Faculty of Medicine, Dentistry, Nursing and Pharmacy
MEDICINE GRADUATE PROGRAMME

6 MONTHS

Electronic versions:
www.schestowitz.com/Research/Progress/Forms/form4.doc
www.schestowitz.com/Research/Progress/Forms/PDF/form4.pdf

Updates:
December 30th, 2003; March 11th, 2004; March 15th

FORM 4– Progress Meeting – 6 Months

Name: Roy Schestowitz Supervisor: Chris Taylor

Date of meeting: .....

PROGRESS REPORT–To be completed by the Supervisor and Advisor after the meeting.

Research Project - progress and key areas for future development: **The Student should provide a one-page report summary** of progress to date and areas for future development that is made available to the supervisor and advisor prior to the meeting. This summary should be attached to this form. The Supervisor and Advisor should provide comments (particularly of areas for improvement) on the back of this form or attached to it.

Aspects that need attention or improvement before the next meeting. Please comment critically upon progress to date including performance in the laboratory where appropriate.

Signature of Supervisor ..... Date .....

Signature of Advisor ...…..... Date .....

Declaration By Student

I have discussed my progress with the Advisor and my Supervisor and have read and agree with the comments made above.

Signature of Student .....

Date .....

FIX DATE OF CONTINUATION/TRANSFER REPORT PLANNING MEETING:

Don't forget to send a copy to the Graduate Tutor/Education Office

Research Summary

Progress Made

A stable registration benchmarking tool has been constructed and used to perform various experiments. These experiments aided the analysis of the intrinsic behaviour of different objective functions, some of which were newly-conceived. All results have been recorded and occasionally included in the weekly progress reports where further detail is provided.

We have identified several characteristics and patterns of the most genuine of our objective functions –- that which is guided by optimisation of the quality of appearance models. Previous work on shape models, based the MDL principle, has implicitly shown the potential for automatic construction of appearance model, but we have yet neither proven nor disproved this premise.

As well as profound analyses of this objective function of choice, we have also comparatively tested, with the aid of a large range of metrics, the performance of a wider selection of registration algorithms. Additional attempts were made at finding efficient ways of solving the problem posed, namely the utilisation of wavelets and probability density functions. None of these successfully surpassed conventionally used algorithms which are based on mean-squared-difference or mutual information.

While no overly exciting results have been obtained to date, a robust application for evaluation has been established and a very large number of experiments and results have become available to infer conclusions from.

Future Developments

We are hoping to find a framework under which optimisation using appearance models becomes practical and rather powerful. Although alternatives exist to this method, we hope to find a global solution to the problem of registration while possibly automating the construction of optimal appearance models.

Once the nature of the problem we face is better known, extension of the algorithms to 2-D and 3-D is expected. Biomedical data can then be used to yield measures of performance in a real-world medical problem such as the registration of brain slice images.

This research work is destined to proceed in accordance with the activities of the MIAS IRC. It will benefit from opinions and methods proposed by other people whose knowledge of the problem domain is far broader. Therefore, developments are partially dependent on the work of peers.