



WT2.8: University of Salamanca, Spain

Report

Activities performed during the visit

in University of Salamanca, Spain

period: 02.02.2015 - 16.02.2015

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Personal Information

Dr. Konrad Jackowski and MSc. Dariusz Jankowski, faculty members of Wrocław University of Technology, Poland visited

(name of sending institution, country)

in the period from 02.02.2015 to 16.02.2015 in University of Salamanca, Salamanca Spain

(name of the visited institution, country)

Establishing research cooperation and carry out research activities in the field of machine learning

(give the area)

Information about Seminars

In sake of presentation Wrocław University of Technology and our research teams, two seminar presentations were organized on 09-02-2015

the date

1. Presentation of the team Department of System and Computer Networks (Department of Electronics WRUT) - MSc Eng. Dariusz Jankowski
2. Compound machine learning algorithms - An overview of research tracks - Dr. Eng. Konrad Jackowski

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)

According to objectives put for our visit we focusses on establishing closer cooperation between our (Machine Learning Group) and research team leaded by prof. Emilio Corchado. It has to be mentioned, that this visit is a result of previous agreement made by prof. Michał Woźniak and prof. Emilio Corchado who met previously. Both professors made preliminary agreement to establish closer cooperation in research areas.

Therefore, main focus of our discussion was put onto the following topics:



1. Research activities carried on by both teams as the main field of professional activities
2. Organization of the conferences as the mean of developing professional network relationships and worldwide recognizable position
3. Options for professional cooperation between our teams.

According to point one.

During the meeting and presentations in which we participated we realized that both teams work on quite wide research areas. Therefore, we identified topics which are common both teams and make deeper insight into those domains. Among the other we shall mention the following points:

1. Machine learning algorithms with special on their application for classification and regression tasks. We shall underlined, that the especially second options was especially interesting for us as we had got very little experience in this field. Therefore possibility of sharing knowledge and experience in this area can bring many advantages for us.
2. Processing data streams as a relatively new area of application for machine learning algorithms. We defined new challenges here such as processing complexity causing problem with effectiveness of the processing, potential changes which can appear in data characteristic over a time which makes classical machine learning algorithm irrelevant. Particularly advantageous for us is experience of our hosts in processing DataStream for regression purposes and ability to identify new practical application and source of empirical data. It has to be underlined, that gathering reliable empirical benchmark data is quite difficult as there are very few shared resources (benchmark datasets) available for the research community.

Sharing this information was possible due to several meetings in smaller groups of the closest colleagues of prof. Corchado and two presentations given also for quest from other departments which happen to cooperate with our hosts.

What more, we discussed also possibility widening cooperation with other partners. The main objective for those partners would be entering new areas of practical application for our algorithms. Achieving this objective would have very positive impact onto experience of our teams as so far we have very few opportunities to apply practically our algorithms in systems working in real environment. Prof. Emilio Corchado has wide relationship network and he agree to share with us his if we want to start common research projects. During our visit we started common two research project based on this kind of real data shared with us, namely: data for modelling dental production, and data for optimization schedule of student practices. Two other datasets are likely to be shared with us as the prof. Corchado declared to discuss starting common project with two other partners.



Based on two aforementioned datasets we started work on two projects realized in cooperation between our teams :

1. Developing model of dental production procedure in sake for production optimization (known under name drilling problem)
2. Optimization of student practice activities by classification student skills.

Some preliminary work were done during the visit especially those, which required support from side of prof. Corchado team, i.e. description of the task, dataset, interpretation of the data, defining possible ways of problem solving, etc.

As the result we decided to finish the researches in relatively short period in order to publish their results in ongoing conferences, namely Cores 2015 (which is sponsored by ENGINE project), and HAIS 2015 which is organize by prof. Corchado in Bilbao this year.

According to point two.

We shared our experiences on organization international conferences. We presented our experience on organization Cores conference and listened to our hosts sharing his strategy of organization HAIS, SOCO, and many other events. Apart from sharing information on regular problems which are encountered by conference organizer such as dealing with submissions, organizing additional events which accompany conference, etc., we especially focus on marketing which has to be make on such an event in order to develop its position among other events of this type. This topic is especially important as recognizable positon of the conference helps to develop good reputation of the

of the organizers what leads in turn to expanding professional networks and significantly elevate chances for establishing cooperation with other good research partners.

According to point three.

We agreed to open two afore mentioned research tasks. As it was mentioned, we are going to publish the results on the conferences. Positive results of this preliminary cooperation will prove that such a cooperation would be valuable for both sides. Therefore we defined the following tracks we can follow together in next steps:

1. DataStream processing
2. Medical application of machine learning algorithm for decision making
3. Application of regression algorithm based on machine learning for modeling processes of different kind.

Information referring to the intellectual property

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



We carried on one discussion on intellectual property law in Spain and we manage to gather the following information.

Most of the legal regulation in Spain reflects European Union Directive guidelines as Spain ratified the main International Conventions regarding Intellectual Property rights. Inventions are protected under Spanish law by means of

1. patents,
2. utility models, and
3. industrial designs.

Patents are dedicated to invention made in research and development area and is intended to protect country's technology. It is protected by State by specific term usually 20 years. When protection expires, subject of protection became public domain. The main purpose is similar to those which are implemented in any other countries in UE. Patent guarantee that product can be exploit only by patent owner or by third parties under specific licensing policy.

There are three main condition which control if particular product can be patented or no: product must be novel, involve inventive step, and be capable for industrial application.

It has to be understood, that in Spain both inventions and procedures may be patentable.

Spain ratified two conventions:

1. the Munich European Patent Convention (EPC) in 1973 and therefore can be designated in a European patent application.
2. Patent Cooperation Treaty, therefore cost of obtaining international patent protection through unified initial application procedures is reduced.

Utility models is a protection procedure dedicated for inventive steps. Here it is necessary to provide definition for inventive steps. It is a configuration, structure, or constitution that results in an advantage, appreciable in practice, for its use or manufacture.

Other important difference in subject of protection between inventive steps and novel product is that inventive steps requires a lesser degree of invention. Utility model is also protected only for period of 10 years.

Looking more locally, it has to be also noted that University of Salamanca has its own office for intellectual right protection named Oficina De Transferencia De Resultados De Investigación (OTRI). Apart from establishing protections for innovation it also helps to establish cooperation with industries.

Prof Corchado, promises us to come back to this topic and share with us practices which are used in University of Salamanca during our next meeting. According to preliminary agreement, that will take place during Cores, and Hais conferences summer this year.

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).

As it was mentioned in previous section University of Salamanca has its own agency which deals with all activities which aims at establishing and maintaining cooperation between the University and industry. The regular procedure when a new innovation is developed at the University and its authors intend to commercialize results of their work is to submit such a proposition to OTRI agency.

In general, all the rules of cooperation obey 83th article of the General University Act (la Ley de Orgánica de Universidades) which regulates any aspect of this cooperation.

The following activities are possible:

1. Research and development
2. Consulting
3. Analysis on studies, reports or opinions
4. Services analysis
5. Technical services
6. Teaching activities

It has to be mention, that cooperation between University of Salamanca and industry is also supported by Local authorities which maintain information service providing more details on services and research domains and research groups at the University. This service can be found under the following link (<http://ofertatecnologica.usal.es/>)

Other activities

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.