Artificial Intelligence in Substance Use Research: A literature overview and recent developments

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Introduction: *Recent advances in Artificial Intelligence (AI), particularly Machine Learning (ML), have provided impressive results in various domains such as medical and sports diagnosis. ML algorithms require initial training on data to learn about target outcome in a 'supervised' way or can be used 'unsupervised' to identify patterns in very large datasets. In this emerging field, we provide an overview of ML applications in substance use research.*
Method: *Narrative literature review of studies published in the last decade.*
Results: *ML has been used and performs well in substance use dependence diagnosis, generating tailored treatment plans, and predicting treatment trajectories or outcomes. ML methods are also popular to help profile addictive behaviours, including the comorbidity of alcohol, nicotine, and cannabis use, and to identifying significant risk factors for substance use behaviours in very large datasets. Other ML applications concern the identification of alcoholic beverage from real-life images and even of alcohol inebriation from audio files of speech with an accuracy between 67% and 89.*
Discussions and Conclusions: *Although AI applications for addiction research are in their infancy, they have shown promising results. ML algorithms have the advantage to produce results (a) often more consistently, accurately, and objectively than humans who are prone to errors, fatigue, and subjectivity bias and (b) on a scale that largely exceeds manual annotation or content analysis.*
Implications for Practice or Policy: *In a time, in which enormously large datasets are available or can easily collected using registries, sensors, and mobile technology, the importance of using of AI algorithms will be increase exponentially. Future developments include the more extensive use, but also the need for further validation, of large pre-trained models including ChatGPT.*

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