Research Degree
Examiner's Preliminary Report

	to knowledge and practice that their work makes?	

3. **EXAMINERS PRELIMINARY REPORT**
A report of about 300 words should suffice

This thesis tacked an important topic in computer graphic/animation; that is the clothing computer generated characters. The thesis has two main sections:

1. The automatic measurements of CG characters using a geodesic computation scheme which in principle mimics the tape measuring process in tailoring. This scheme can be used for both polyhedron mesh and point cloud models. Different versions are proposed to minimise the computation load.
2. Automatic cloth fitting to CG characters using genetic algorithms as an optimisation tool. The proposed technique is able to fit cloths patterns to different CG characters while preserving the design.

The simulation results are limited to two basic garments (a shirt and toruses) and both are quite simple. It would have been better if more challenging garments are experimented with (different gender garments) , especially that the authors claims that his technique is developed for practically any virtual clothing.

While the thesis is focussed on clothing CG character, one may question the need of geodesic curvature flow based measurement scheme to extract the measurements.

In chapter 3 which introduces geodesic algorithm for measurements, the focus on body measurements was lost and even the subsection 3.6 was very brief with no validation on even a modelled or scan statue.

4. **PROVISIONAL RECOMMENDATIONS**
Note: *If the Examiner wishes to suspend judgement until after the oral examination this should be stated below. If the candidate's performance in the oral is such as to necessitate an amendment to the recommendation made on this form, the final recommendation should be stated on the Examiners' Report Form.*

I prefer to suspend the judgement until after the oral examination

5. EXAMINERS SIGNATURE

Name of examiner	Dr Hammadi Nait Charif		
Signature	H. Nait Charif	**Date**	18/02/14

Research Degree
Examiner's Preliminary Report

Bournemouth University

to knowledge and practice that their work makes?	

3. EXAMINERS PRELIMINARY REPORT
A report of about 300 words should suffice

This thesis addresses a difficult issue in clothing up virtual characters with dramatically varied body parts dimensions, while keeping the same cloth styles. A new virtual clothing method has been proposed and developed which includes automatic character measuring, automatic cloth pattern adjustment and cloth patterns assembling.

The thesis started with an introduction to virtual clothing and its application in computer animation. The current clothing design and making practice in fashion industry has been referenced as a motivation point for the research. After a literature review, thesis gave a big space to geodesic algorithm for measurements, and followed by the discussion of the virtual cloth modelling and re-targeting. Finally, the final conclusion was drawn with discussion of the future works.

In general, thesis is clear to read and presents two main contributions. It is suitable for conducting a viva.

The main concerns of the thesis from the examiner are as follows:

(1) The title is too general, it needs to be narrowed down with a research focus

(2) In the literature review, too much contents covers 'Geodesics' and 'Genetic Algorithm', but the literature on virtual clothing methods and techniques is no good enough.

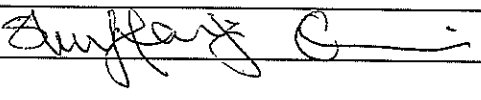
(3) Thesis spends about 50 pages on general 'Geodesic algorithm for measurement' discussion and performance analysis. But this algorithm is nothing special for human body modelling. But how the required body dimensions are computed based on this algorithm is not clear. The thesis does not discuss an interface design at all for artists or animations to use this algorithm.

(4) In the 'Virtual cloth modelling and re-targeting' chapter, a discussion or comparison with other virtual clothing approaches is needed to support the contribution claim.

Some clarifications need to be made during the viva. .

4. PROVISIONAL RECOMMENDATIONS
Note: *If the Examiner wishes to suspend judgement until after the oral examination this should be stated below. If the candidate's performance in the oral is such as to necessitate an amendment to the recommendation made on this form, the final recommendation should be stated on the Examiners' Report Form.*

5. EXAMINERS SIGNATURE

Name of examiner	Sheng-feng Qin		
Signature		**Date**	17/02/2014

Research Degree Examination - Chair's Report

☐	**that the candidate be awarded the lower research degree of MPhil** subject to presentation of the amended thesis to the satisfaction of the ☐ External Examiner and/or ☐ Internal Examiner by: Click here to enter text. *(please specify date)*
☐	**that the candidate NOT be awarded the degree and not be permitted to be re-examined**

4. **REPORT ON THE VIVA VOCE**
Please provide a brief report on the following:

