

Deep Mining Reveals Omics Promise for Cancer Biomarkers



Harnessing the use of omics data – derived from research studies in biomedical sciences – is becoming increasingly important in advancing personalised cancer medicine. Analyses of omics data help scientists in identifying cancer genotype and phenotype, for example.

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However, knowledge discovery from complex biomedical datasets (omics data) poses a significant challenge to data mining experts. Such datasets are characterised by high dimensionality and relatively small sample sizes with small signal-to-noise ratios. These factors make extraction and interpretation of relevant knowledge from omics data difficult.

In a study published in the journal *Artificial Intelligence in Medicine*, researchers proposed an AI-based deep mining model that can work around the current obstacles in omics data analysis. "In this paper, we exploit recent advances in deep learning to mitigate against these limitations on the basis of automatically capturing enough of the meaningful abstractions latent with the available biological samples," wrote Abeer Alzubaidi, PhD Researcher with the [School of Science and Technology, Nottingham Trent University](#), and co-researchers.

The study's deep feature learning model is based on a set of non-linear sparse auto-encoders that are deliberately constructed in an "under-complete manner" to detect a small proportion of molecules that can recover a large proportion of variations underlying the data.

As noted by the researchers, applying multiple projections to the input signals makes it difficult to identify which cancer phenotypes are responsible for deriving predictions.

"Therefore, we also introduce a novel weight interpretation technique that helps to deconstruct the internal state of such deep learning models to reveal key determinants underlying its latent representations," Alzubaidi and colleagues explained.

The study's findings indicate the proposed deep mining model is robust enough to [identify biomarkers](#) that are positively and negatively associated with cancers of interest, the research team concluded.

Source: [Science Direct](#)

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Reference: Alzubaidi A, Tepper J, Lotfi A (2020) A novel deep mining model for effective knowledge discovery from omics data. *Artif Intell Med.* 104: April 101821. <https://doi.org/10.1016/j.artmed.2020.101821>

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