

Considering the 'FAT' implications of the use of machine learning within police decision-making

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Machine Learning = a specific category of advanced algorithm that is able to improve at a certain task after being exposed to new data



‘The theories underlying machine learning are statistical, and therefore ML algorithms deal with **probabilistic** classifications or predictions, **not certainties**, and generalisations from particular observations.’

(Babuta, Oswald & Rinik, 2018)

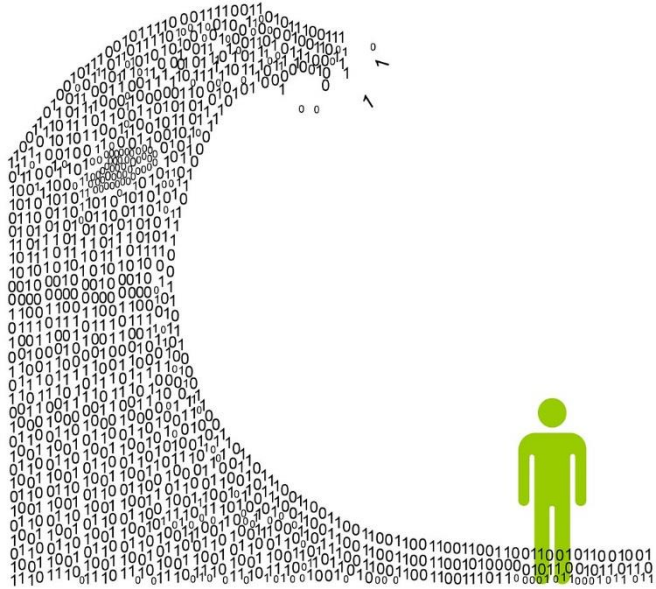
Purposes of machine learning within policing

- Derive **insights** from data
- Inform **operational decision-making**, including investigations
- Make **predictions** (about locations, circumstances or people)

But

‘We are often seduced by the talk of prediction and facial recognition, but a lot of the more important and perhaps mundane uses are in the background, more to harmonise big databases... The predictive stuff may be a red herring.’ (Interview quote from Babuta and Oswald, 2020 forthcoming)

Drivers for use of algorithms in policing



“Police decision-making on a risk basis is inconsistent. We struggle to identify the needles in the haystack of truly high-risk...There’s real room for that sort of tech to better identify high-risk, better screen out high-volume, low-risk where we don’t need to prioritise resources, and it enables us to make better decisions and push our resources in the area of greatest need.” (Babuta and Oswald, forthcoming 2020)

Issues and limitations (Babuta and Oswald, 2020 *forthcoming*)

- **Evidence base:** ‘the development of policing algorithms is often not underpinned by a robust empirical evidence base regarding their claimed benefits, predictive accuracy, scientific validity or cost-effectiveness. Furthermore, capability development is largely data science-driven, with comparatively little focus on the underlying criminological theory, legal requirements or conceptual framework on which the technology is based’
- **Data quality:** ‘Interviewees stressed the importance of context when interpreting the reliability of police-recorded information’
- **Skills/expertise:** ‘The big issue in policing is not the technology, it’s what the military call the “capability stack”, the combination of the technology, the people and the processes that need to be considered... There’s still a long way to go because we’re not considering all three.’ (police interviewee)

'Predictive' use cases

- **Predictive crime mapping** = the use of statistical forecasting applied to crime data to identify locations where crime may be most likely to happen in the near future
- **Individual 'risk' assessment** = statistical model which uses pre-defined 'risk factors' to assign individuals numerical scores corresponding to their predicted probability of future offending

But

Are they really 'predicting' or 'risk assessing' anything? More accurate to say that they are categorizing by comparison with selected characteristics of a specified group in the past in accordance with an algorithm generated by ML



Do they work in policing?



