

Multi-Modal Deep Learning Training Model

The global market for deep learning architectures is expected to reach USD 60.5B by 2025, with over 63% of healthcare companies using machine learning. Deep learning models expedite and improve the efficiency of discovering and proving correlations in data analysis, especially in healthcare research. Present technologies rely on large labeling setups where companies must hire personnel to process enough labels for the task of interest. This current method is costly and time consuming.

A deep learning model is provided that can, among other things, describe a supervised contrastive learning strategy using deep machine learning that can be used in various modalities. For example, on one medical modality, such as clinical labels, the model learns useful features for fine-tuning on another modality, such as biomarker labels. This model reduces the time and labor required to label tasks. To train conventional deep learning architectures, large quantities of labeled data is necessary. In this novel deep learning model, each individual data item, such as an image, is associated with a modality of labels such as clinical information. The model trains the data with a standard cross-entropy loss, a measure of probability distribution, to identify labels. This setup allows the leveraging of other types of data for the task of interest even without access to large amounts of labeled information within the explicit modality.

This technology is related to [9099 "Deployable Critical Active Learning \(DECAL\) System Offers Better Characterization for Improved Diagnostics and Imaging"](#)

Summary Bullets

- Resource Efficient
- Improved Modeling Method

Solution Advantages

- **Resource efficient:** This strategy for training machine learning creates models using less labeled data and less human capital.
- **Improved modeling methods:** The invention closes the gap between artificial intelligence theory and its application within various domains such as the medical domain, allowing for the deployment of intelligent methods even when access to domain experts is limited.

Potential Commercial Applications

- Clinical medicine, geology, geophysics, astronomy, etc.
- Most clear application is within the medical domain due to interactions of easy to collect clinical scores compared to fine-grained biomarkers.

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IP Status

<p>Patent application has been filed</p>: US63/425470

Publications

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Images

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<https://s3.sandbox.research.gatech.edu//index.php/print/pdf/node/3978>