Research plan for 2014

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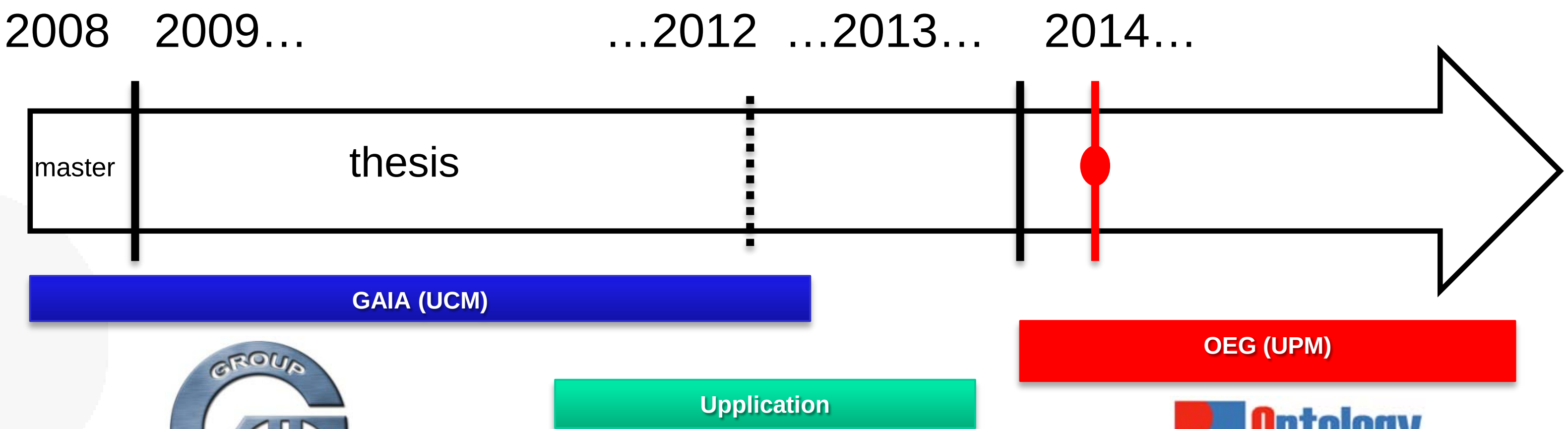
Outline

- Background
  - The PhD
- My current activities
  - What have I done so far?
  - Next steps

The PhD…

Background

Timeline


2008
2009…
…2012
…2013…
2014…
master
thesis
GAIA (UCM)
Upplication
OEG (UPM)

My Thesis

"Estrategias de recomendación basadas en conocimiento para la localización personalizada de recursos en repositorios educativos"

