

Radiomics

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Valorisation

INTRODUCTION

Increasing evidence of inter- and intra-patient heterogeneity and an ever increasing number of novel treatment strategies, mean there is a major need for the identification of non-invasive and easy to repeat biomarkers to be incorporated in clinical decision support systems (CDSS) to guide precision medicine.

Radiomics concerns with the high-throughput mining of large amounts of quantitative features from standard medical images, for knowledge extraction. As described in this thesis, radiomics has great potential to improve CDSS, by providing complementary and interchangeable information alongside other sources, such as demographics, pathology, genomics and proteomics.

The research carried out at Maastricht Radiation Oncology (MAASTRO) clinic and other institutes worldwide, has resulted in a large number of publications, which has shown a rapid increase during the last few years. Many possible applications for radiomics are extensively discussed in recent literature, which shows its great valorisation potential. This undeniable potential has led to a concrete business plan, based on which the spin-off company Oncoradiomics has been established in Liège, Belgium, in 2016.

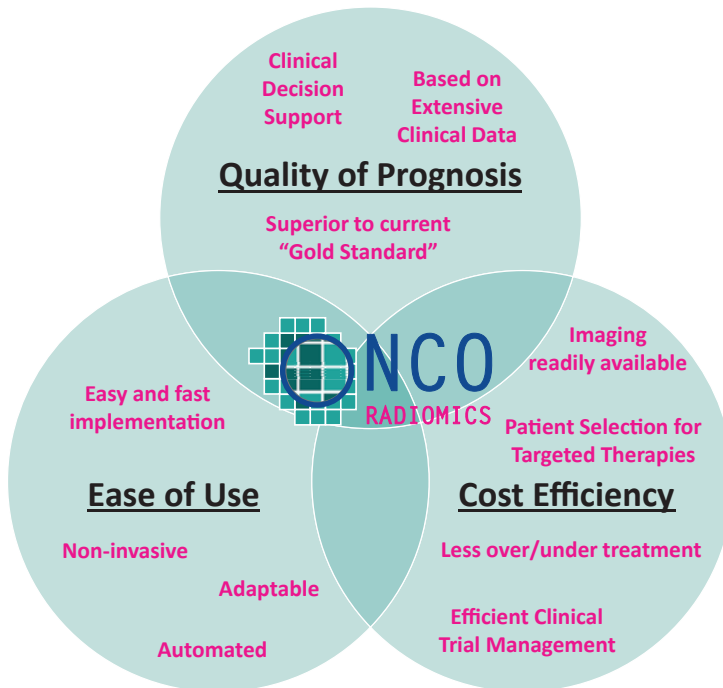


Figure 1 – Oncoradiomics aims to develop easy to use products and services providing higher quality of care for cancer patients while increasing the cost-effectiveness of treatment.

ONCORADIOMICS

Oncoradiomics (www.oncoradiomics.com) is a life science company and its intellectual property originates from MAASTRO clinic. Oncoradiomics aims to develop easy to use products and services providing higher quality of care (e.g. prognosis) for cancer patients while increasing the cost-effectiveness of treatment (**Figure 1**).

RADIOMIX

Based on the software developed for this thesis (addendum **Software development**), Oncoradiomics has developed RADIOMIX. RADIOMIX is a clinical grade CE marked software solution, enabling the extraction of quantitative image features and radiomic signatures from standard medical images to guide precision oncology. It includes the validated prognostic signature described in **Chapter 6-7** of this thesis. Different versions of this software will be made available to tailor different segments of the market.

First, it is made available as a plug-in, which makes it possible to easily integrate radiomics into existing software packages of large established market players in the fields of radiology, radiation therapy, PACS and other healthcare IT software. One example is the recent integration of radiomics into Aquilab's ARTIVIEW software, which has been presented at ESTRO 35 (29 April - 3 May 2016, Turin, Italy) and ESTRO 36 (5-9 May 2017, Vienna, Austria).

RADIOMIX will also be available as a cloud based software as a service. As such, it will provide means for patient stratification and response assessment using a secure online platform. This also makes it an ideal platform for clinical trials to investigate the effectiveness of novel therapeutic strategies or drugs.

Since the software is development in a modular way, future radiomic features and signatures can be easily added to the system to be made available to end users.

Currently, several renowned cancer centres are using a research version of RADIOMIX. Development of novel radiomic signatures will initially be investigated in close collaboration with these select centres. This research will result in presentations at key conferences, as well publication of peer-reviewed scientific articles.

DISTRIM

As discussed in this thesis, radiomics is fundamentally dependent upon the availability of data for development and validation. Oncoradiomics therefore also develops a commercial solution for distributed learning, DISTRIM. DISTRIM aims to enable a globally scalable and encrypted network, which will allow for (1) the development and validation of new radiomic signatures, and (2) continuous refinement and updating of existing signatures, to increase prognostic, predictive or diagnostic power.

