



 experian™

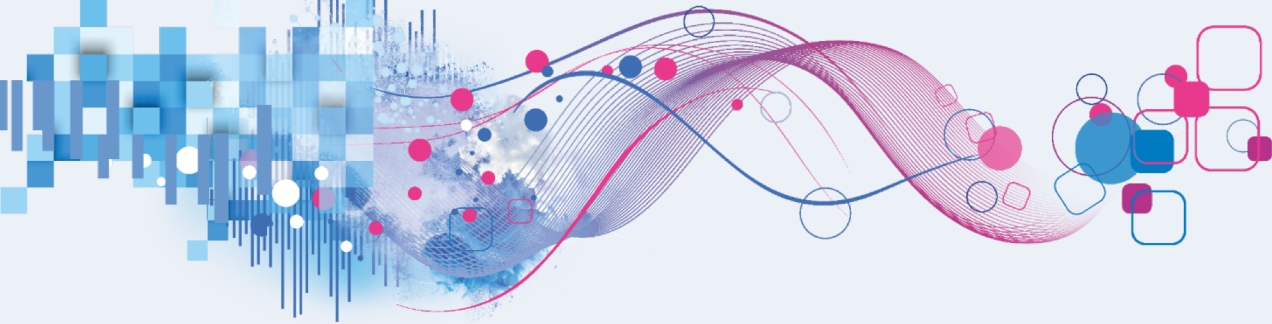


Artificial Intelligence in Tax & Revenue Fraud

Presented to FTA Technology Conference and Exhibition

Presented by David Kregness & Eric Thompson
Aug 2018





Contents

1. Analytical Challenges in detecting Tax and Revenue Fraud
2. “Artificial Intelligence”- what it means and why it’s important
3. Best Practices in Tax and Revenue Analytics
4. Summary
5. Questions

Analytical Challenges in detecting Tax and Revenue Fraud

What I am looking for?

- Frauds try to look like good filers (not unusual)
- Temptation for non-fraudulent filers to do things that look fishy
- Separating fraud types – inflated return v. identity fraud

How will I know it when I see it?

- Rules-based approach (aka, red flags)
- Limited history on many filers
- Confirmed fraud, cleared good filer, or non-response (reject inference)

What data can I leverage?

- Trended data (year over year v. point in time)
- Socio-Economics
- Data is thin where needed most
- Data Source presumptions and biases

An integrated decisioning system drives value by converting raw data into meaningful actions

Request for decision

“Should I trust the identity on this return?”

