

# Undergraduate Internships Program Report - Spring 2017

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August 3, 2017

My internship at the Carnegie Mellon University (CMU) took place between March 27 and June 30. I was hosted by Professor Asim Smailagic and sponsored by Professor Aurélio Campilho.

The goal of the internship was to develop a Multiple Instance Learning method for detection of Diabetic Retinopathy (DR) from retinal images. This method should be capable of, not only classify an image as being healthy or pathological, but also to output a heatmap with the indication of the regions where the lesions are located. We devised such a method using Convolutional Neural Networks (CNNs) achieving very good results on the task of DR detection. Moreover, we adapted this method for the task of quality assessment of retinal images, also achieving top results.

As a result of my stay, we wrote and submitted a paper to a conference and are in the process of writing a second one to submit to another conference or journal.

I had the opportunity to collaborate and learn from top CMU Machine Learning professors and researcher, namely Professor Christos Faloutsos, Professor Kris Kitani, Bryan Hooi and Shenghua Liu. I also collaborated with researchers at Portugal, namely Adrian Galdran, a post-doc at INESC, that helped me during the development of the method and writing of the paper.

I attended several Machine Learning classes and seminars at CMU. There is always something new happening in the University campus. There's a lot of things to do inside the campus such as going to the gym or watching movies, and there's also a lot of things to visit in Pittsburgh.

I would like to thank the Carnegie Mellon Portugal program for this invaluable experience and for all the support they provided me during the whole process.