- Supervisors

  Mercedes Gómez Albarrán & Guillermo Jiménez Díaz

🗎 PDF http://bit.ly/1pyKmaH

🗐 slides http://slidesha.re/1mLldrP

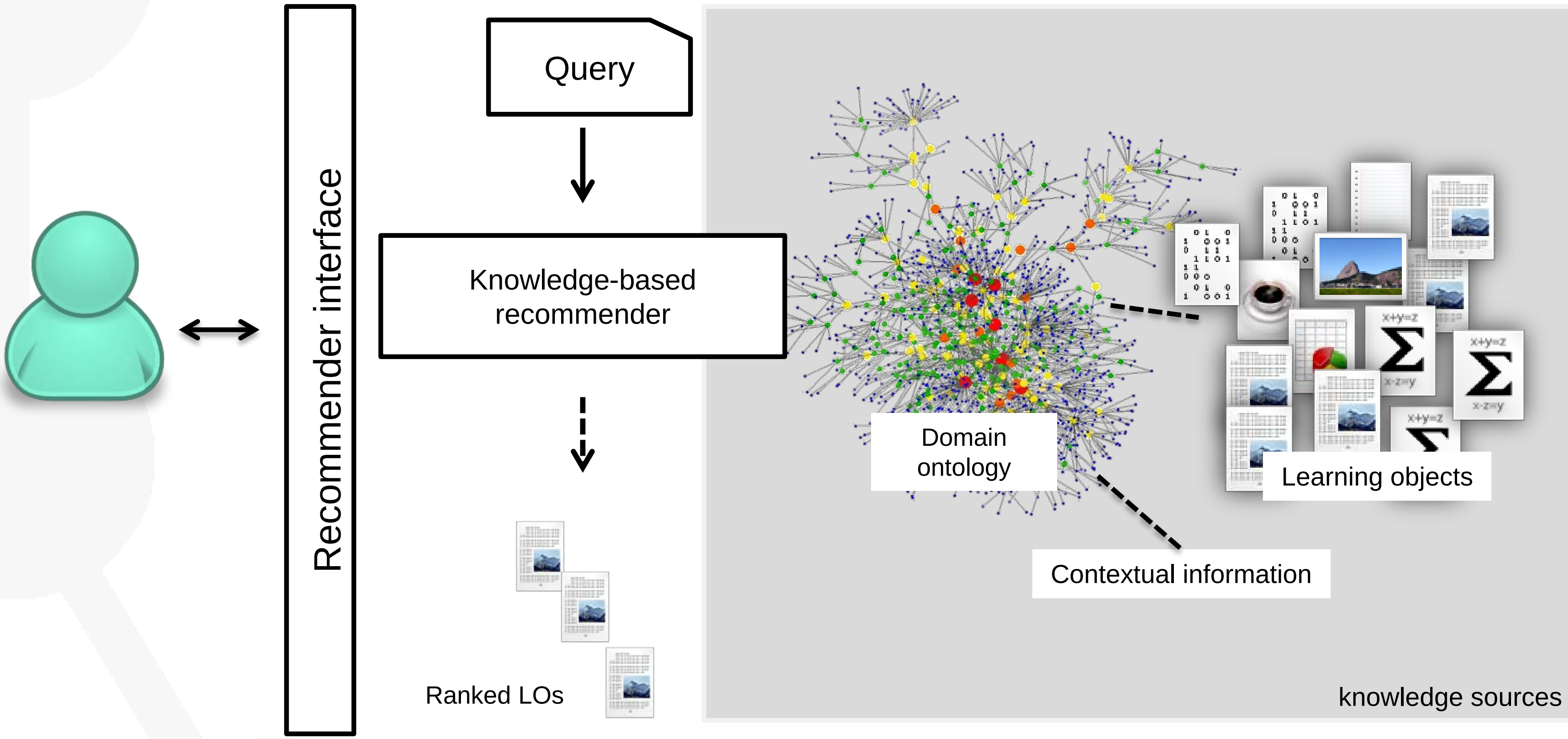
- Open Educational Repositories (OERs)
  - Information overload
    - Educational resources adapted to the student's learning needs
    - A restricted number of Learning Objects (LOs) and diversity in the proposals
    - Reduce the amount of effort
- Challenge
  - Provide smart support for accessing to the LOs that are in repositories

Main goal

- A knowledge-based recommendation strategy that enhances a user's OER repository search experience
  - Context-aware
  - Diversity in the recommendation
  - Proactive interaction

- Three alternative knowledge-based strategies
  a) Personalization
  b) Overspecialization (or lack of diversity)
  c) Facilities in the user interaction

LORecommender



LORecommender framework

- Framework for the rapid prototyping of knowledge-based recommender systems

  http://bit.ly/1dRfoZs

  - Recommendation scheme of five stages
  - Configure and adapt each stage to build different recommenders

The Post-doc

My current activities

- Dr Inventor Project
  - http://drinventor.eu/

  - Promote scientific creativity by utilising web-based research objects
  - A personal research assistant will provide hints to researchers
  - Applied to the Computer Graphics domain

Consortium

Name	Country
UNIVERSITY OF BEDFORDSHIRE (Coordinator)	United Kingdom
UNIVERSITAT POMPEU FABRA	Spain
UNIVERSIDAD POLITECNICA DE MADRID	Spain
NATIONAL UNIVERSITY OF IRELAND MAYNOOTH	Ireland
BOURNEMOUTH UNIVERSITY	United Kingdom
ANSMART LTD	United Kingdom
IMAGEMETRY S.R.O.	Czech Republic
INTELLIXIR SARL	France

Role of the OEG

- Semantic Technologies for Exploring Research Objects
  - Build a repository for indexed ROSs
  - Provide techniques for ontology learning
  - Provide techniques for ontology matching
  - Provide mechanisms for personalised recommendation of research objects

What have I done so far?