Action

*1) Require additional verification
or
2) Process return*

Integrated decisioning process



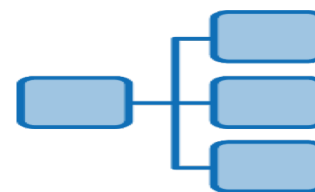
Data



Attributes



Scores



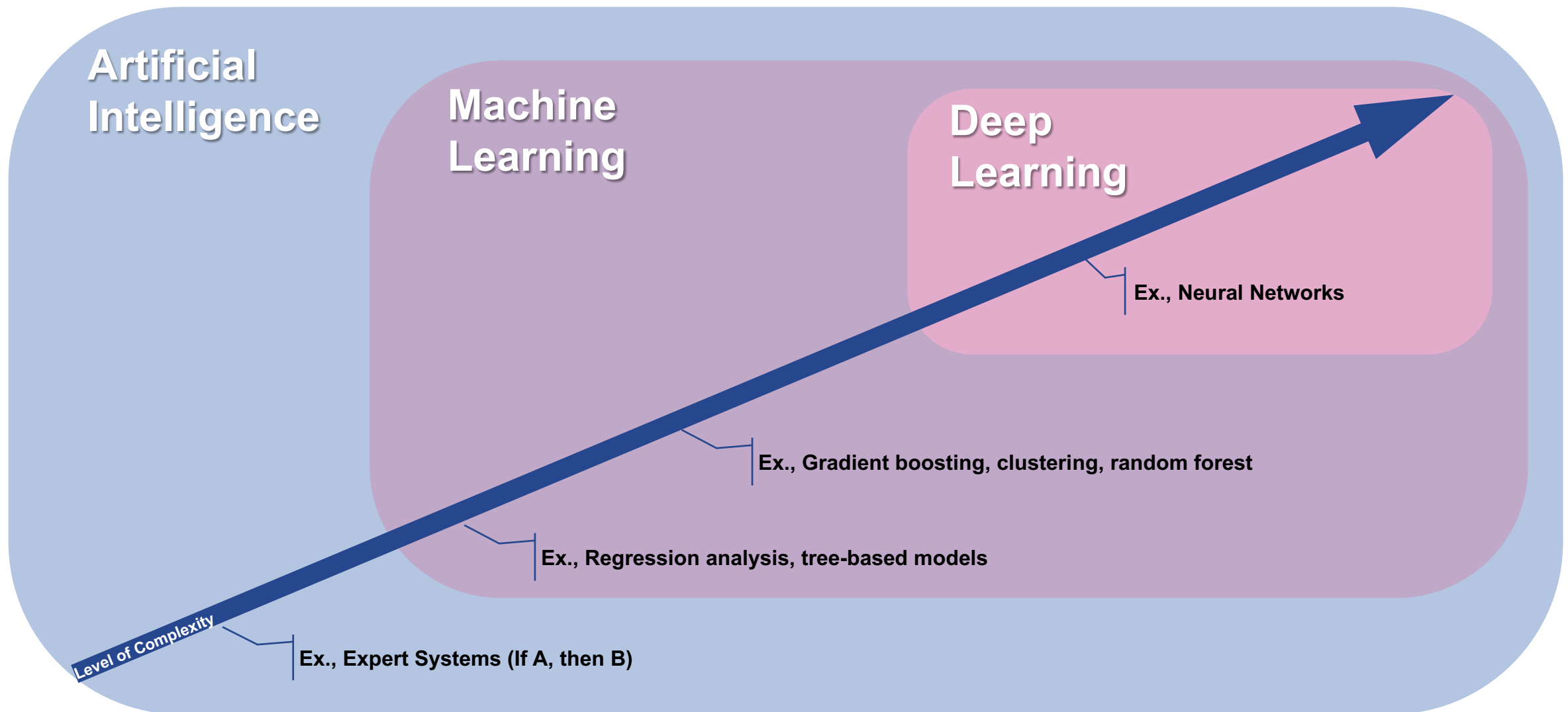
Decisions



Actions

“Artificial Intelligence” is trending as a buzzword, but what does it really mean?

- **Artificial intelligence** is simply “the capability of a machine to imitate intelligent human behavior”¹, which comes in many flavors and levels of complexity
- “Artificial Intelligence” as a term is first attributed to John McCarthy (Dartmouth College professor) in 1956², but the concept is documented as far back as Greek mythology (i.e., Talos)³

