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**Carnegie Mellon University - Portugal**  
Undergraduate Internships Program - Summer 2014

**Final Report**

**Host: Umut Acar, Computer Science Department**  
**Period of visit: August 2014 - October 2014**

My 2 month internship gave me the opportunity to participate and contribute to the design and implementation of a distributed self-adjusting computation engine being currently under development at CMU. I worked in the context of a team, lead by Umut Acar and Andy Pavlov, and attended their weekly meetings. I worked in collaboration with a doctoral student, Thomas Marshall, that is currently working on the system.

The main activity during my internship was to study Naiad. Naiad is an investigation by Microsoft Research on data-parallel data flow computation, with a focus on low-latency streaming and cyclic computations. It introduces a new computational model, timely dataflow, that aims to combine low-latency asynchronous message flow with lightweight coordination when required. The idea was to be able to compare the existing system with the one being built.

I was to download and install Naiad and repeat their previous experiments. Afterwards I wrote some standard benchmarks, like map, reduce and quick sort to get an overview of how it works and might be limitations. I gave a small talk on my findings and an overview of Naiad and it's incremental computation capabilities.

The remaining time was used getting performance measures of Naiad and a better comparative analysis with the system being built at CMU. Also a small comparative study has been done between Spark Streaming and Naiad.

The internship was also a great experience in a social and cultural aspect. I have met a lot of people, at CMU and off-campus, and discovered new places and cultures. In particular is the contact with other students at CMU who came with the same program.

I am very grateful to the the Portuguese Foundation for Science and Technology, Carnegie Mellon University and especially the CMU-Portugal program and it's people for making my visit possible.

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