the programme committees of relevant international conferences and workshops.