

# WT2.6: European Centre for Soft Computing Report

Activities performed during the visit

in Wrocław, Poland

period: 10.09.2015 - 12.10.2015

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## Personal Information

Mr. Sergio Damas, member of **European Centre for Soft Computing, Spain** visited **Wrocław University of Technology, Poland** in the period from **10.09.2015 to 12.10.2015** in order to carry out research and training activities in the field of **System Dynamics for Social Media Analysis**.

## Information about Seminars

The seminar presentation was organized on **21.09.2015**

It was entitled:

Craniofacial Superimposition - Face 2 Skull (21.09.2015)

## Description of scientific activities

(Please describe value added to the ENGINE project i.e. new knowledge, new skills with respect to the objectives of the project, the assigned common area of future cooperation with the partner, plans for common research, projects, publications and how it could be used in the scope of ENGINE)

### **New knowledge:**

Mr. Damas has presented work on Craniofacial Superimposition - Face 2 Skull. Building a bijective projection of skull to face task is a computational forensics, an interdisciplinary research domain that applies some computer science fields, such as computer vision (CV) and soft computing (SC), to forensic sciences with the primary goal of making decisions in an objective and verifiable way. CV includes methods for automatically processing, analyzing, and understanding image data. Within it, image registration (IR) aims to find a transformation overlaying two pictures taken under different conditions requires positioning the skull in the same pose as the face in the photo to compare both objects by marking anatomical landmarks SC mimics the remarkable ability of the human mind to reason and learn in an environment of uncertainty and imprecision has some inherent sources of imprecision related to landmark location and matching, as well as the final identification decision. The presentation was devoted to methods and algorithms that finds projection from craniometric landmarks to cephalometric landmarks.

The second part of presentation (informal) was devoted to system dynamics.

### **New skills:**

Thanks to Mr. Damas's visit Engine Center's team had a chance to familiarize with specialized skills on craniofacial superimposition and system dynamics application to network analysis.



### **Common area of future cooperation:**

It has been agreed that further collaboration within the project will be concentrated on:

- 2D RTG to 3D model projection of knee bone implants (M. Joachimiak)
- diffusion processes in complex networks
- classification in networks
- social network analysis and social media analysis

### **Plans for common research:**

During the visit it was provided a submission to Net-Sci-X conference on the topic “Key Variable detection in System Dynamics Framework based on Multiplex”. It is sometimes difficult to identify key variables in dense or large problems modelled by system dynamics. These key variables are those able to generate significant changes in the whole system. This descriptive information of the system is vital for modellers since they can apply strategic actions over those variables (in a direct or indirect way) and focus their what-if scenarios. The identification of these key variables is also useful for understanding the dynamics of the model and for validation purposes. We can define a key variable in a system dynamics model as a variable that is able to generate significant changes in the whole system. Then, the goal of this work is to automatically detect which variables constitute the set of key variables.

### **Plans for joint projects:**

Not decided yet.

### **Plans for collaboration in publications preparation:**

Not established yet.

## Information referring to the intellectual property

(the generally binding law in this area in the visited country and procedures of patenting);

Not addressed.

## Description of the cooperation between universities and industry

(how it is organized in partner’s organization, the sources of funding, the opinions about drawbacks and strengths of existing solution).

Not addressed.

## Other activities

None



**REMARK:** Apart from this information also a program of the visit and the presentation in electronic version should be given to the project office (please send all of them to Urszula.Markowska-Kaczmar@pwr.wroc.pl). Please respond to the points 1-5 for outgoing visit and points 1-3 for incoming visit. Point 6 is for extra activities that are not put in points 1-5.