‘high accuracy rates at the group level
can often conceal very low accuracy

rate

group

large

are

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often

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accuracy’ of the tool.’ (Babuta and
Oswald 2019)



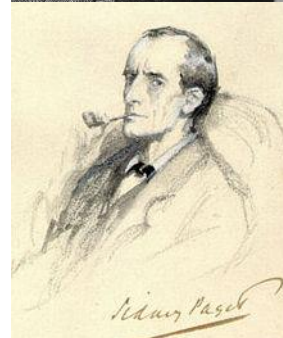
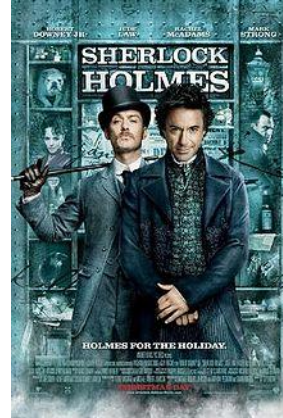
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Or...

‘While the individual man is an insoluble puzzle, in the aggregate he becomes a mathematical certainty. You can, for example, never foretell what any one man will do, but you can say with precision what an average number will be up to. Individuals vary, but percentages remain constant.’
(Doyle, 1890)



SHERLOCK



Want To Leave A Life Of Crime Behind?



We Can Checkpoint You In The Right Direction



Who (or what) decides?

