Layman Summary for "Weakly Supervised Training with Explainable Artificial Intelligence to Predict Breast-Cancer Response to Neoadjuvant Chemotherapy"

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This research tried using artificial intelligence (AI), specifically a deep learning model, to predict how patients will respond to a breast cancer treatment called neoadjuvant chemotherapy. The authors did this by analyzing a type of medical image known as Maximum Intensity Projection (MIP) images. The aim was to predict two values: the ratio of tumor sizes on MRI before and after treatment (RTVR) and the amount of cancer remaining after treatment determined by a pathologist (RCB).

The researchers used the same AI model in three experiments, making slight tweaks each time. The authors found that while the model could make some predictions about the outcomes, it was not very accurate overall. They also found that having the model predict both RTVR and RCB simultaneously (multi-task model) did not significantly improve its performance.

The researchers used Deep SHapley Additive exPlanations (SHAP) to understand why the models made their predictions. It showed that the model primarily focused on the tumor and nearby structures.

When they compared their model's performance to similar AI models used for breast cancer imaging, they found their model was not as accurate. They suggest this could be due to a few reasons, like the model overfitting the data (where the model becomes too specialized to the data it is trained on and performs poorly on new data) and a limited number of images they had for the model to learn from.

In conclusion, the model did not show the ability to predict patients' responses to treatment. The predictions were not accurate enough to be used in a real-world medical setting. Future work should look into refining the current method or exploring different strategies to improve the accuracy of the predictions.