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Imaging features for treatment selection, disease monitoring, and outcome prediction

Stanford scientist has developed a computational method that extracts quantitative imaging features that reproducibly describe lesion phenotypes associated with treatment response and clinical outcomes in cancer.

Medical imaging is a reliable, widely used diagnostic tool. However, to date, medical images require trained radiologists for accurate interpretation and clinical diagnosis. Researchers have attempted to use machine learning to diagnose disease instead by feeding a trained neural network with medical images. The current invention builds upon this research with a novel series of machine-learning models that segment lesions in medical images, extract radiomic features, and provide predictive diagnoses based on the radiomic features. Radiomic feature combinations extracted using this technology act as a virtual biopsy and enhance predictions of treatment response and clinical outcomes in cancer. Hence, the current invention can optimize treatment selection based on the best predicted outcome and monitor treatment response.

Stage of Development
Other

Applications

- Cancer patient selection for clinical trials.
- Companion diagnostic for treatment initiation.
- Disease monitoring.

Advantages

- Cost-effective
- Geographically unbound, compared to standard clinical diagnostics.
- Enhances the prediction of clinical outcomes beyond the current standard.
- Novel patient screening method for standard clinical and clinical trial use.
- Non-invasive

Publications

- Haruka Itakura, Achal S Achrol, et al. (2015). Magnetic resonance image features identify glioblastoma phenotypic subtypes with distinct molecular pathway activities. Science Translational Medicine, 7, 303ra1387.
- Adam B. Mantz, Ryle Zhou, et al. (2022). Radiomic features quantifying pixel-level characteristics of breast tumors from magnetic resonance imaging predict risk factors in triple-negative breast cancer. Journal of Clinical Oncology, 40, no. 16_suppl, e12612-e12612.

Patents

- Published Application: 20230404509
- Issued: 12,465,311 (USA)

Innovators

- Haruka Itakura

Licensing Contact

Jon Gortat

Licensing & Strategic Alliances Director for Physical Science

Email