

Deep Learning for Lung Cancer Treatments



A deep learning (DL) model developed at the Pennsylvania State University proved to be much more efficient in predicting survival expectancy of lung cancer patients than the traditional ML models (Doppalapudi et al. 2021).

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Using the data on lung cancer from Surveillance, Epidemiology, and End Results (SEER) cancer registry, a team of researchers at PennState assessed the survival period predictions by three DL architectures – Artificial Neural Networks (ANN), Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) – as well as compared the DL models' performance against traditional machine learning models. Both cancer survival classification and regression approaches were implemented.

The findings show that under certain conditions DL models' accuracy was 71.18% while the traditional machine learning models predicted the survival periods with an accuracy rate of 61.12%.

The researchers also conducted feature importance analysis to investigate the model interpretability, i.e. to evaluate how a combination of relevant factors, such as types of cancer, size of tumours, or the speed of tumour growth, impact lung cancer survival periods.

SEER registry is one of the biggest and most comprehensive databases on the early diagnosis information for cancer patients in the U.S., covering about 35% of U.S. cancer patients. The data are very diverse and cover many features across different patient populations, and DL models are particularly well-suited for processing such large, diverse datasets as SEER.

In the future, the researchers plan to work on improving DL models' accuracy, including through adding new, currently unaccounted features for analysis. They note that while a DL model cannot replace a human specialist, its application may substantially improve survivability estimates.

Source: [PennState](#)

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