- A risk forecasting algorithmic model

To **support** decision-making by

- The custody officers

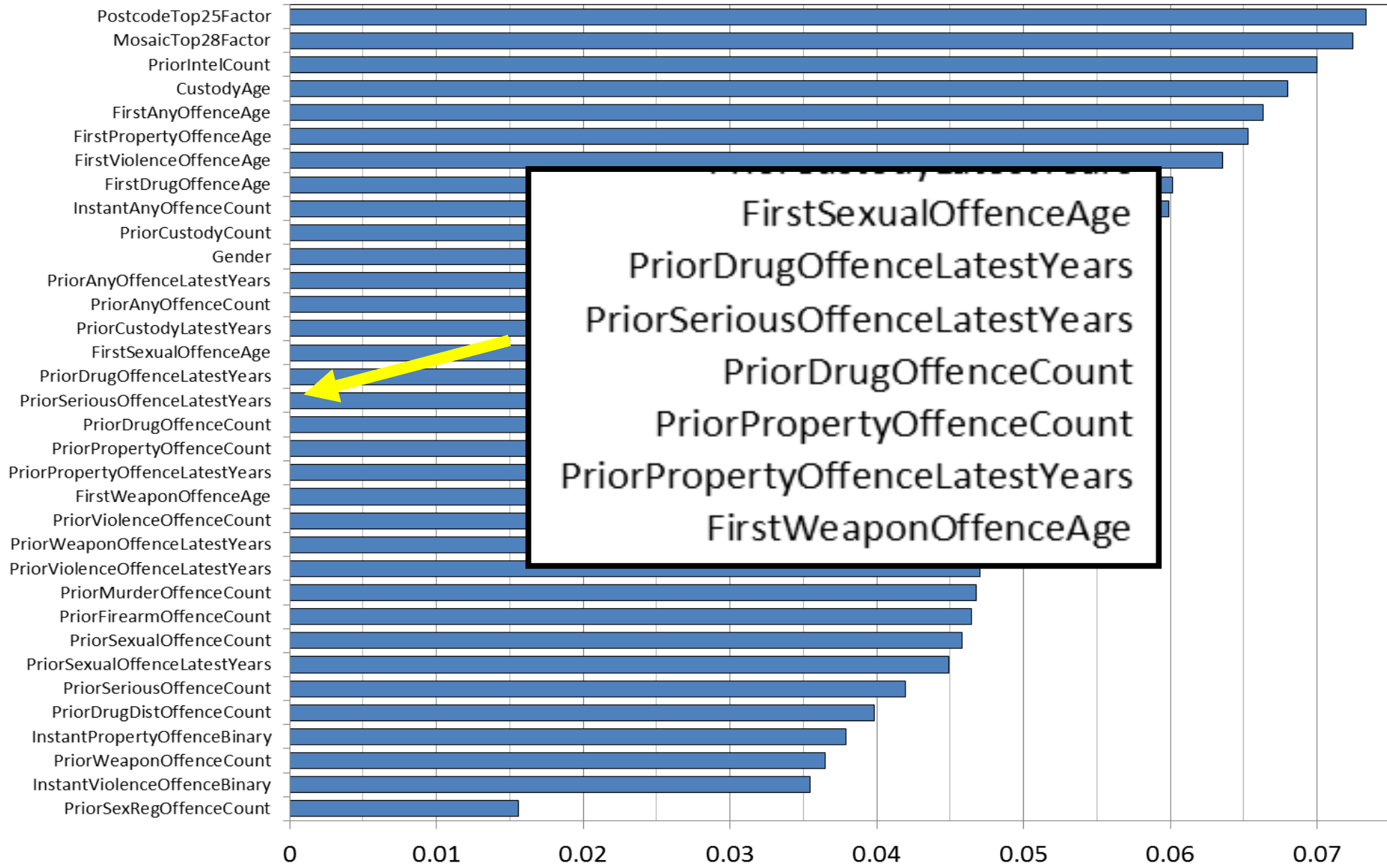


Durham Harm Assessment Risk Tool

- Forecast separates offenders into 3 different risk groups & so whether **could** be eligible for Checkpoint
- **high risk**
 - Likely to commit new serious offence within 2 years (murder, attempted murder, GBH, robbery, sexual offence, firearm offence)
- **medium** risk
 - Any new offence, provided not serious
- **Low** risk = no new offending of any kind

‘Random forest’ machine-learning approach





We need new law for new policing tech! Or do we?

- **Data protection.**
- Prohibited **discrimination.**
- Obligations pursuant to the **ECHR.**
- Responsibilities regarding **coercive and investigatory powers.**
- Requirements relating to investigation, prosecution and disclosure of **evidence.**
- In E&W, the duties of the police within the **common law**, including **administrative law principles** applicable to lawful public sector decision-making.
- Police code of practice and guidelines.

What do we mean by 'discretion'?

Power or duty of a public sector official, such as a police officer, to **make decisions** based on their **own opinion** subject to **legal boundaries**

Why can't they just follow the 'rules'?



It's not as simple as that

- Rules cannot cover every scenario; discretion 'recognizes the **fallibility of interfacing rules with their field of application**' (Hildebrandt, 2016).
- The law often requires the officer to make a judgement in a particular **context** based on concepts such as '**reasonableness**' or '**risk**'.
- Discretion permitted to allow for consideration of **merits** of each case, **rules not applied unbendingly**; 'discretion leads to accountability; the exerciser of the discretion can be held responsible ..' (Babuta, Oswald & Rinik, 2018).
- The police have to use their discretion as regards **prioritisation and deployment** of resources, and in respect of what fulfilling the policing role might require at any given time.

Computer says NO!

Or

**“The problem comes when the
database and the engine go from
coach to oracle”**

(Garry Kasparov, 2017)

And

**‘it is difficult for the decision-maker to disregard the
number and alter their evaluation even if presented
with detailed, credible and contradictory information’**

(Cooke and Michie, 2012)

Discretion and the challenge for algorithms

- Risk of fettering discretion if **only take certain factors into account** e.g. those that may indicate risk (but on what basis?) or those which can be easily codified into a tool
- **Un-nuanced** scores packaged as indicating 'risk' or need, or objective assessment. **Risk is the human judgement!**
- Binary nature eliminating any power to deal with '**hard**' cases (Bayamlioglu and Leenes, 2018)
- Too much importance being attached to the tool, resulting in nervousness about the 'defenceability' of **taking action contrary** to the algorithmic recommendation (Avon and Somerset inspector quoted in Dencik et al., 2018).

Discretion and the challenge for algorithms

“Questions and decisions based on **risk**, and **legal concepts** such as ‘reasonableness’, ‘public interest’ and opinions of necessity represent a challenge for algorithms...to produce a model that is genuinely able to reflect the **complexity of individual circumstances**, which apply to the **multiple elements** that may need to be considered, and which produce **every choice** of next steps that could reasonably apply to the decision(s) in question.” (Oswald, 2018)



“**Design** affects our expectations about how things work and the context within which we are acting.”