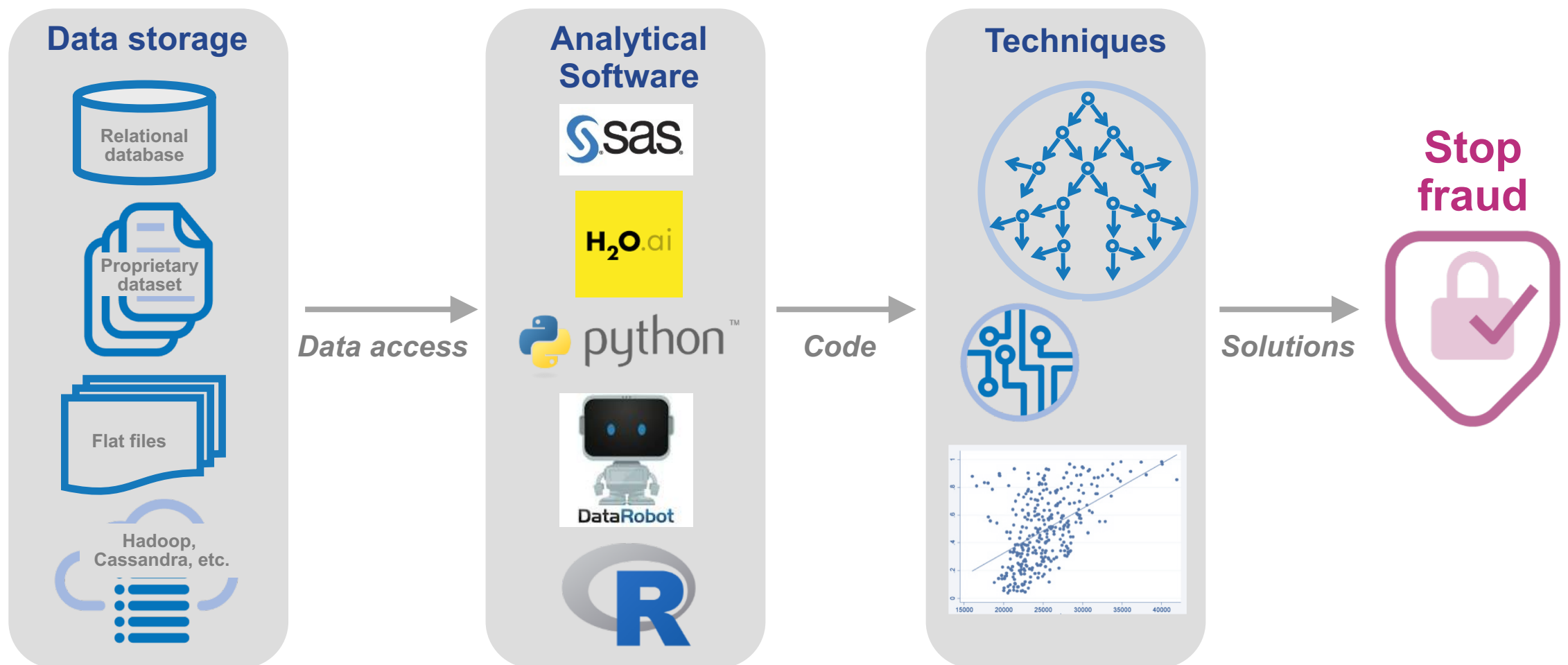


Sources:

- 1) Merriam Webster - https://www.merriam-webster.com/dictionary/artificial%20intelligence?utm_campaign=sd&utm_medium=serp&utm_source=jsonld
- 2) History of Artificial Intelligence, McCorduck, et. al., <http://ijcai.org/Proceedings/77-2/Papers/083.pdf>
- 3) Talos - <http://www.maicar.com/GML/Talos1.html>

Artificial Intelligence is making a resurgence now due to a combination of factors

