Advancements in Medical Imaging

Brendan O'Keefe, *Biomedical Engineering, University of Rhode Island*
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***Abstract*—In recent years, advancements in computing power and screen resolutions has allowed for electronic and computer mapping of inside the body to become more complex and more efficient, thus improving medical treatments and saving lives.**

I. Introduction

Medical imaging delivers technologies that are crucial to today's diagnosis of medical anomalies. Because it relies on computer power to be effective, medical imaging is still in the stages of rapid development. Since Conrad Roentgen's discovery of the X-Ray in 1895, researchers and engineers have been able to improve the technology of mapping the inside of the human body. Today, medical imaging has the possibilities of non-invasively showing healthcare professionals nearly every corner of the body, through cat scans, MRI's, and x-rays. Then, these images can be processed and enhanced by computer programs that can interpret more data and produce 3-dimensional images more easily understandable by doctors and patients. These 3D images can be used to create "avatars" of any individual person that shows any system or organ in their body.

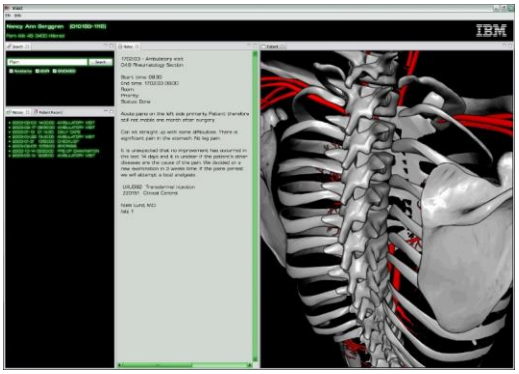
II. Methods

The ability to construct a 3D image of organs and organ systems in the human body does not lie with one specific device. X-ray machines, CAT scan machines, and magnetic residence imaging machines all provide the framework for constructing a multi-dimensional image of the internal parts of the human body. X-Ray machines simply project a beam of higher-energy (with respect to visible light) light that can penetrate the skin, but is unable to penetrate bone. Much like a normal camera, this produces a 2D image of bones. CAT scan machines (shown here)

is essentially an X-Ray machine that produces a 3D model of the skeletal system of the body by taking images from multiple angles, then being interpreted by a computer which assembles such a model. Finally, magnetic residence imaging (MRI) machines use magnets to pick up different tissues in the body and map out there locations, sizes, etc.

III. Results

From these technologies, 3D computer models or "avatars" of an individual's body can be produced. With ever-improving computer power and higher-resolution screens, more detailed models can be produced than before. IBM, a computer-innovation and server producer, has created a catalog of programs that interpret data from medical imaging machines to produce images and data like the screen shot below:



These 3D models of an entire body could one day allow for this to be a complete medical file, essentially replacing all other medical files and documented information.

IV. Discussion

Currently, tradition methods of medical imaging are widely used in nearly every treatment environment. Medical professions heavily depend on X-Ray machines to conduct mapping of the skeletal system, and CAT scans for further analysis of problem areas and to get 3D perspectives on skeletal injuries. Further, MRI's can be used to take "images" of the body, which go beyond X-Ray and CAT scan abilities to see nearly every type of tissue.

However, developments in computer technology are allowing these technologies to be improved a great deal, giving doctors and patients a whole new way to look at the human body, diagnosis illnesses with more precision, and quicken office visits. Essentially, this technology would improve the efficiency of a wide range of aspects of the medical industry.

These developments have led to a study that was conducted in order to determine if this technology would be more or less value in the future. This study, conducted by Global Industry Analysts, Inc., concluded that 3D medical imaging technologies would increase 17.5% to $5.9 billion USD.

References

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