(Privacy's Blueprint: The Battle to Control the Design of New Technologies by Woodrow Hartzog, Harvard University Press 2018)

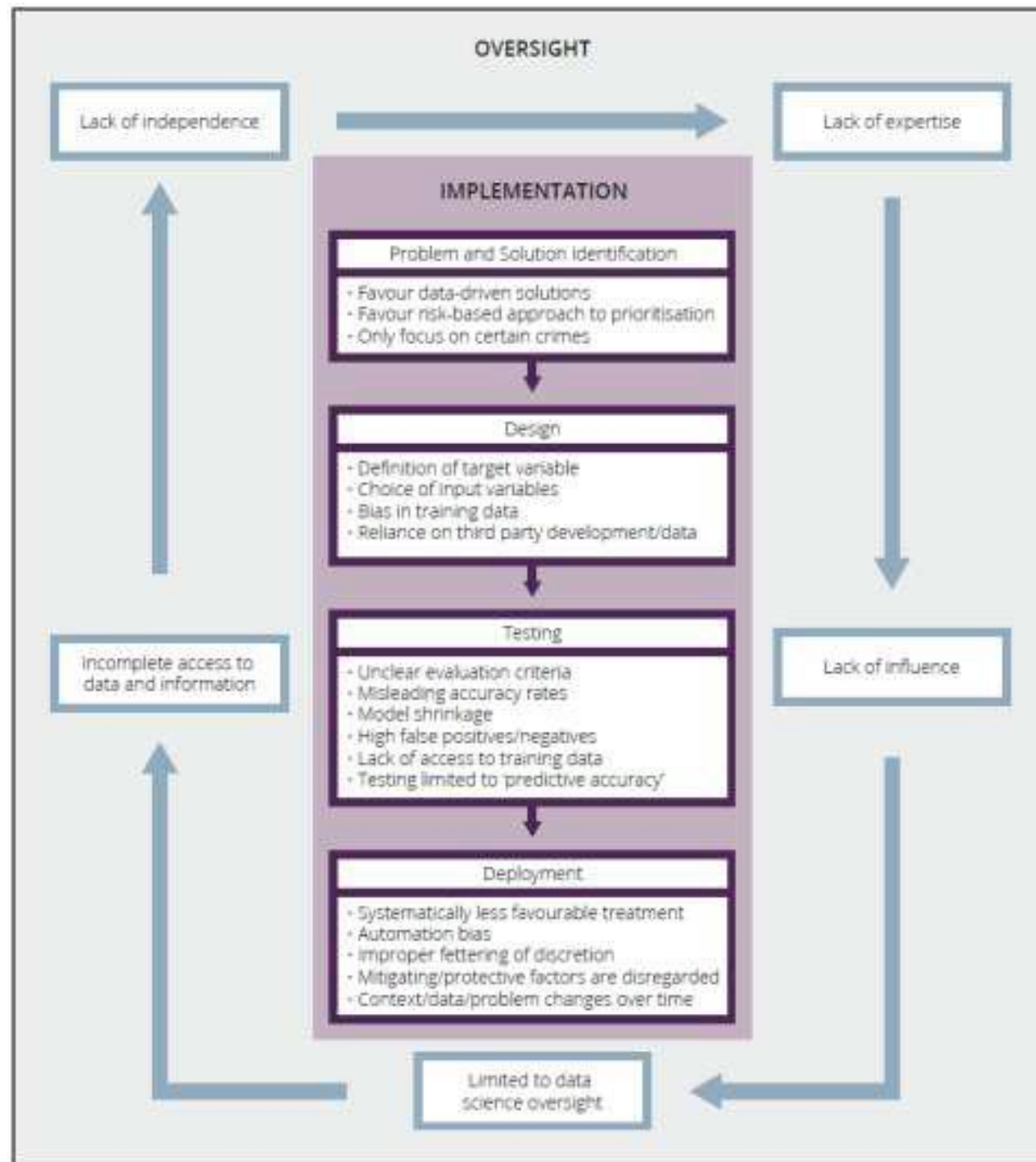
LOW RISK

is not likely to commit a new offence in the next 24 months, this Harm Assessment Risk Tool (HART) is here to assist and support your decision making. The information available to you including the checking police databases to ensure an appropriate disposal option is given, consider Police Bail where appropriate, necessary and proportionate.

