

Title: Vision based medical features for diagnosis and treatment

Vision based systems together with machine learning techniques are utilized in medicine to provide very detailed images and measurements for doctors in order to enhance and improve the diagnostic and treatment processes. This is of particular importance in areas of critical care where accuracy and speed of medical delivery are vital. In this project a combination of novel 3D reconstruction techniques and computational analysis of 3D structures using the methods of Finite Element Analysis will be investigated in order to develop a system that can serve these medical needs. It will involve monitoring and modelling of movements, characteristics of human tissue and surface topographies. State of the art image acquisition devices will be used to observe behaviours and actions and their patterns. These will be taken from simulated conditions and subsequently will use information from patients in critical care. Computational modelling and machine learning techniques will be used to determine abnormalities in motion and behaviour in order to differentiate these from norms and to distinguish differences and severities where abnormalities arise. This will enable the development of new systems that can remotely monitor critically ill patients and alert doctors to problems as soon as they arise.

Desirable skills:

Matlab or C#/C++ programming skills, 3D and maths

Technical supervisors:

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