

Advance Medical Image Analysis: Global optimization of low-parametric transformations

Marc Sevaux*, Torbjörn Vik†

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1 Description of the problem

At Philips research, we develop advanced medical image analysis techniques that are deployed in several of Philips clinical products. For radiotherapy planning, we have developed state-of-the-art, segmentation algorithms for the automatic delineation of organs at risk in 3D CT images. To further improve these algorithms, we constantly explore new and alternative techniques.

The general research will be conducted in the domain of global optimization of low-parametric transformations, e.g., adapting techniques such as differential evolution to the problem at hand.

The work will consist of analyzing the mathematical functional with respect to the free parameters, analysis of the existing optimization scheme, proposing alternative optimization schemes and improvements, implementation in C++, testing and evaluating on a large dataset.

2 Scientific environment

The training period will take place at Philips Research Labs¹, Hamburg, Germany. The candidate will work in close collaboration with the authors of this text, who are going to provide scientific guidance and possess some previous experiences in the described area of research. The trainee will be provided a shared office with a computer and the required software/internet access.

*marc.sevaux@uni-ubs.fr

†torbjoern.vik@philips.com

¹<http://www.research.philips.com/locations/hamburg.html>

3 Candidate

You are a motivated student with good programming skills and a solid mathematical foundation. Currently, we propose a master thesis (6 months in Hamburg, Germany starting early 2012).

Since Philips center is an international research lab, speaking German is not compulsory (and Hamburg is a big international city where English is currently spoken everywhere). The training period will be conducted in English but the local advisor speaks French too.

4 Support

Philips research labs will financially support the candidate with a monthly incentive of 700 € + 200 € for accommodation.

Candidates may contact Marc Sevaux by telephone (02 97 87 45 64) for more information. . .