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Predicting problem gambling with machine learning models: Insights from player tracking data across three countries

What this research is about

Online gambling has increased significantly over the past decade. This increase has unfortunately led to an increase in self-reported gambling problems. At the same time, online gambling allows gambling operators to monitor player data. This involves tracking bets, wins, losses, deposits, and withdrawals that people make through their gambling accounts.

Several studies have used player tracking data and machine learning models to predict problem gambling from behavioural (e.g., number of bets made) and monetary (e.g., amount of money bet) indicators. Machine learning models are algorithms that can learn from a given dataset and make predictions on new data. Recent research suggests that behavioural indicators may contribute more to the prediction of problem gambling than monetary indicators. This is because income levels vary across countries. Thus, there are differences in monetary indicators, which can reduce the accuracy of machine learning models.

In this study, the researchers tested five machine learning models' ability to predict self-reported problem gambling. Data were from people from the UK, Canada, and Spain who gambled online on casino games. By analyzing account-based player tracking data, the researchers aimed to identify behavioural indicators that predict problem gambling. They also evaluated whether the models developed in specific countries could predict problem gambling among players in another country.

What the researchers did

The researchers analyzed account-based player tracking data from people who gambled on online casino games. Each participant completed the Problem Gambling Severity Index (PGSI) between January 2022 and November 2023. The PGSI assesses problem gambling behaviours and consequences.

The dataset included participants' information regarding bets, wins, deposits, and withdrawals made in the 30 days prior to completing the PGSI. It also included behavioural aspects such as the number of deposits made per session and frequent deposits within a session. Regular account depletion was determined using the percentage of sessions ending with a low account balance (less than €5).

The researchers excluded data from participants who completed the PGSI in less than 1 minute. This left a

What you need to know

In this study, the researchers used player tracking data to evaluate whether behavioural indicators could predict problem gambling using machine learning models. The data were obtained from 1,743 adults from the UK, Canada, and Spain who played online casino games. The researchers found that behavioural indicators (e.g., frequent deposits within a session) were more important than monetary indicators (e.g., total amount of money gambled) in predicting problem gambling. The five machine learning models employed in this study showed promising results in predicting problem gambling. Including country-specific data improved their accuracy. Nevertheless, the models performed well even without training using country-specific data. The findings suggest that there are behavioural indicators that can be used across diverse contexts to identify problem gambling.

final sample of 1,743 participants. The participants were 39% female and had an average age of 42.4 years. Around 27.4% of the participants had scores of 8 or higher on the PGSI, indicating they experienced problem gambling. Most participants were British (73.7%). Canadian participants comprised 6% of the sample, and Spanish participants comprised 20.3%.

The researchers used regression to examine the influence of demographic, behavioural, and monetary indicators on self-reported problem gambling. They then employed five machine learning models: AdaBoost, decision trees, extra-trees gradient boosting, and random forests. The models were trained using data from two countries and tested on the third country. To evaluate whether including country-specific data improved prediction, an additional model was trained using data from all three countries, with the data split 70/30 for training and testing.

What the researchers found

Younger people, particularly in the UK and Spain, were more likely to report experiencing problem gambling than older people. Self-exclusion, shorter gambling sessions, frequent deposits within a session, and regular depletion of one's account were also indicators of problem gambling among participants in at least one of the three countries.

Monetary indicators, such as the total amount of money deposited, did not significantly improve the prediction of problem gambling. This suggests that behavioural indictors are more important than monetary indicators in identifying problem gambling.

The five machine learning models showed promising results in predicting problem gambling. Even when trained with one country's data excluded, the models still identified problem gambling patterns. Including country-specific data did improve their accuracy. Key behavioural markers, such as frequent deposits and regular account depletion, consistently predicted problem gambling across all three countries.

These findings suggest that while including country-specific data improves accuracy, the models can still identify problem gambling in diverse contexts.

How you can use this research

The findings can be used by gambling regulators and researchers. Regulators can implement responsible gambling tools that emphasize behavioural indicators of harm (e.g., frequency of deposits). Researchers can explore additional behavioural markers and improve the predictive ability of machine learning models.

About the researchers

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Citation

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