- Provide support on the final selection of the scientific discourse ontologies to be used for annotation

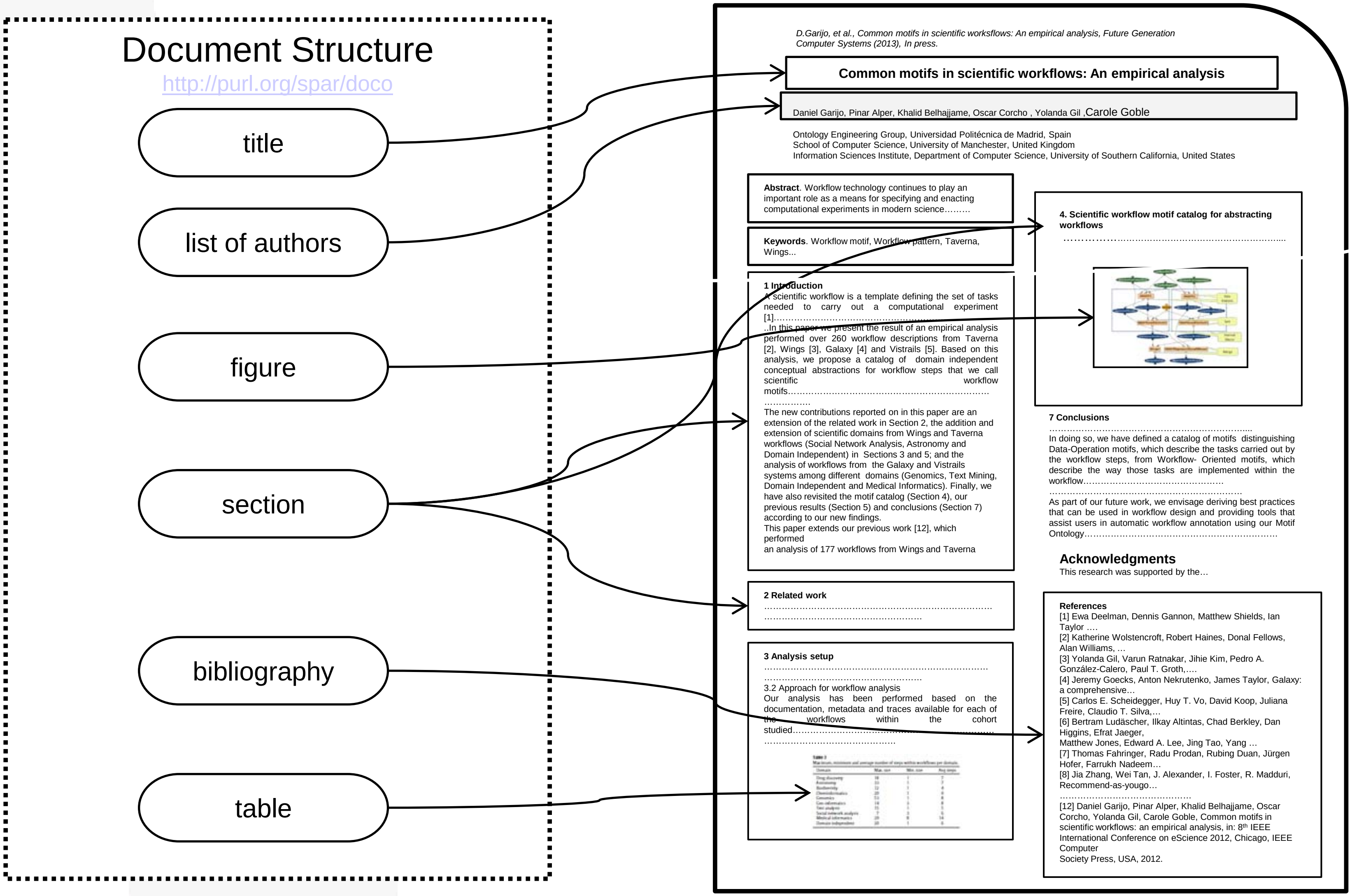
- “A review of ontologies for describing scholarly and scientific documents”, submitted to SePublica 2014

