

Applying advanced machine learning to existing data

During the COVID-19 outbreak and ensuing decreased access to campus, many labs have had to put their current research plans on hold. Dr. Nils Forkert's Machine Learning and Image Processing lab (ucalgary.ca/miplab) is willing to help apply novel machine learning techniques to analyze any unpublished data or re-imagine data from an existing database.

The machine learning framework developed by Dr. Forkert's team consists of two steps. The first step employs a feature ranking method in order to extract the most relevant features linked to the outcome variable. The second step involves training a machine learning classifier or regressor with the resulting feature set. Using cross-validation techniques, the optimal combination of the feature ranking method and machine learning model can be identified for each individual problem, important measures about how 'good' the model is (e.g. accuracy, f-score, correlation, root-mean-squared error) can be provided, and the optimal subset of features needed by the machine learning model can be determined. The optimal subset of features can also be investigated in more detail using conventional statistics while the developed machine learning model can be used to make predictions or classifications for new patients and thereby aid in Precision Medicine-focused research. One of the major benefits of machine learning is that data from various sources can be combined without strong assumptions about the data, even if the number of features (biomarkers) is higher than the number of subjects used for machine learning model training.

Dr. Forkert's lab aims for a two-to-four week turnaround on machine learning analysis, which could allow students, postdoctoral fellows, and PIs to use this data to write abstracts and/or publications in order to help continue productivity in this modified work environment. There is no fee for this collaborative support. Please contact Dr. Nils Forkert at nils.forkert@ucalgary.ca for further details about this collaboration.