BIG DATA + **PROCESSING POWER** + **DATA SCIENCES**

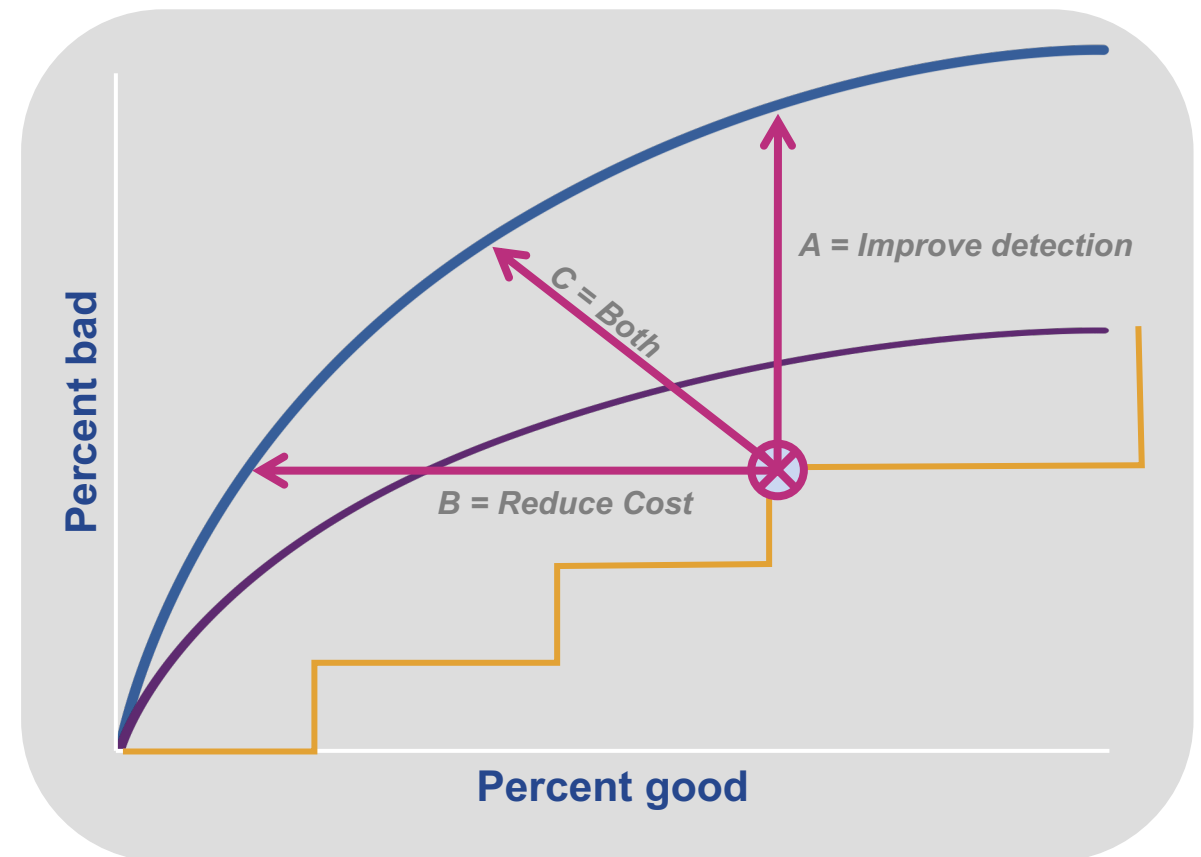


Why should we care?

Better techniques allow for improved performance, regardless of objective

- **Option A: Improve detection, hold cost steady**
 - Detect more fraud, with the same amount of effort
- **Option B: Reduce Cost, hold fraud steady**
 - Detect the same amount of fraud, with less effort
- **Option C: Reduce Cost AND Improve Detection**
 - Detect more fraud with less effort

Receiver Operator Characteristic (ROC) Curve



Artificial Intelligence examples:

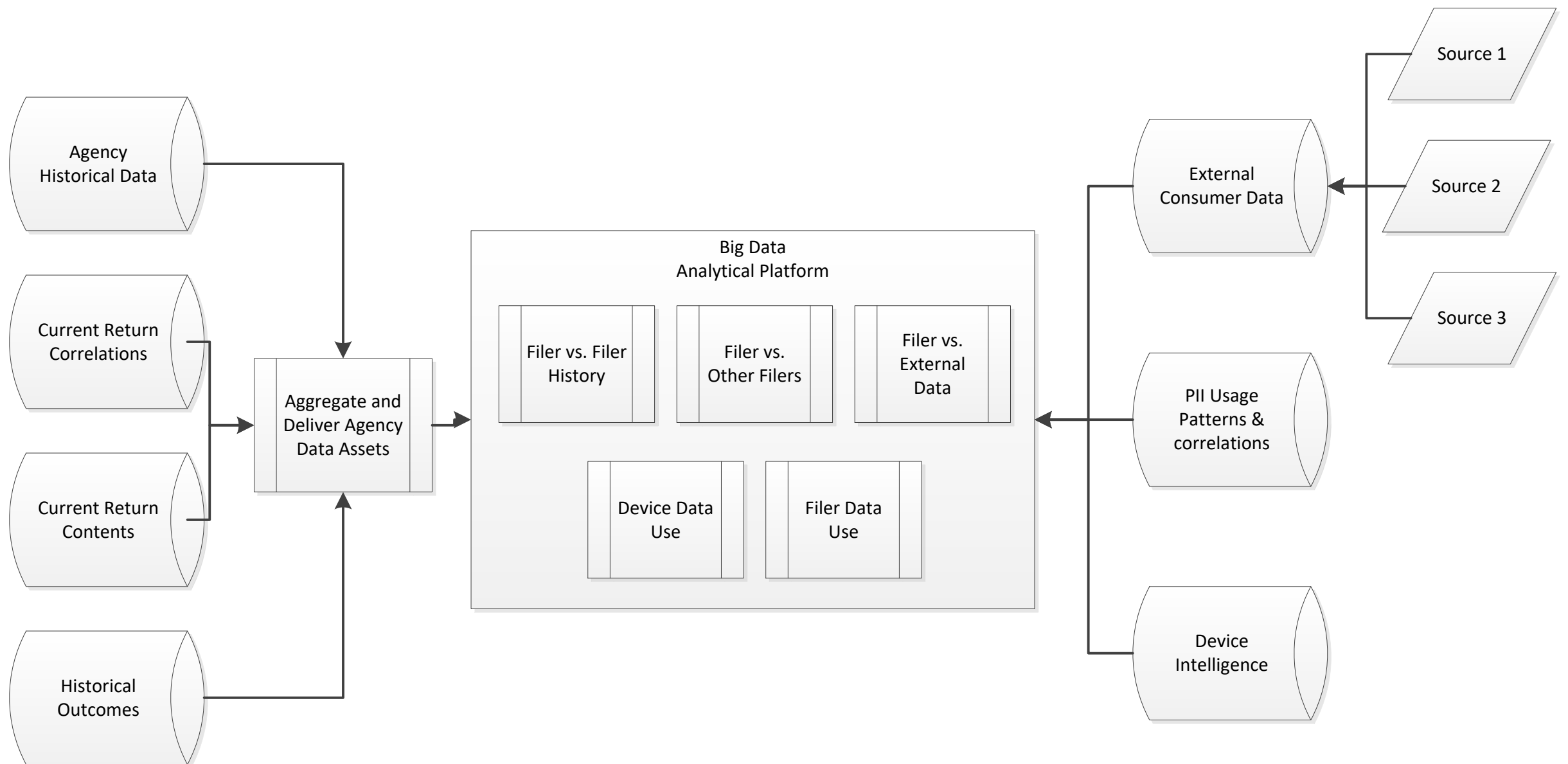
Gradient Boosting	—
Logistic Regression	—
Rules-Based	—