- A first version of the ontology for describing the scientific discourse
  - http://purl.org/drinventor/sci-doc

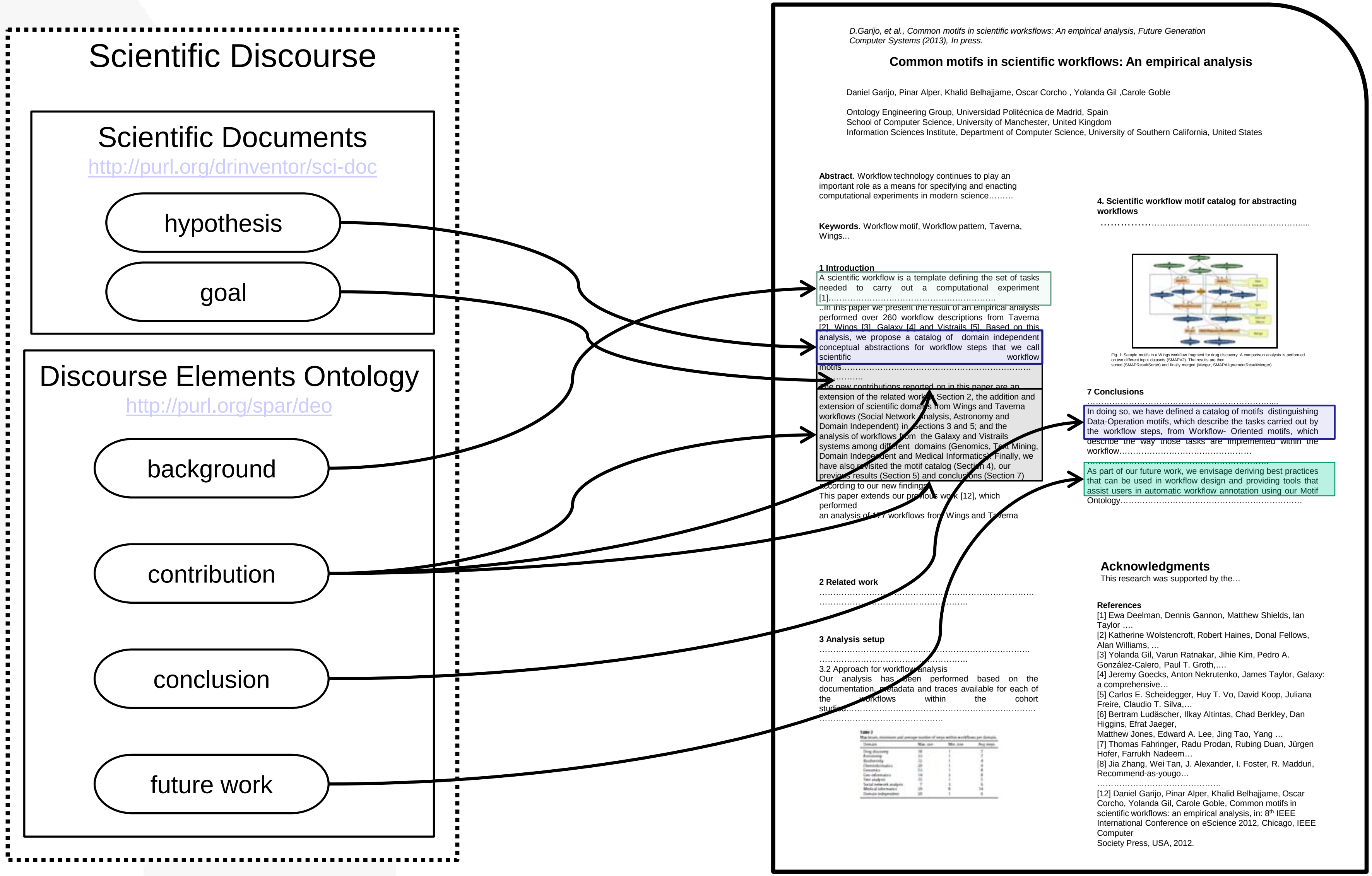
Ontologies for describing documents

- Document structure
- Rhetorical elements
    - Scientific discourse
- Bibliographies and citations

