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Raising Standards in Compliance: Can Artificial Intelligence help industry stay one step ahead of criminal spenders in online gambling?

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Disclosures

• Current;
  • Employed by BetBuddy, a wholly owned subsidiary of Playtech Plc, a significant industry supplier and operator
  • External supervisor at City, University of London
    • One research project funded by Kindred Group
• Previous research funded by;
  • InnovateUK
  • EPSRC
  • ESRC
  • DSTL.
In 2017 Kindred, City, University of London, and BetBuddy kick-started an AML / AI project
What is money laundering?

• Person benefits from being party to criminal activity

• Involves funds related to;
  • Fraud
  • Corruption
  • Tax evasion
  • Organised criminal activity
  • Terrorism
  • Theft
  • Leisure spend of criminal proceeds.
All high profile regulatory cases in recent history in the UK have centred primarily on criminal spend

<table>
<thead>
<tr>
<th>Year</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>2015</td>
<td>Two cases involving money laundering and criminal leisure spend (£950K)</td>
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<tr>
<td>2016</td>
<td>Customer gambling significant amount of stolen funds (£850K)</td>
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<tr>
<td>2017</td>
<td>Social responsibility failings and a case with one customer gambling stolen money (£7.8m)</td>
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<tr>
<td>2018</td>
<td>AML and social responsibility failings (£6.2m)</td>
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</table>
Whilst significant investment in modelling gambling related harm, AML largely ignored

- Problem gambling largest negative externality in gambling industry and has had comparatively [and rightly?] much larger funding;
  - Machine learning applied to problem gambling detection 10+ years ago
  - Growing body of research using gambling data for past 10 years
- Very little research attention, data sets, funding, applied to improving AML detection.
Stakeholder interviews

Raising Standards in Compliance: Application of artificial intelligence to online gambling data to identify anomalous behaviours

Industry Stakeholder Interview Whitepaper

1. Are Criminals Staying One Step Ahead?

Yes

• Criminals are sophisticated, in that they have the ability to stay ‘under the compliance radar’
• Relatively easy to develop strategies using multiple online accounts to remain under their respective compliance controls and checks
• Challenging to detect money once in the system i.e., banked.

However

• There are obvious examples of high-spending individuals being missed by operators
• Data privacy laws shouldn’t be an issue in data retention and information requests
• History of criminal leisure spending gambling, industry must keep trying.
2. Is Compliance Elevated Sufficiently in Industry?

Yes
• But, cultural change in commercial departments can take time
• Significant costs to hire additional staff to increase compliance checks.

However
• Gambling is a clearly regulated industry, and AML laws have been in place for many years, arguably industry has under-invested and is today catching up
• A compliance rich commercial team can be a commercial advantage in preventing regulatory action and protecting a brand.
3. Is increased AML focus inconveniencing customers?

Yes

• Source of Funds (SOF) and Source of Wealth (SOW) requests seen as an invasion of privacy, risk of going to competitors who may not be applying as stringent checks, in effect rewarding less compliant operators with valuable and legitimate customers.

However

• Customers already have to share personal information when opening an account or if they wish to receive marketing and rewards
• Industry needs to re-educate its customers that, if they wish to gamble in a certain way or over certain monetary thresholds, they will be asked questions and asked to prove things. This is very common practice in other industries.
4. Is increased ongoing monitoring too technically challenging?

Yes

- Posing significant operational challenges for operators, that compliance costs have increased significantly and that increasing coverage using the current systems and tools could easily double compliance team sizes
- No data sharing exists across operators, with no feedback from crime agencies on SARs/STRs submitted.

However

- Human oversight plays an important role here, through the application of observation and common sense e.g., all regulatory settlements involved ‘obvious’ large spend, if proper checks were implemented.
Recommendations - For Regulators and Crime Agencies

• Develop a single format or technical protocol for submitting STRs and SARs across jurisdictions that enables operators to submit cases using a consistent system

• Continue exploring opportunities to develop a single central database for customers flagged for suspicious gambling activity.
Recommendations - For Online Gambling Operators

• For threshold checks, explore the addition of both more threshold levels and variable elements.

• Develop more sophisticated and cost-efficient methods to improve ongoing monitoring.

• Use data to develop more sophisticated behavioural checks and customer affordability segments.

• Invest in modernising and simplifying KYC and SOF processes, using it as an opportunity to build a closer customer relationship and to build trust.
Recommendations - For Online Gambling Operators

• For threshold checks, explore the addition of both more threshold levels variable elements

• Develop more sophisticated and cost-efficient methods to improve ongoing monitoring

• Use data to develop more sophisticated behavioural checks and customer affordability segments

• Invest in modernising and simplifying KYC and SOF processes, using it as an opportunity to build a closer customer relationship and to build trust
Opportunities to raise standards

Opportunity 1
More sophisticated ongoing behavioural and affordability monitoring for customers who pass initial enhanced KYC checks and are larger than average spenders.

Opportunity 2
More sophisticated and efficient analysis of many millions of daily transactions for ongoing behaviours below regulatory thresholds, especially for emergent payment methods (and ideally across multiple operator/brand player accounts).

£1.5K
Registration
Customer tenure
Customer spend

Mature Process
Typically enhanced KYC checks following deposit or staking at £1.5K within a 24 hour period.

Mature Process
Age verification checks on registration.
Recommendations - For Enhanced Ongoing Monitoring

<table>
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<tr>
<th>Domain</th>
<th>Type of Machine Learning</th>
<th>Proposed Machine Learning Techniques</th>
</tr>
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<tbody>
<tr>
<td>7. Suspicious Play Check</td>
<td>Supervised Learning</td>
<td>Random Forests, Bayesian Networks, Multi-Layer-Perceptron</td>
</tr>
<tr>
<td>8. Anomaly Check (Player)</td>
<td>Unsupervised Learning</td>
<td>Hierarchical-Temporal Memory (HTM), Long Short-Term-Memory (LSTM), Hidden Markov Models (HMM)</td>
</tr>
<tr>
<td>9. Anomaly Check (Branch, Game, Game Type, etc.)</td>
<td>Unsupervised Learning</td>
<td>Hierarchical-Temporal Memory (HTM), Long Short-Term-Memory (LSTM), Hidden Markov Models (HMM)</td>
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<td>10. Affordability Check</td>
<td>Supervised Learning</td>
<td>Random Forests, Bayesian Networks, Multi-Layer-Perceptron</td>
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New behaviours can be analysed and methods tested to potentially improve monitoring.
Data and Analytical Approach

- UK sports and casino sport betting (~35K players)
- 218 labelled AML cases
- 9 feature model: Deposits, Withdrawals, Balance, Losses, RTP, Frequency, Staking
- ~4K randomly selected for control group
- Balanced data sets for model training i.e., positive class oversampled
- 20% of data samples withheld for hold-out testing using real-world ratio i.e., 1% suspicious cases
- Three methods; Logistic Regression, Random Forest, NN.
Early Results – Supervised Learning

Logistic Regression

Random Forest

Multilayer Perceptron
Next Testing – RNNs

- A special kind of neural network for sequential information
- Have a “memory” that remembers what has been done so far.

**Uber Example**

- Extreme forecasting
- Data sparsity e.g., small number of NYEs to work with
- External factors influential e.g., weather
- 2-18% increase in accuracy.

https://eng.uber.com/neural-networks/
THANK YOU