Note: A Receiver Operator Characteristic (ROC) Curve helps to visualize the value associated with a given predictive model

Best Practices for Tax and Revenue Fraud Analytics

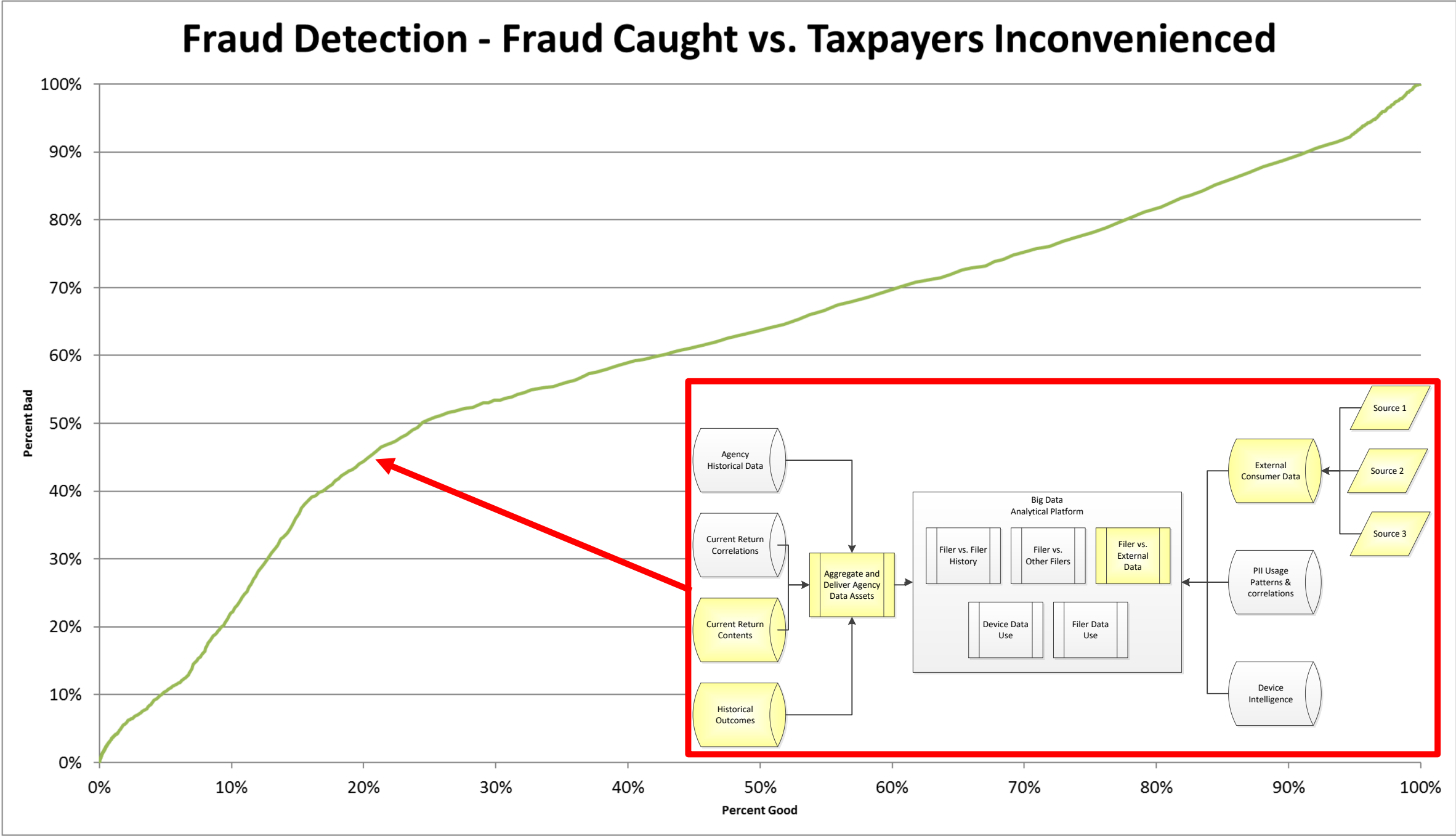