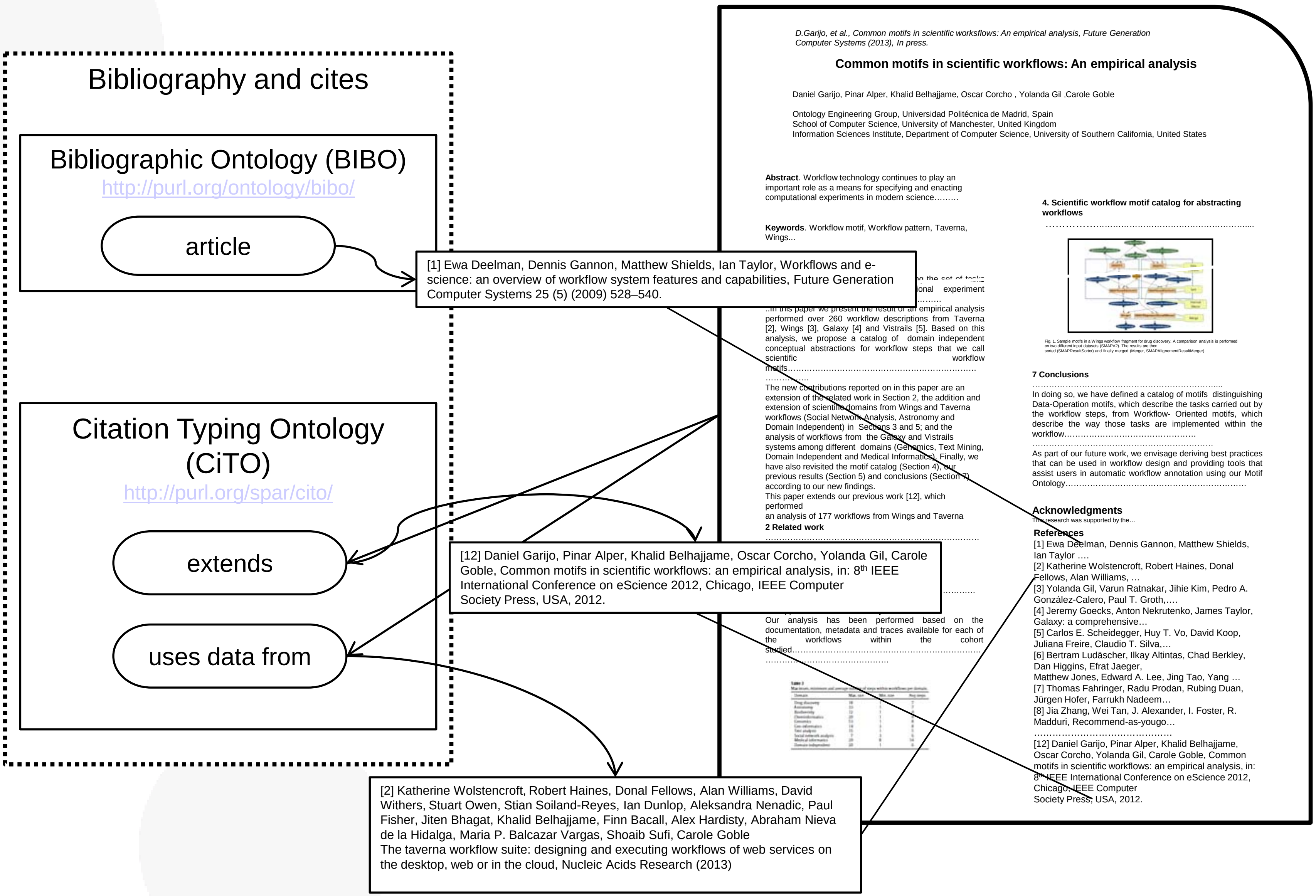
Towards an annotation schema for Dr Inventor



