Faculty Exchange Program
Fall 2013 – Final Report
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This report summarizes the activities developed during my visit to the Carnegie Mellon University (CMU), which took place in the Fall Semester from the 26th of August to the 20th of December, 2013. During this period I was hosted by Prof. Mario Berges, at the Civil and Environmental Engineering Department.

For this semester at CMU my goals were:

- Follow and participate in at least one course to experience the culture of the CMU and understand the methods used and the possibility to apply them in Portugal;
- Develop a professional connection with colleagues at CMU in order to achieve future collaboration.

Considering the first goal, I followed the course of Applied Machine Learning and partially the course of Machine Learning. I was also part of the course of Advanced Digital Design Project with two project proposals and a participation in teaching by accompanying the laboratory classes and teaching one of the lectures. The first two courses were chosen to expand my knowledge in these areas since they are relevant to my research: they complement my knowledge about artificial Neural Networks and allow select the most appropriate tool for each problem, within Machine Learning. The second course was chosen because it is closely related to a course that I teach: Advanced Digital Systems. Both courses are project based and the approach followed at CMU will influence the next edition of this course at the University of Madeira.

For the second goal, I had the opportunity to work with Mario Berges and his PhD student Lucas Pereira. The work with Mario Berges regards Non-Intrusive Load Monitoring and I expect to continue developing it during the next semester. The NILM approach has been under research for a few years and holds the promise of monitoring energy consumption with very few resources. Nevertheless it faces several challenges due to the lack of labeled data to develop algorithms or empirical solutions to control the energy consumption. It is the latter problem that we are addressing.

I also had the opportunity to discuss opportunities for future collaboration with other colleagues such as Yuvraj Agarwal, Norman Sadeh and Aminata Garba. With Yuvraj and Norman a project proposal regarding smart grid management with application to Madeira was discussed. With Aminata the possibility of collaboration with the CMU-Rwanda campus involving applied research with utility to this country.

Throughout this semester I kept some of my duties at the University of Madeira, namely those connected to supervising bachelor, master and PhD students and I even became the new Director of the PhD program in Automation and Instrumentation. These activities will also benefit from my experience at CMU for I expect to bring to them a new vision.

I would like to acknowledge the Portuguese Foundation for Science and Technology, CMU and the CMU-Portugal program for supporting my visit.

Pittsburgh, 26th December 2013
Morgado Dias