Replace isolated/linear assessments with a machine learning approach leveraging available data



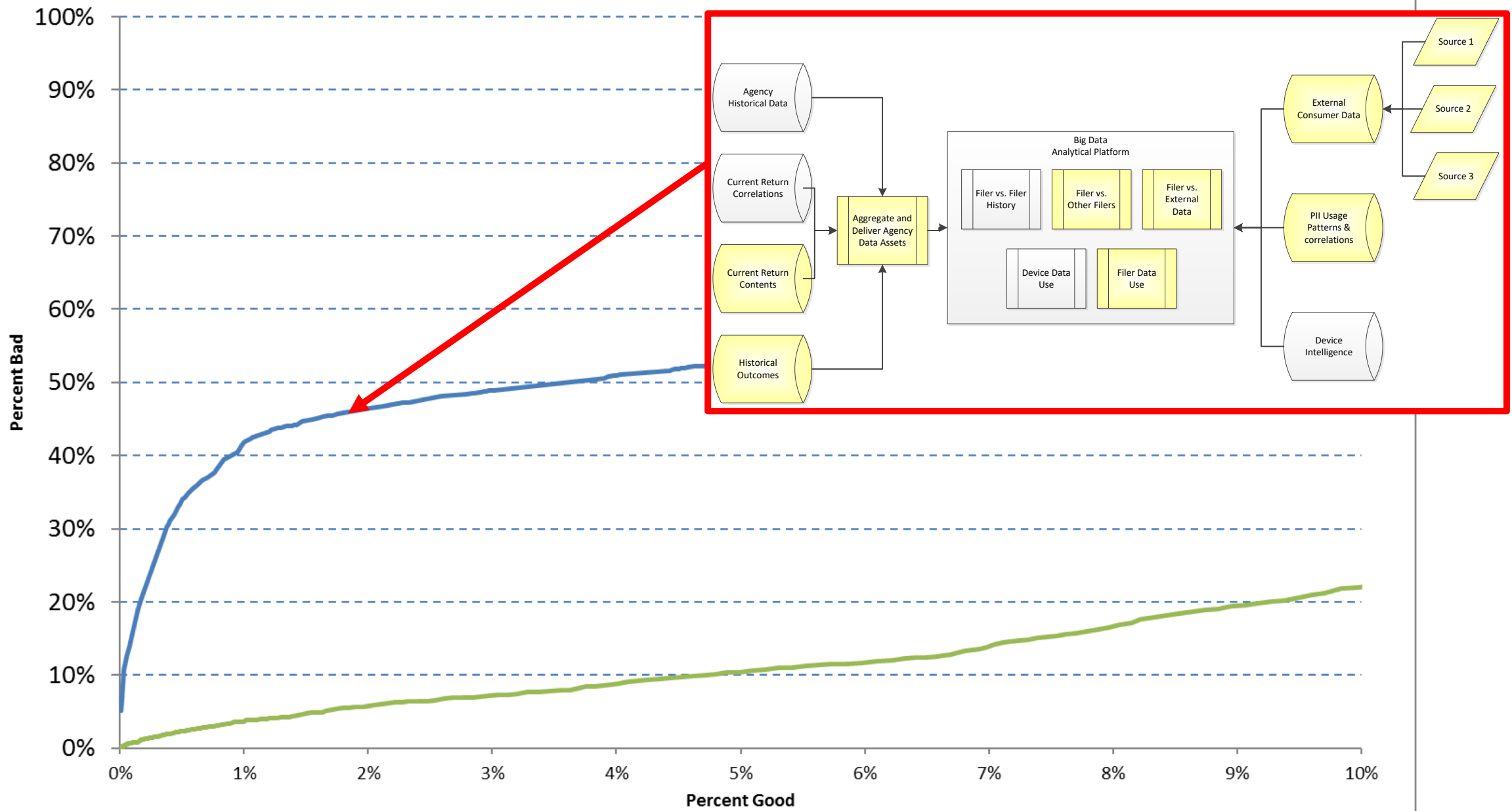
Using a generic model performs better than randomly selecting, but is not optimal

