‘DIRTY SCIENCE’: BIG DATA, ALGORITHMS & SOCIAL WORK PREDICTION SYSTEMS

SAANZ 2018, University of Wellington, New Zealand ‘Disrupting the social work narrative stream’

Professor Lauren Devine Laurendevine@uwe.ac.uk
Director, Social Justice Research Group,
University of the West of England, Bristol, UK
England’s socio-political contextual landscape

- Technological advances enable big data and its use in creating ‘predictive algorithms’ across public sectors, used to socially engineer and further political agendas.

- In theory, technology is ideally suited to State welfare systems, helping to identify and benefit the vulnerable, disadvantaged and marginalised.

- However, welfare ideology in the UK operates in a climate of considerable political chaos and uncertainty, economic downturn and a rise in extremist views towards minority groups since the EU Referendum in 2016.

- In this context, there are considerable dangers in singling out vulnerable groups for State interference into private family life via algorithmic predictions.

- This paper identifies and explores a dual danger in the current climate:
  - Inaccuracy
  - Victimisation
The ‘elegant theory’ of machine prediction & prevention of child abuse

- An ‘elegant theory’: one that is economical and imaginative, and sometimes breathtakingly simple once explained, one that demonstrates an ontological simplicity. A deeper explanation might also note that the theory must also be plausible and reliable on testing.

- Predictive systems used in social work to predict and prevent child abuse draw on germ theory to justify their approach: An elegant theory.

- Historical analysis of the genus of germ theory in the UK’s child protection system dates to the late 1980s. Germ theory presents this seemingly elegant solution by drawing on medical ontology: if the source of a problem (disease) can be identified, isolated and eradicated then the problem ceases to exist. By analogy it is argued that if the problem is not isolated then the problem (disease) will spread. Applied to germs, this has saved lives and eradicated epidemics. Applied to child abuse the theory fails at each stage.

- Thus the flawed ideological basis presents a theoretically elegant but flawed science of child abuse eradication: Child abuse is not analogous to a disease and cannot be eradicated by predicting (identifying the unhygienic germs), and removing children to stop the spread of disease (quarantining).
Idealised risk prediction

- Local authorities in the UK commission their own risk prediction systems from private, profit-making providers.
- There is no regulation or minimum standard. The ‘black box’ contents of the algorithms are commercially sensitive.
- What do commissioning managers think they are buying?

**Child Protection & Safeguarding**

Idealised Screening and filtering system:

- Positive Screen Result
- Negative Screen Result

**Screening process**

- True Positive
- True Negative

This figure represents a perfect screening system.
- 100% efficient
- All interventions fully justified
- No adverse outcomes
- Appropriately targeted resources

INTERVENTION
FILTERED OUT
An acceptable margin of error?

- We analysed the data from a 10,000 family predictive study in the UK.
- This study underpinned the risk prediction movement in ‘child rights’ based child protection systems.
- The overall prevalence of abuse in the overall population was 0.4%.
- The percentage of false positive predictions was 97.3%. Affects the whole population.
- The percentage of false negatives in the target population was 17.5%. Affects a percentage of children actually being abused.

### Kevin Browne - False Positive Predictions

<table>
<thead>
<tr>
<th>Derived from Figure 1 at p.71 of Browne et al</th>
<th>Browne et al analysis scaled to 2014 population (England)</th>
<th>Comments/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>10,000</td>
<td>11,500,000</td>
</tr>
<tr>
<td>Abuse rate (prevalence)</td>
<td>0.40%</td>
<td>0.40%</td>
</tr>
<tr>
<td>Number abused</td>
<td>40</td>
<td>46,000</td>
</tr>
<tr>
<td>Number not abused</td>
<td>9,960</td>
<td>11,454,000</td>
</tr>
</tbody>
</table>

**Apply Browne et al checklist**

<table>
<thead>
<tr>
<th>82% sensitivity - Correct Identification (Number correctly predicted as abused)</th>
<th>33</th>
<th>37,720</th>
<th>c.f. 2014 CPP register number of 46,300</th>
</tr>
</thead>
<tbody>
<tr>
<td>82% sensitivity - Missed Identifications (Number incorrectly predicted NOT abused)</td>
<td>7</td>
<td>8,280</td>
<td></td>
</tr>
<tr>
<td>88% specificity - false alarms (Number incorrectly predicted as abused)</td>
<td>1,195</td>
<td>1,374,480</td>
<td>c.f. 2014 number of referrals of 657,800</td>
</tr>
<tr>
<td>88% specificity - non-abusers identified (Number predicted correctly NOT abused)</td>
<td>8,765</td>
<td>10,079,520</td>
<td></td>
</tr>
<tr>
<td>Efficiency of detection process</td>
<td>2.7%</td>
<td>2.7%</td>
<td>Extremely low ratio</td>
</tr>
<tr>
<td>Percentage of false positives</td>
<td>97.3%</td>
<td>97.3%</td>
<td>Extremely high error rate</td>
</tr>
<tr>
<td>Population identified as likely abusers</td>
<td>1,228</td>
<td>1,412,200</td>
<td>c.f. actual 2014 referrals of 657,800</td>
</tr>
</tbody>
</table>
Unregulated ‘Othering’: victimisation & the dystopian future

- In addition to ethical issues of applying demonstrably flawed science, assuming child abuse is analogous to germs, the unstable political and confused ideological climate in the UK presents dangers to minority and disadvantaged groups targeted by predictive analytics.

- Identification (Othering) and intervention (social engineering) via forced separation of families is unregulated by ethical or legal charter when underpinned by predictive systems.

- Viewed through the lens of the ‘welfare/policing dichotomy’, the disadvantaged are drawn into the forensic process of assessment.

- The mixing of budgets gives the illusion that the overall budget is too small. The problem is more fundamental. Providing more resources will amplify the problem.

- The ‘outlier paradox’ results in a ‘resistance is futile’ system whereby compliance is the only navigational route for the vulnerable.

- Reflection on the fate of the vulnerable in this chaotic political regime offers a glimpse of a dystopian future and a compelling argument for rethinking not only the algorithmic basis, but the ethical basis of an AI driven welfare economy.

- Resistance is futile…..