Pre-*Viva Voce* discussion	Agreed to cap viva presentation to 15 minutes. Close agreement between examiners. HnS: perception is that he started doing geodesic coordinates, but shifted topic to something else. SQ: conclusion doesn't match the narrative thread. Title is inappropriate. Geometric based method - other methods are physics based - many references are not referenced. Geometric methods for dressing, physics needed for simulation. HnS: body measurements section is insufficient. SQ: Title lacks focus, content does not match title. Writing style good, but grammar problems. SQ: thesis does not clarify which equations / problems are new and which are from references. Contribution is not identified. Algorithm relevance is not explained. SQ: Body scanner not considered - this technology makes his algorithm unnecessary. HnS: Algorithm efficiency is not the only criteria - measuring quality is essential. HnS: Writing style is good. HnS: 100+ pages on geodesics, but this is not relevant to the the virtual clothing title. Not relevant to genetic algorithms. HnS: results look very basic and do not reflect the quality of his method for animation. SQ: Missing references.
***Viva Voce* examination**	Below is a full transcript of the viva. Points written in bold were agreed to be vital criticisms which must be addressed before resubmission: WL: Gives presentation. SQ: Asks about education background. WL: Studying animation production in UG, MS in image processing SQ: Presentation much clearer that thesis introduction SQ: For animation, do you need to go from 3D to 2D (for geometric modelling) WL: Geometric modelling method difficult for retargetting SQ: You did not clearly identify limitations of fashion industry. Who are the users of either method (geometric / fashion industry) WL: I want to use pattern based modelling method for animation characters - it has advantages over geometric modelling: fashion industry uses patterns, retargetting is easier. WL: Morphing methods does not deal with large changes in body shape. His method enables clothing retargeting. Saves cost for animation studio. SQ: Thesis does not demonstrate interface. Have you demonstrated testing with user? WL: Compared with previous methods (Maya) it should be easier. Cloth retargetting traditionally aimed at human like characters and use constrained morphing techniques. With large changes in body shape morphing methods do not maintain clothing style. SQ: Comparison with SIGGRAPH 2012 - what did you do that is novel? WL: Their method operates on the 3D model and measures distance of cloth to skin. However, their method method transfers the cloth into a 2D pattern. His idea is to use the pattern directly rather than flattening the pattern (as they do in 2012). SQ: Did you evaluate the fitting - judging the result?

Research Degree Examination - Chair's Report

	SQ: Mapping cloth to cylinder - this could be worse than using the original geometry. SQ: A full survey of existing approaches needs to be made to make an argument for the benefits of his method, including some recent references which are not included in the thesis. Also, a survey of what a real tailor is doing. WL: This idea came from previous study. Cloth creation needs pictures and uses geometric modelling method to model this shirt on the body in 3D. This is standard practice in the animation industry. SQ: How does a tailor invent a completely new style? WL: Fashion designers draw designs which are then transferred on to a pattern maker - a highly trained / paid job - who translates the new designs to patterns. Cloth designs are stored as patterns in the fashion industry - so we can use these for character retargetting. HnS: "Virtual Clothing" does not relate to the content. SQ: Why not compared to SIGGRAPH paper? This needs to be done to narrow down the contribution. SQ: Why do you need 22 measurements? You can get the convex hull for most of them. Geodesics follow surface while tape measure will follow the convex hull. WL: If it is a curve it is not convex / concave. Geodesics give same solution for straight vs bended arm. Rigging and skeleton creation happens at same time, so skeleton can't be used to measure the body measurements. HnS: If your aim was "Virtual Clothing" - why spend 90 pages on geodesic distances? WL: If I need to create cloth from patterns I'd need to measure the cloth. Geodesic work seemed worth doing and worked on this problem to get a publication. Character models are now very high resolution, but existing methods for geodesic creation are too slow. His method is much faster. SQ: Qualitative comparison is more important than performance. Important point: how do you determine the points from which the tailor measures? A title change will need to reflect the specific contributions of this thesis. WL: User currently specifies where to measure the geodesics from. SQ: This should really be compared with a 3D body scanner. WL: They wanted to do this, comparing a real tailor and body scanner, but they didn't have time and couldn't find a real tailor to help. HnS: Do user trials to evaluate the error when users try to click the positions of the geodesics. HnS: Point cloud is unnecessary: I can already generate a mesh from a point cloud. WL: Unlike other methods, ours works on both point clouds and surfaces. SQ: Not true. Other methods can do this. HnS: Argument is not convincing: geodesics work seems unrelated to the direction of the research. SQ: Genetic Algorithms - not a major contribution to the field, so unnecessary to include this. SQ: A general list of stylistic problems follows: recommends grammar and proof-reading. Issues with caption clarity / case of words. **SQ: Introduction needs to include information about animation and fashion industry clothing production pipeline. Clear argument must be made to justify research direction.** SQ: You require a clear definition of virtual clothing: process, requirements, techniques. Define it and describe how it is being used. HnS: Unsubstantiated statements should be removed. If it derived from a conversation, this can also be referenced. SQ: The research project must be contextualised. Industrial need? How does it fit into current research? WL: SIGGRAPH 2012 paper is closest to his research work. SQ: If this is important, reference requires volume and page number! **SQ: If this is closest to your work, why not provide a comparison? You can perform a visual comparison of the different methods using users.**