Fraud Detection - Fraud Caught vs. Taxpayers Inconvenienced



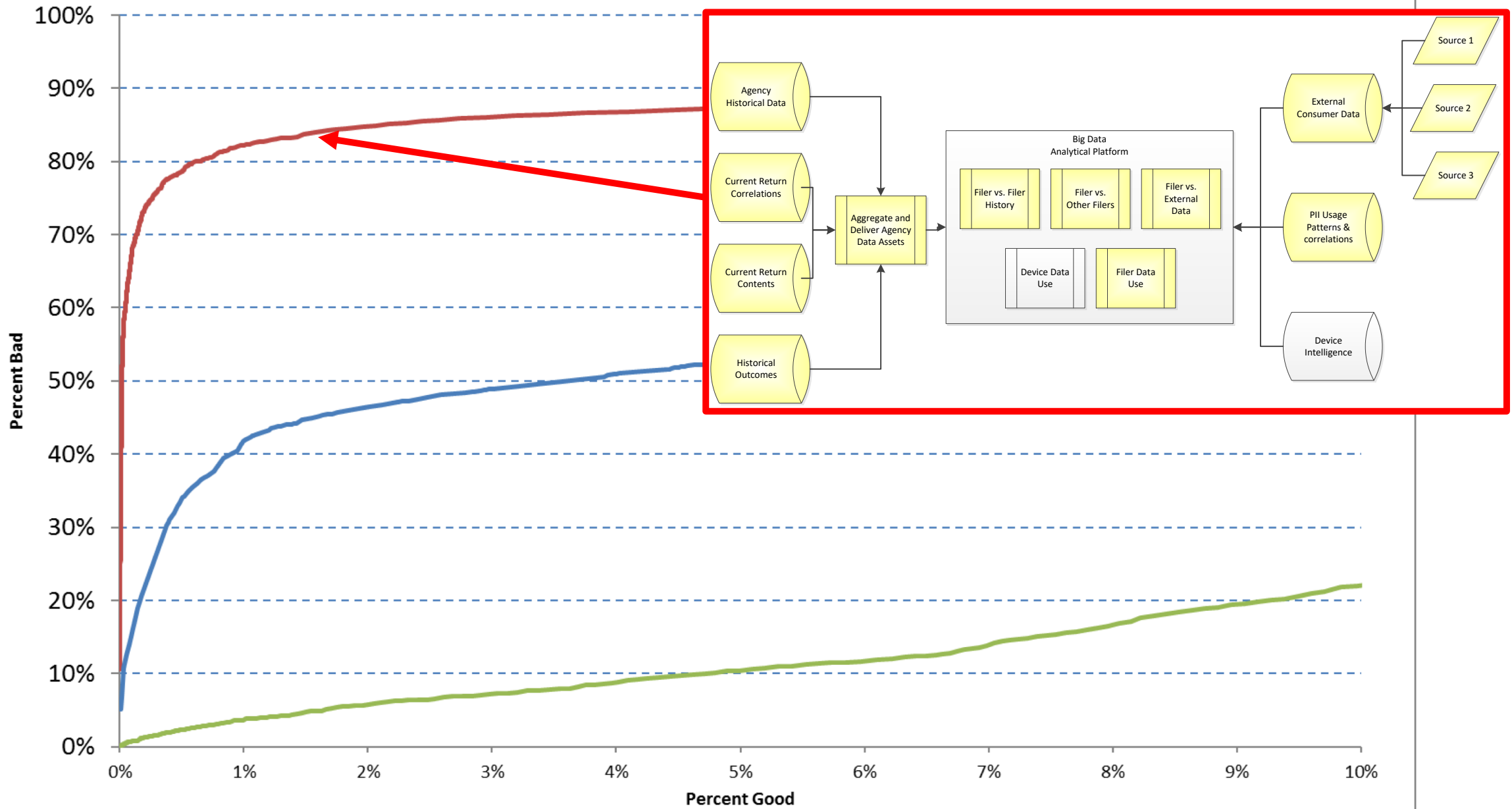
Leveraging a customized model with more data provides significant lift from the generic one

