Combining data science and medical imaging

Propositions accompanying the thesis

Combining Data Science and Medical Imaging:
Advancing Cancer Precision Medicine with Radiomics

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1. Radiomics, an emerging field where many others intersect (medical physics, biostatistics, and computational biology) finds its significant application in recent cancer research (this thesis).

2. Radiomics can extract large amount of data from medical images, uncovering advanced features that characterize tumours non-invasively through data analysis. These features can robustly create a unique phenotypic atlas for each tumor (this thesis).

3. Associating clinical information to this atlas has enabled the identification of new, reproducible, image-based biomarkers, which have been used to predict tumor response to a specific treatment and understand tumor evolution or its intrinsic biology (this thesis).

4. Better treatment decisions will help reduce physical, emotional, and financial burden on patients; and on a larger scale, it will reduce the overall cost on the healthcare system through avoiding unnecessary surgeries, complications, and medications (this thesis).

5. The goal of this method [*radiomics*] is to investigate the association between image characteristics and tumor crucial information (relating to its nature, response, or evolution). This new method could be a potential tool for precision medicine (this thesis and valorization).

6. Data Scientist (n.): Person who is better at statistics than any software engineer and better at software engineering than any statistician. - Josh Wills, Director of Data Engineering at Slack (related to the field of science).

7. Data beats emotions - Sean Rad, founder of Tinder (related to the field of science).

8. In God we trust. All others must bring data. - W. Edwards Deming statistician, professor, author, lecturer, and consultant (related to the field of science).

9. Sanity is not statistical. - George Orwell, 1984

10. You can laugh about everything, but not with everybody. - Pierre Desproges

11. C'est drôle comme les gens qui se croient instruits éprouvent le besoin de faire chier le monde. - Boris Vian