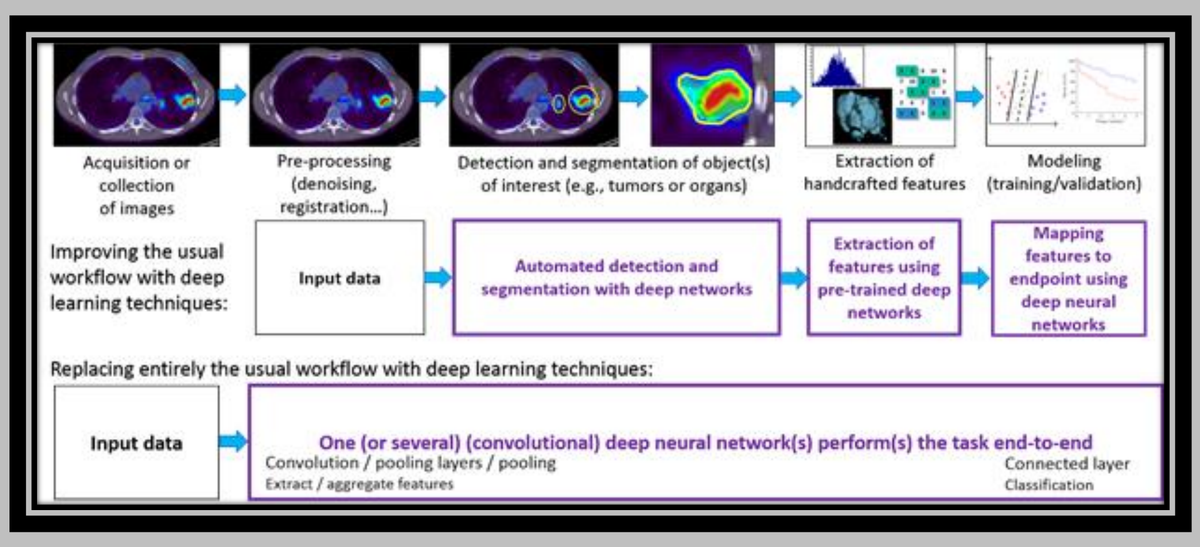
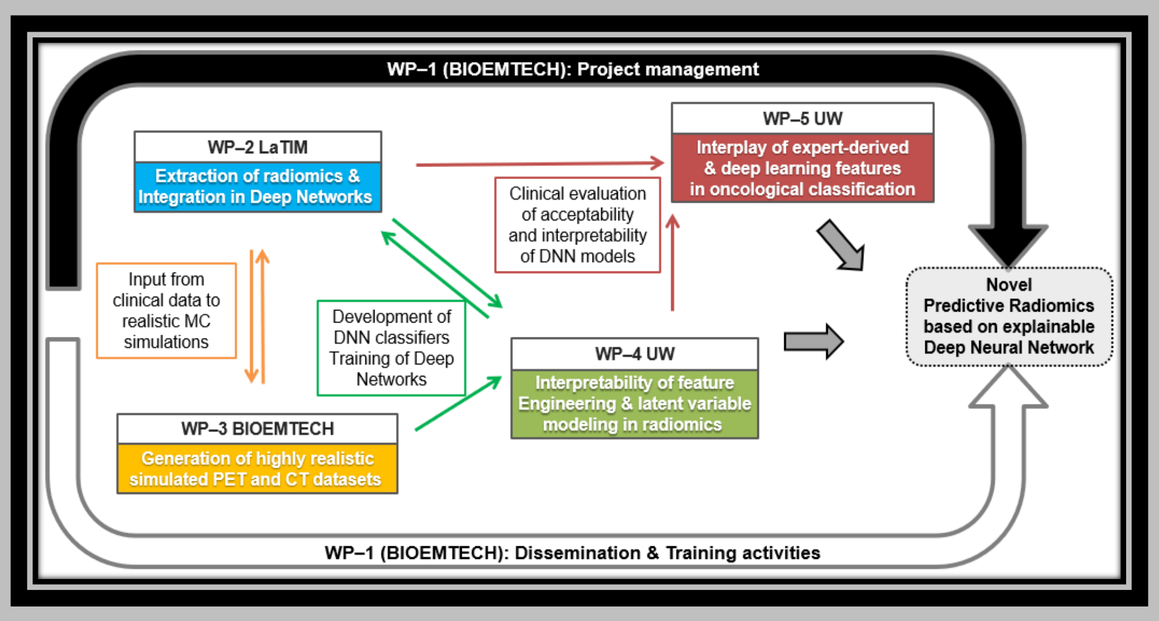
Interpretability of Deep Neural Networks for Radiomics

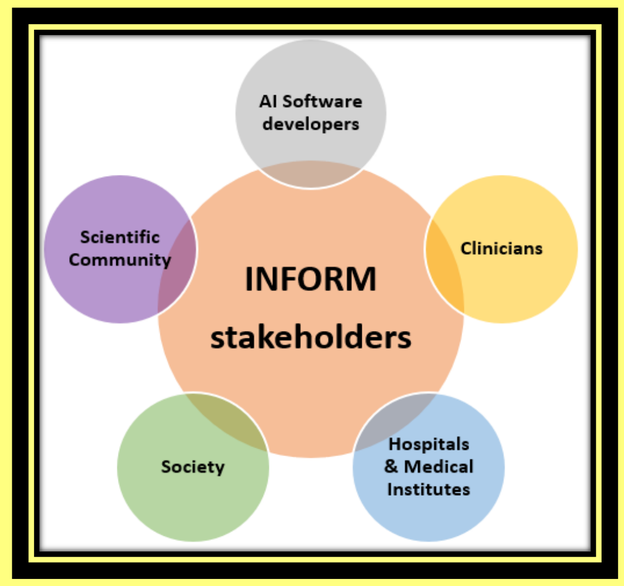
INTRODUCTION

DNN-based models and algorithms have seen limited adaptation and development within the radiomics approach, which aims at improving diagnosis or prognosis through extraction of engineered image features (intensity, shape, textures) sometimes combined with other clinical expert-derived features. The INFORM consortium proposes to investigate explainable artificial intelligence (XAI) with a dual aim of:

- Building high performance DNN-based classifiers
- Developing novel interpretability techniques for radiomics







METHODOLOGY & WORKFLOW

INFORM address state-of-the-art challenges by:

i. MC simulations combined with generative adversarial networks (GAN) will be used for producing large amounts of highly realistic simulated images to facilitate training DNNs.

ii. The innovative developments of saliency maps and related approaches for relevance scores, to tackle the interpretability of DNN-based feature engineering and latent variable modeling.

iii. Proposing to build explainable AI models that incorporate both conventional radiomic and DNN-based features.

iv. Carrying out the preliminary evaluation with the help of clinical collaborators on predicting outcome of patients with lung, cervical and rectal cancer

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