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An Overview on 3D Modeling Techniques of Human Bodies

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Abstract

Many attempts and contributions were made to make the human body modeling an easy and accessible task. We need to model the human body for several reasons; First, the classification of human bodies based on shape analysis allows the comparison between individuals and enables the distribution of the population for many purposes such as clothing and virtual dressing in shopping purposes. Second, the virtual visualization and animation of human models and avatars are also beneficial in movies, and advertisement industries. Furthermore, these techniques prove to be essential in medical applications as well. An example of a medical application is the creation of orthotics and prosthetics designs. Another example is monitoring the growth and the posture of the body to determine an adequate dose of prescribed medications. In this report, we present an overview of the literature on human body 3D modeling techniques, and we analyze the strengths and weaknesses of each modeling technique. We also discuss the techniques of data acquisition of the CAESAR models which is a large database 3D models of human body. In addition, we discuss the most important methods used in 3D data representation and surface reconstruction. This work will help scientists and programmers better understand the different technologies of the industries that use 3D modeling and scanning techniques of human bodies.

Keywords
3D modeling, Surface reconstruction, Data acquisition, CAESAR models, Scanning techniques.

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Biography
Sarah Ali is a clinical assistant professor in Engineering with a specialization in the field of biomedical engineering. Dr. Ali graduated in 2015 with a Ph.D. in electrical engineering at Laval University in Quebec City, Canada. Prior to joining Loyola University Chicago, Dr. Ali worked at Size Stream as a Scientist and software developer. Her focus was to develop algorithms for the 3D modeling of human bodies. She also had the opportunity to work at GE Healthcare where she developed software related to healthcare applications. Designing software for medical devices is very crucial in the field of healthcare. Dr. Ali is interested in investigating the recent technologies of processing medical images and designing software for medical devices. Her other interests are in computer vision, image processing and machine learning.