Fraud Detection- Fraud Caught vs Taxpayers Inconvenienced



Adding in additional data provides significantly more data

Fraud Detection- Fraud Caught vs Taxpayers Inconvenienced



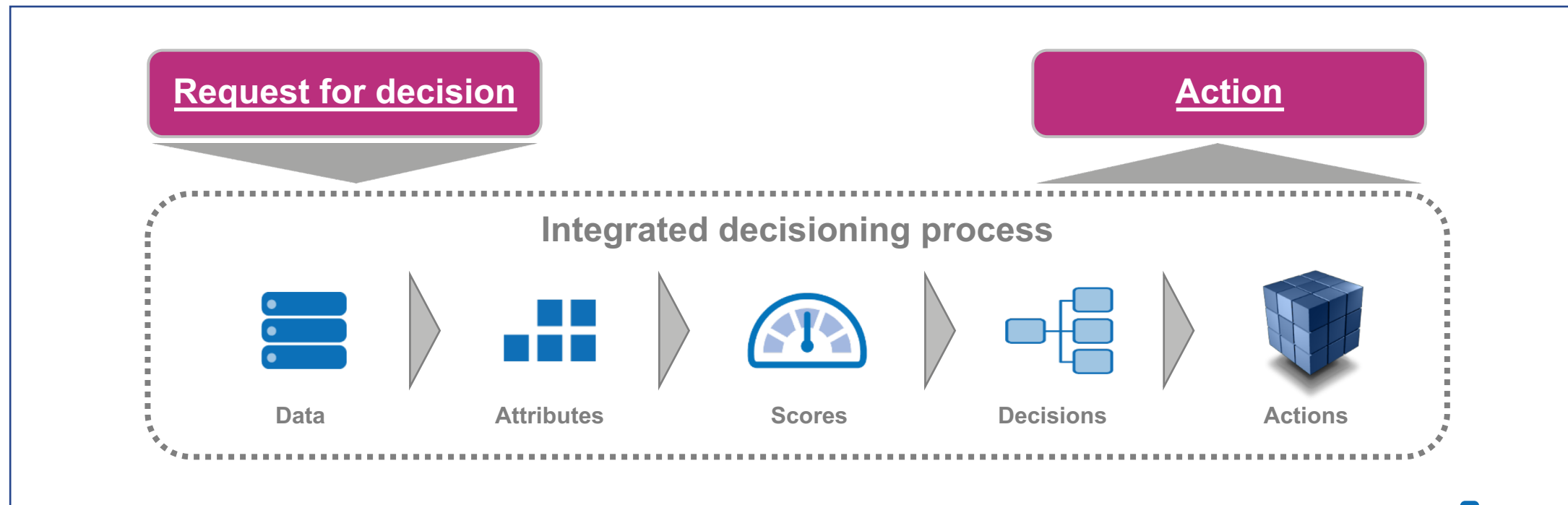
Summary

Artificial Intelligence is opening new avenues to reduce Tax & Revenue Fraud

- Big Data: Increased data and attributes available; optimal to use a combination of agency data and external data
- Processing Power: Systems are more powerful for advanced models with local or out-sourced options
- Data Sciences: Advanced statistical methods (machine and deep learning)



Integrated decisions are critical to achieving the best outcomes for agencies and tax payers alike:





Questions

David Kregness
Sr. Account Director, Experian Public Sector
Dave.Kregness@Experian.com
(612) 819- 7532

Eric Thompson
Fraud & Identity Business Consulting
Eric.Thompson@Experian.com
(972) 693-2763