Evaluating the capacity of novel image analysis algorithms in estimating prostate cancer patient outcomes

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There are a number of dilemmas in the diagnosis and treatment of prostate cancer. Current strategies result in over treatment of indolent disease due to their inability to determine if a tumor will progress. Image analysis offers a mechanism for objective, reproducible and repeatable biopsy interpretation and also the extraction of novel biomarkers imperceptible to the human eye. Thus, adding further information to stratify patients into appropriate treatments. The Irish Prostate Cancer Research Consortium cohort was used for re-interpreting digital colour images of prostate tissue sections. The patient outcomes of this cohort are known (Indolent, Significant or Aggressive) as well clinical information (PSA, family history, DRE, needle biopsy Gleason Score, Age). Novel image tissue features of entropy and symmetric wavelets were calculated on local and overall tissue level. Similarly cell nuclei size and distributions were calculated along with luminal and stromal distributions. Using k-Nearest Neighbors and Neural Network models correct classification rates of patient outcomes based on clinical datasets (53%), image datasets (49%) and the merged datasets (56%) were computed for Indolent, Significant or Aggressive disease. Similarly patient outcomes based on clinical datasets (79%), image datasets (77%) and the merged datasets (84%) were computed for Indolent or non-Indolent disease. Thus, indicating that the novel image features are synergetic with clinical data in separating patients with or without a significant cancer. These image features add value to the current clinical features and could be used to reduce the over treatment of prostate cancer and increase the quality of life of these patients.

Biography

Patrick Jackman pursued research with the aim to find alternative solutions to challenging research questions. He has published 15 papers in high impact journals, 2 book chapters and 7 conference papers. In 2008 he was awarded the Armaund Blanc young researcher of the year award in advance of the awarding of his PhD in 2009. He has worked in commercially based research in the University of Manchester and his current role is Senior Research Fellow: FASTPATH: Fast-Tracking Pathology via Automated Image Analysis and High-Performance Computing: Application to Prostate Cancer Diagnostics (Marie Curie IAPP (FP7)), University College Dublin, Ireland.

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