Title

Abstract

1. Introduction(10 pages)
   1. Overview
   2. Motivation
   3. Challenges
   4. Research problem
   5. Thesis structure & summary
2. Research Background (30 pages)

Section 1. introduction

Section 2. Garment manufacturing research

1. fashion design
2. Textile engineering and material science

Section 3. Human measurement

1. Landmark location
2. Measuring method
3. Measuring posture

Section 4. Computer Cloth Simulation

1. Physical cloth simulation
2. Geometric cloth simulation
3. Data-driven cloth simulation

Section 5. Conclusion

2.5.1 limitation

2.5.2 future work

1. Virtual Cloth modeling and Retargeting (60 pages)

Section 1. introduction

In this chapter, a pattern-based cloth modeling and retargeting technique is introduces. This method consist with modern made-to-measure techniques [ reference for make-to-measure ] for making bespoke cloth. It involves three steps, character body measuring, choosing the cloth pattern, resizing the pattern and assembles patterns to form a complete cloth.

In the section of human body measurement, a novel algorithm for computing geodesic is introduces which fits the special need in character measurements. It achieved linear time-complexity which never be achieved before.

In section 3, the data structure of cloth pattern and pattern database are introduces in detail.

In section 4, several methods are proposed for resizing pattern based on the measurements.

During resizing, the pattern shape is preserved and seemliness remains consist by using global optimization technique. When transfer 2D cloth pattern into 3D space, geodesic distance algorithm is used to construct string between each stitch point pairs to assemble cloth.

Section 2. Human body measurement

­­­­­­­­­­­­­­­­­­­Measurements are the precondition for modeling a fit cloth. This section introduced a method that measures all the necessary data for defining a cloth accurately and efficiently.

Section 3. Cloth pattern data base

1. Cloth pattern Data structure
2. Cloth pattern Data compress method
3. Data retrieval method

Section 4. Cloth modeling

1. Definition of “style” and “accuracy”
2. Pattern mesh generation
3. Pattern resizing

Multiple criteria

Multiple objectives global optimization(Non-dominated Sorting Genetic Algorithm-II)

Single objective global optimization(Covariance Matrix Adaptation Evolution Strategy )

Definition of error function

Evolution algorithm :

Definition of individual

Crossover method

Mutation method

Select method

Evaluation

1. 2D to 3D transfer
2. Stitching

Section 5. Experiments

Section 6. conclusion

1. Linear Time-Complexity Geodesic Algorithm (60 pages)

Section 1. Introduction

Section 2. Geodesic research background

Section 2. Geodesic on Mesh

Section 4. Experiment

Chapter.5 winkle generation (40)

Section 1. textile engineering property retrieval(2 standard measurement method)

* 1. KESF system(Kawabata Evaluation System for Fabrics) (<http://158.132.122.156/portal/fom01/fom/kes.htm>)

A). Fabric Low-stress Mechanical Properties

* + 1. Tensile and Shear
    2. Pure Bending
    3. Compression
    4. Surface Characteristics
  1. FAST system(Fabric Assurance by Simple Testing)

(<http://158.132.122.156/portal/fom01/fom/fast.htm>)

* + 1. Compression
    2. Bending
    3. Extension
    4. Dimensional Stability

Section 2. Wrinkle category

Based on the KESF and FAST method, the main property of a piece of textile are: tension, shear, and compression. Thus the wrinkle can be categorized as 4 kinds(reference available in geometric cloth modeling section )

* 1. Definition of tension shear wrinkle

2.2 Definition of compress wrinkle

Section 3. training data acquisition and deformation detection

* 1. Definition our own feature-deformation features(scale invariant feature)
  2. Learning classifier- SVM(support vector machine or nearest neighborhood search)
  3. Detection

Chapter 6. Conclusion (5 pages)