ISO/ASTM TR 52916:2022-01 (E)

Additive manufacturing for medical - Data - Optimized medical image data

Contents

Page

Foreword ..... **v**

Introduction ..... **vi**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Medical images generation for AM **3**
4.1 General medical image data generation 3
4.2 General error occurrence steps in medical images generation 3
4.3 Medical image extraction 4
4.3.1 Introduction of medical image extraction 4
4.3.2 CT image error generation factors 4
4.3.3 MRI Image error generation factors 5

5 Image segmentation **6**
5.1 Introduction of segmentation 6
5.2 Segmentation techniques 6
5.2.1 Thresholding algorithm 6
5.2.2 Region growing algorithm 6
5.2.3 Morphological image algorithm 7
5.2.4 Level-set algorithm 7
5.2.5 Other partial segmentation algorithm 7

6 Reconstruction **7**
6.1 Introduction of reconstruction 7
6.2 Reconstruction process 7

7 Smoothing **8**
7.1 Marching cubes 8
7.2 Mesh smoothing 8

8 3D visualization method **8**
8.1 Surface rendering 8
8.1.1 Introduction of surface shaded rendering 8
8.1.2 Surface shaded rendering feature 9
8.2 Volume rendering 9
8.2.1 Introduction of volume rendering 9
8.2.2 Volume rendering feature 9
8.2.3 Ray casting techniques 9
8.2.4 3D texture mapping techniques 9

9 Additional processing for additive manufacturing **10**

10 Methods **10**
10.1 Image isotropic conversion 10
10.2 Image enhancement 11
10.3 Image segmentation 12

11 Minimizing error of software and equipment **14**
11.1 Introduction of software and equipment error 14
11.2 Software error 14
11.2.1 Background 14

11.2.2 Verification method using main inflection 14
11.2.3 Improving accuracy and precision 14
11.3 Equipment error 15
11.3.1 Background 15
11.3.2 Standard computational mesh model data creation for an evaluation method 15
11.4 Tolerance error situations 15
Annex A (informative) **Medical CAD for additive manufacturing tolerance** **16**
Bibliography **24**