Towards an annotation schema for Dr Inventor



Towards an annotation schema for Dr Inventor



An example for Dr Inventor

3D Morphable Model Construction for Robust Ear and Face Recognition

Method (sci-doc) /// FutureWork (deo) /// Results (deo) /// Contribution (sro) /// Background (sro) /// Discussion (sro) /// Motivation (sro) /// Conclusion (sro)

3D Morphable Model Construction for Robust Ear and Face Recognition

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Abstract
Recent work suggests that the human ear varies signi.cantly between different subjects and can be used for identi.cation.cc The paper describes work that investigates this hypothesis using an approach based on the construction of a 3D morphable model of the head and ear. One issue with creating a model that includes the ear is that existing training datasets contain noise and partial occlusion. Rather than exclude these regions manually, a classi.er has been developed which automates this process. When combined with a robust registration algorithm the resulting system enables full head morphable models to be constructed ef.ciently using less constrained datasets. The algorithm has been evaluated using registration consistency, model coverage and minimal-ism metrics, which together demonstrate the accuracy of the approach. To make it easier to build on this work, the source code has been made available online.

1. Introduction

In the .eld of face recognition, morphable model .tting has been used very effectively to identify people under relatively unconstrained settings [6]. However, evaluations of these techniques show that there is still signi.cant scope for improvement [18]. One possibility is to include additional recognition features. The ear is particularly suitable for this purpose as it has a wide variation in appearance between individuals and, like the face, is recognisable at a distance. It also has some advantages over the face in that its appearance does not alter with expressions, is rarely disguised by makeup or cosmetic surgery, and is believed to remain similar in appearance with age.

Earlier work has con.rmed the ear as a viable feature for recognition using two dimensional techniques [10] [11] [1] [13]. However, results are sensitive to large pose or lighting changes so an alternative approach based on the construction of a morphable model of the face and ear is now being investigated.

Existing morphable models of the head have focused on the face and implicitly or explicitly avoided accurate ear reconstruction [5] [2]. As a result, range scan data of the ear is generally of lower quality and less complete than that available for the face [21]. This neglect of the ear is partly due to the challenge of modelling its more detailed and self occluding structure. In addition, ears have not been a priority in existing work as they are not generally used by humans for recognition.

The main contribution of the work described here is a novel technique for the morphable model construction of a face pro.le and ear using noisy, partial and occluded data. The resulting system is the .rst developed for modelling the three dimensional space of ear shapes. The model is constructed by registering a generic head mesh with 160 range scans of face and ear pro.les. Occluders and noise are identi.ed within the scans using an automated classi.er. The remaining valid regions are then used to register the mesh using a robust non-linear optimisation algorithm. Once registered, the scan orientations are normalised and then used to construct a linear model of all head shapes.

The next section summarises relevant existing work on morphable model construction and the representation of ears in those models. This is followed by a discussion of how the .tting problem can be formalised and the technique is then described in detail. Particular attention is given to the automated process for removing noise and occlusions in the training data. Finally, an evaluation section describes how three model metrics are measured and summarises the experimental results obtained. The paper concludes with proposals for future work. The algorithms used in this paper are available through the project website [9].

2. Related work

In 1999, Blanz and Vetter created the .rst 3D morphable model [7]. It was constructed from over 200 cylindrical range and colour scans of male and female heads, registered with each other using an optical .ow algorithm. The model was constructed using the mean of these values and their .rst 90 eigenvectors calculated using PCA (principal com

Figure 1. This image is of the base mesh, cleaned scan and .tted model for the technique used by Amberg et al. [3] It shows that the ear is not affected by the range scan and retains the shape

Next steps

- Improve the ontology for describing the scientific discourse
- Build a semantic repository of indexed ROSs
  - Computer Graphics
- Personalised Recommendations of ROSs

Thank you!


THANK YOU
Arigato
Efharisto
Gracias
Danke
Shukran
Thoinks Moite
Merci
Mahalo
Grazie
Spasiba
Dankie

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