



Koriyama Area

Support for Next-generation Surgery with Haptic Technology and Development of Medical Diagnosis Equipment

Fukushima Prefecture industrial promotion center
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Core Research Organizations

College of Engineering Nihon University, The University of Aizu

Major Participating Research Organizations

Industry... ASTER INDUSTRIES Co.Ltd. P&M Co.Ltd, IR Medical Laboratory Co. Ltd
Academia... College of Engineering Nihon University, The University of Aizu, Fukushima Medical University
Government... Fukushima Technology Centre

Typical result of City Area Program

1. Development and clinical application of palpate probe for surgery support

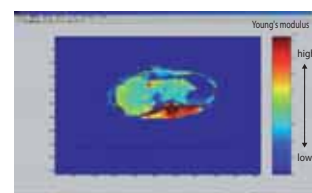
Generally, hands are used to evaluate for surgeries for doctors to touch the liver or artery blood sedge, but it was difficult to judge if it is soft or hard in the clinical setting. In addition, it is also difficult even to touch directly by hands as the endoscope started to be used frequently. Therefore, the development of the Haptic technology that quantitatively evaluated texture by the sense of touch using the sensor and the instrumentation system was demanded in the clinical settings. Then, it was confirmed that the tactile sensor with a characteristic near the palpate that used the phase shift method by city area program (Basic Stage) was developed, and the hardness of the involved area of internal organs was in real time good at the imaging by the animal test. It is scheduled to advance clinical on a real time basis and for practical use to be aimed in the future.



Palpation probe to support surgery

2. Practical use of imaging system of hardness using X-ray CT

Physical information on hardness and the softness etc. such as tumors cannot be acquired directly from the obtained CT image with the X-ray CT system used now. Then, it succeeded in diagnose the hardness of cirrhosis and the liver cancer organization by a probe to obtain the image from the obtained calibration curve for the correlation with Young's modulus measured with transmission X-ray strength of the X-ray CT and the tactile sensor for the hardness testing. Some technologies as part of study results were transferred to a software company.

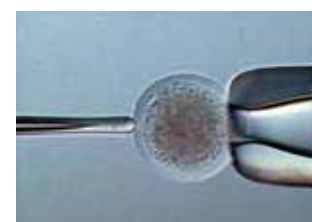


Imaging of hardness of liver cancer of a rabbit using X-ray CT value

About the approach after the project

1. Advanced functionalization and application of haptic (sense of touch) technology by collaboration of medical science and engineering (development stage)

Aiming to develop a new diagnosis technology for quantitative evaluation using sensors and measurement systems with haptic technique and the next generation robot hand arms with soft touch and application of the new medical support system, research and development was continued by City Area Program from FY2006 under the construction of the medical equipment related business platform.

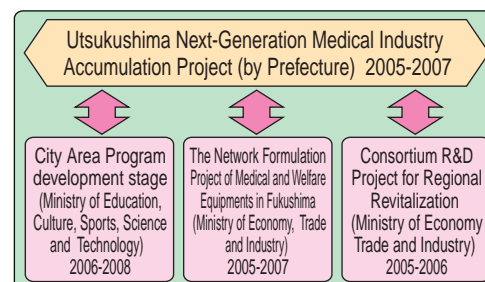


Measurement of hardness for the zona pellucida of ovum

2. Approach for industrial cluster formation of medical and welfare equipment

The industrial policy that specializes in the medical equipment industry is progressed in Fukushima prefecture. To correspond to Death Valley, approval process of medical device, its animal test, and its clinical examination, "Utukushima Next-generation Medical Industry Accumulation Project", which included the system of support to making to business, has been executed. Moreover, "Medical Creation Fukushima" is held as a chance for business matching of medical equipment, and it works aiming at the formation of the medical equipment related business platform.

Besides, the development of haptic sensor result in City Area Program (Basic Stage) continued cooperating Tohoku university having MEMS technique as one of the consortium research and development project for regional revitalization as "Development of Ultrasonic Diagnosis System with Haptic Technology using MEMS Technique" as Local New Consortium Research and Development Programs (FY2005-2006).



Support system from Fukushima Prefecture for development and practical application of medical devices