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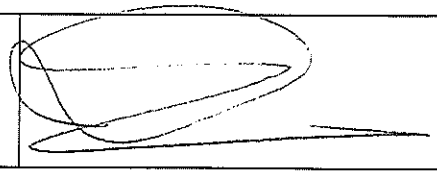
	SQ: You need to provide more examples of using your method. HnS: for example on female characters. SQ: Also with different styles. SQ: Streamline your research aims and objectives. A clear connection must be made between aims and contributions. HnS: Contributions make sense, but do not correspond to current contents. Reorganisation of the dissertation might be necessary. SQ: Not all the related work is related to your thesis, e.g. physics based simulation. SQ: What kind of measurement technique are you going to use? UK vs US? Advanced body measurement techniques use body scanners to derive measurement data and distributions. SQ: Why can material properties not be specified by user? **SQ: At least 3 important missing references on geometric methods for clothing modelling. (a list of 7 was given)** HnS: Character cloth retargetting is a big area - comparison with other methods is necessary. SQ: Why not use other techniques to Genetic Algorithm (e.g. Support Vector Machines, Neural Networks) - justification needs to be stronger. SQ: Which formula's are developed by you? WL: From pg 50 they are developed by him. HnS: Tridiagonal matrix is not clearly written. Also several undefined parameters in the formulation. Also in the algorithms. SQ: Choosing the source point for the geodesic algorithm does not link to the user interface? SQ: Link must be made with overall application - particularly in the figures that display geodesics on the models. **SQ: Geodesics measurement needs to be compared against tape measurement. HnS: quality of results is most important, rather than the performance of the algorithm. (these were in the presentation but not in the thesis)** SQ: Geodesics on point clouds - give a justification for doing this. HnS: regular grid will filter out details if the point cloud has high resolution features. HnS: Title of Chapter 4 is closer to what should be the title of the thesis. HnS: Control point is missing from the scaled pattern - this could affect the quality of the fit. SQ: Genetic Algorithms does not need to be introduced to such a high level of detail. **HnS: I would not be able to reproduce your results which you produced from GA - this is because details of the implementation are not included in the thesis.** SQ: Is the cylinder mapping method the best possible quality method for this problem? WL: The choice of the mapping shape does not alter the final shape. SQ: There needs to be a comparison of the SIGGRAPH 2012 paper with his result. HnS: Either create the same result with both methods, or get artists to visually compare the results. **HnS: Offer a critical analysis of his technique for clothing the characters. What are the failure cases? When is your method good? When is it bad?** SQ: Discussion section necessary to compare his result with other methods.
Post *Viva Voce* discussion	Chair summarize bold faced items. There was agreement that these were the key concerns of the examining team. The decision was that the degree be awarded, subject to AMENDMENTS (i.e. major corrections). This will require a resubmission within 6 months, and for it to be assessed by the INTERNAL examiner only.
Any other comments on the *Viva Voce*	I was impressed by both the thoroughness and professionalism of both examiners, and felt that the exam was a fair and measured judgement of the students work.

5. DOCUMENT CHECKLIST	
☒	*Chair's Report completed*
☒	*RD14 Examiner's Preliminary Reports attached for each examiner*
☒	*RD15 Examiners' Joint Recommendation Form attached*

Research Degree Examination - Chair's Report

☒	*Where corrections, amendments or resubmission is required, instructions MUST be attached*
☒	*If thesis title is to be changed, please state new title:* Several suggestions were offered, but the choice is up to the PGR student. The new title will be assessed by the internal examiner on resubmission.

6. CHAIR'S SIGNATURE

Signature of Independent Chair		**Date**	19/02/2014