**Supplementary Tables**

Table S1:Example systems in which feedback loop failure might occur.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Domain | Target Parameter(s) | Issues contributing to failure | Feedback mechanism | Consequences | Related work |
| Predictive policing | Localized crime rates | Crime is discovered more often in neighborhoods with more police presence. | Rates of discovered crime inform police presence, which shapes discovered crime rates. | Neighborhoods are subject to disproportionate police presence. | [1,2](https://paperpile.com/c/YltaFg/KV78F+jMZdL) |
| Ranking and recommender systems (e.g. media, news) | Popularity ranking model | Item popularity may not capture “quality” or “benefit.” Recommendations influence future popularity. | Popularity of an item determines rank or recommendation probability, influencing popularity. | Low-value popular items increase in popularity; High-value unpopular items remain obscure. A “filter bubble” effect[3](https://paperpile.com/c/YltaFg/Fwuc7) may arise. | [4–7](https://paperpile.com/c/YltaFg/q8cnr+KYrSL+umaff+bvV82) |
| Diagnosis | Disease symptoms and risk factors | Diagnosed vs. actual disease cases are not equivalent. | Diagnosed cases shape understanding of prevalence, symptoms, and risk factors used in the diagnostic process. | Disproportionate overdiagnosis or underdiagnosis, with a misunderstanding of disease etiology | This paper. Examples in heart attack[8](https://paperpile.com/c/YltaFg/bT3DT) autism[9,10](https://paperpile.com/c/YltaFg/UauZr+alnYv), and risk modeling[11](https://paperpile.com/c/YltaFg/TeMMI) |

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