Prognostic and Prediction Modelling with Radiomics for Non-Small Cell Lung Cancer

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VALORIZATION ADDENDUM

With the increasing burden on healthcare both in terms of patient load as well as tremendous growth of the imaging data, there is a need for the healthcare industry to adopt advanced and newer solutions to improve the patient experience, affordability and access to care. These new technologies are already facilitating these transformations [1].

Royal Philips being a leading health technology company is focused on improving people's health and enabling better outcomes across the health continuum from healthy living, prevention, to diagnosis, treatment and home care. The vision of Philips is to improve the lives of 3 billion people a year by 2030 [2].

As far as the research presented in this thesis is concerned, being an employee of Philips the work in this thesis has influenced and contributed to the products and solutions as described in the paragraphs below.

Knowledge Dissemination

The research carried out in this thesis was shared with broader scientific community by publishing papers in Journals, book chapters and conferences. In addition, the concepts and the algorithms developed as part of thesis were shared amongst the researches across the Big Imaging data approach for Oncology in Netherlands India Collaboration (BIONIC) consortium. The algorithm for auto segmentation of lung and GTV is being used in the clinical setting of Tata Memorial Hospital in the radiomics extraction pipeline to realize the objectives of BIONIC. Further, the work on histology classification and new addition of fractals as features would help in identifying tumor habitats within the gross tumor volume. Finding of these habitats would be useful in targeted therapy for better prognosis.

Economical Exploitation

The outcome of this thesis work has contributed towards addressing the need of hospitals and patients through the proposed solutions, in particular to cancer care. Philips being a health technology company can valorize the following results of this thesis.

1. The concepts and techniques proposed in Chapter 2, on how to build prognostic and predictive models and the challenges associated, can be part of Philips quality assurance framework for AI.
2. The Lung auto segmentation model using Deep Learning is being considered to be part of data science platform of Philips. Further, along with the Gross Tumor Volume detection is integrated into Philips Translation Research platform – IntelliSpace Discovery [3].
3. The Radiomic models developed in chapters 5, 6 and 7, survival models, automatic classification of tumor histopathology and Fractal Analysis for non-small lung cancer, are currently being verified and validated as part of the Philips Translation Research platform – IntelliSpace Discovery. Based on the outcome of the validation phase, the models could become part of the Philips IntelliSpace Portal [4], in the near future
4. The use cases discussed and developed in Chapter 8 a cloud-based framework to distribute/share clinical images with a CDSS for radiologists on the move and to the institutions that do not have an on-premise solutions can be part of a Philips cloud-based solution for distributed learning.

Societal Expectation Management

Although, the work provided insights on the economic benefit and the dissemination of information to the scientific community, it also has influence on society. The technology blocks developed will help alleviate the burden of the physician thereby improve disease diagnosis and treatment at a rapid pace.

At the remote care setting, the cloud-based platform for image analytics, described in Chapter 8, can provide capabilities, to help connect the experienced radiologists practicing in the large cities to physicians in remote villages and towns.

Further, the clinical decision support systems deployed on a cloud-based platform can empower physicians and healthcare workers in primary care to improve their diagnosis, treatment strategies and throughput.

References

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[2]. *https://www.philips.com/a-w/about/company.html*

[3]. *IntelliSpace Discovery : https://philipsproductcontent.blob.core.windows.net/assets/20190515/509c084a1c25484380c9aa4e00cb6773.pdf*

[4]. *IntelliSpace Portal : https://www.philips.co.in/healthcare/product/HC881062/intellispace-portal-80-all-your-advanced-analysis-needs-one-comprehensive-solution*