| | | | | |
|--|--------------------|--|----------------------|---------------------------|
| Decision For Arrested Subject | Excluded | Not Eligible For Diversion Project | 27/04/2018 by 1733 | View Qu |
| Offence Related? | NO | Passed Question Sets | YES | Exclude Question Answered |
| Result | | Referral Type | No Referral Required | Confirmed to Proceed? |
| Diversion Scheme / Intervention | YES | Custody Officer | 1733 Jas | |
| Ar | 1299 Andy Crowe | | | |
| Ar | 11ED/1234/18 | No of Presenting Offences | 1 | |
| | 08/0204890C | Date Of Birth | 01/05/19 | |
| | No Fixed Abode | Are any of the presenting offences Violent Offences? | NO | |
| Presenting offences Property Offences? | NO | Is it Domestic Abuse Related? | NO | |
| | 27/04/2018 by 1733 | Workstation | b5343 | |
| to be Bailed for this offence? | NO | Bail Date | | |
| to be Released under Investigation? | NO | OIC | | |
| Appt | | Normal Prosecution Process | | Show more |

Impact on rights

- **Data protection** – including question of whether the human input is meaningful enough to avoid a *de facto* automated decision. Output is a new piece of personal data
- Positive obligations on the police under **Articles 2 and 3 ECHR**
- **Handling the output and Article 8**
- Right to a **fair trial** and the **presumption of innocence** (Article 6)
- Right to freedom of **expression**, and right to **freedom of assembly and association**
- Judging **necessity and proportionality** – preventative/public safety role of the police
- Methods of **auditing and interpreting** the algorithms
- **Bias and unlawful discrimination**



Risk of bias in algorithmic decisions within policing (from Babuta and Oswald 2019)

Relevance – of input factors, and algorithmic output



“if other things equal, shoe size is a useful predictor of recidivism, then it can be included as a predictor. Why shoe size matters is immaterial.”

Richard A. Berk & Justin Bleich
‘Statistical Procedures for Forecasting Criminal Behavior’ (2013) *Criminology & Public Policy* 12(3)



Is the output of an algorithm a 'relevant' consideration?

- We need to know how it's working in order to judge
- 90% 'accurate' so that's alright then?
- But what does that % hide?



**Fictional scenario
Over to you - Advise
Chris!**



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INFORMATION

Ethics Committee

What is the Ethics Committee?

Following a detailed stakeholder engagement, the Ethics Committee has been set up by the Police & Crime Commissioner (PCC) and West Midlands Police (WMP). The Committee's job will be to advise the PCC and Chief Constable on data science projects being proposed by WMP's Data Analytics Lab.

The Lab is led by specially recruited data scientists and will develop programmes of work that use data more intelligently to help WMP prevent crime, allocate resources more efficiently and help it to do its job of keeping the public safe.

The Ethics Committee has been set up to help ensure that ethics and people's rights are put at the heart of the Lab's work. With the Committee's expertise, WMP will be in a better position to help people avoid crime and support the communities of

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Minutes of 1st meeting, 3/4/19

“How is the model going to be used **operationally** and what will be the **benefit to policing purposes?**”

“Far more detail is required around what **interventions** might be applied to those individuals identified, bearing in mind that potential adverse consequences of inaccurate predictions will be largely dependent on the type of intervention carried out, and as regards associated policies and procedures to ensure **all relevant information** taken into account and weighted appropriately”

Minutes of 1st meeting, 3/4/19

“Questions and concerns about the proposed use of **intelligence** (such as the process for deciding which intelligence should be deemed reliable enough for inclusion in the model, which potentially could at times risk wrongly implicating people simply by association with other people known to offend) and concerns over other data sets including Stop & Search and that this might entail **disproportionality** and elements of police **bias**, particularly when using stop & search data that did not provide a positive result, i.e. no illegal items were found”

References

Forthcoming: Babuta and Oswald (2020) 'Data Analytics and Algorithms in Policing in England and Wales' RUSI Occasional Paper.

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Marion Oswald (2018) 'Algorithmic-assisted decision-making in the public sector: framing the issues using administrative law rules governing discretionary power' in 'The growing ubiquity of algorithms in society: implications, impacts and innovations' issue of Philosophical Transactions of the Royal Society A.

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