HHME15-Z03
THE BIOMECHANICS SIMULATION ANALYSIS OF THREE DIMENSIONAL TACTILE BIOSENSOR BASED ON FINITE ELEMENT METHOD

Zhuang X.Y. , Cao L.H., Wang B. , Guo J., Chen Z.B., Liu C.S., Liu X.Y., Li G.N.

Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Science, Changchun, China

Aims: The important content of the traditional Finite Element Method simulation analysis to the dimensional tactile biosensor is two-dimensional array sensing unit. The traditional mode analysis can't effectively simulate the soft reality environment of the dimensional tactile biosensor. In this paper, a certain type medical health monitoring biosensor was three-dimensional finite element modeled.
Methods: By using MSC software, the tactile application of the model which in the lower and higher soft sensing element was simulated. The elastic three-dimensional stress distribution boundary conditions were effective assignment.
Results: Through the computer simulation the stress state in the body of this type of tactile biosensor was simulated and analyzed.
Conclusions: This analysis result can provide effective data for the development and application of this type of sensor.
Acknowledgements: None.
Keywords: Tactile biosensor;Finite Element Method;Biomechanics simulation analysis;MSC software

HHME15-Z04
BUILDING BIOINFORMATICS DATABASE BASED ON CLOUD PLATFORM

Shanbin Z., Xiaotang L.

Shenzhen Institute of Information Technology, Shenzhen, China

Aims: Biological information database is the key task of bioinformatics.At present,it has hundreds kinds of international public database, especially,nucleic acid and protein sequence databases.But more of them published on different computers.Different databases and different interface make it so difficult to collect information from the huge-database quickly.Cloud platform can help us to solve it.
Methods: Different databases has different standards, but the biological information database records generally consists of two parts: the original sequence data and describe these data annotation of biological information.So,at first,we establish the spatiotemporal indexing mechanism to ensure unlimited expansion of database.Then,we need not consider the standard,but use temporal and spatial information to classification. Secondly, the cloud services can ensure accessibility, availability and security. Finally, a new ST-SQL query language to ensure information retrieval rapidly.
Results: In the laboratory platform, we build the biological information database based on JAVA and SQLSERVER.We get some of the test data from the PROSITE database, GENEBANK database and EMBL database.And then,create database script files to store on different servers. The fact proved that spatiotemporal indexing mechanism can obtain the information from the different data structure on the different servers.at the same time,ST-SQL language can query information in the response time.
Conclusions: Biological information database based on cloud service is feasible,it can combine with the existing data resources effectively.
Acknowledgements: Supported by Training plan of Guangdong Province outstanding young teachers in Higher Education Institutions (Grand No. YQ2013194) and Shenzhen strategic emerging industry development funds(JCYJ20140418100633634).

HHME15-Z06
THE MECHANICAL STRUCTURE FINITE ELEMENT FLUID MECHANICS ANALYSIS OF THE BLOOD MONITORING MICRO CAVITY NANOSENSORS

Yan G.[1], Ren Y.[2], Cao L.H.[3], Guo J.[3], Chen N.[3], Shi K.[3], Chen Z.B.[3]

[1]College of Mechanical Science and Engineering, Jilin University, Changchun, China; [2]College of Traffic and Transportation, Jilin University, Changchun, China; [3]Changchun Institute of Optics,Fine Mechanics and Physics, Chinese Academy of Science, Changchun, China

Aims: The mechanical mechanism type of the biological sensor which being used to monitor the condition of human blood is various. One of the key content of this field of research is how choosing the sensor structure type for effectively reduce the blood pressure and blood composition change, and at the same time improving the detection accuracy in research. Therefore it is need to talk the different structure styles for high precision finite element of fluid mechanics analysis by calculation and simulation.
Methods: The flat mat type, triangle type and disc type structure monitoring micro cavity nanosensors were finite element model under human blood environment conditions based on MSC software. And the three kinds of structure forms in human blood environment stress conditions were analyzed in fluid mechanics.
Results: After the analysis and triangle type to the three kind structure monitoring micro cavity nanosensors, it can be thought that the respectively of the flat mat type, triangle type and disc type structure monitoring micro cavity nanosensors were 82%, 75% and 94%. The difference of the three structure in terms of accuracy were small.
Conclusions: It can be thought that the disc type structure monitoring micro cavity nanosensor is better than the other two in the field of blood pressure monitoring.
Keywords: Finite Element Method, Biomechanics simulation analysis, MSC software

HHME15-Z09
HEALTH AND DISEASE CHECK METHOD AND SYSTEM BASED ON QUANTUM MEDICINE AND ARTIFICIAL INTELLIGENCE

Zhu D.J.

South China Normal University, Guangzhou, China

Aims: The aim of this paper is to check health and disease based on quantum medicine and artificial intelligence.
Methods: There are three steps: 1, Collect training data: obtain the different distributions of water molecules in the human bodies with different health and disease conditions; 2, Train: Gain correspondence rules between the different distributions of water molecules in the human bodies and the different health and disease conditions based on the existing Artificial intelligence (AI) learning technique (such as knowledge based system and neural networks); 3, Check: using the correspondence rules, deduce out human health and disease condition according to the distribution of water molecules in the human body.
Results: The distribution information of water molecules in the human body can be obtained based on the existing nuclear magnetic resonance imaging (MRI) technique using the existing technology that hydrogen atoms in the water molecules can produce nuclear magnetic resonance Phenomenon. The distribution of water molecules in the human body is different in different health and disease conditions for traditional Chinese Medicine believes that excess moisture in the human body will cause disease.
Conclusions: The method and system based on quantum medicine and artificial intelligence is provided for health and disease check.
Acknowledgements: Supported by a project grant from Guangdong Province (Grand No. 2014B090901064).