

Surveillance, Discretion and Governance in Automated Welfare: the Case of the German ALLEGRO System

Louisa Well

Independent Researcher

Morgan Currie

School of Social and Political Sciences, University of Edinburgh / Morgan.currie@ed.ac.uk

James Stewart

School of Social and Political Sciences, University of Edinburgh

Abstract

Several scholarly studies and journalistic investigations have found that automated decision-making in welfare systems burdens claimants by forecasting their behaviour, targeting them for sanctions and surveillance and punishing them without revealing the underlying mechanisms driving such decisions. This article develops an analytical framework combining three areas of concern regarding automation: how it might introduce surveillance and social sorting, how it can entail the loss of human discretion, and how it requires new systems of governance and due process. This framework steers investigations into whether and how automated decision-making welfare systems introduce new harms and burdens for claimants. A case study on automation processes in Germany's unemployment benefit service's IT system, ALLEGRO, applies this approach and finds that this system does allow for broad human discretion and avoids some forms of surveillance, such as risk-assessments from historic data, though it nevertheless increases surveillance of claimants through sharing data with external agencies. The developed framework also suggests that concerns raised in one area – whether loss of human discretion, surveillance, or lack of due process – can be mitigated by attending to the other two areas and urges researchers and policy-makers to attend to the mitigating or reinforcing factors of each concern.

Keywords: social sorting, digital welfare, due process, algorithms, data justice, social security

Introduction

"The real goal is what it has always been: to profile, police, and punish the poor." (Eubanks, 2018:

67) This is Virginia Eubank's take on automated decision-making systems used in the adminis-



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tration of the welfare sector in the US, convincingly described in several case studies. Eubanks' ground-breaking contribution to the study of algorithms and poverty gives insights into the ways IT systems can reproduce historically built discriminatory structures, targeted at controlling low-income populations. Since then, other academic studies and civil society investigations (Big Brother Watch, 2021; Alston, 2019; Dencik et al., 2018) have found that algorithmic systems burden welfare claimants by forecasting their behaviour, targeting them for sanctions and punishing them without revealing the underlying mechanisms driving such decisions. Writing about the UK context, for instance, Philip Alston (2018), as the UN's Rapporteur on extreme poverty and human rights, reports that the Department of Works and Pensions uses automation to make means tested calculations about benefits, putting the burden on claimants to contest any errors; UK social security data are also part of risk verification systems that add new dimensions to the surveillance of claimants. The aim of this article is to develop an analytical framework to understand potential or actual forms of discrimination and other harms against marginalised and under-resourced socio-economic groups that may emerge in increasingly automated conditional welfare systems. Researchers (Bovens and Zouridis, 2002; Jones, 2000; Jorna and Wagenaar, 2007; Rodger, 2008; Wacquant, 2009) have long documented the harm wrought by welfare systems due to computerisation, changes in the conditionality of benefits and reorganisations of frontline services, all prior to the introduction of more recent algorithmic systems. This body of research suggests the analyst needs to address the multi-dimensionality of trajectories of change, including policy, information flows and everyday bureaucratic practices across a broader space than one that focuses solely on the algorithmic components of a system.

Drawing on approaches from surveillance studies, law, public policy and data justice, we develop a framework for analysis based on three aspect of welfare systems – surveillance, discretion and governance – that we believe will be useful to analysts, policy makers and implementers with responsibilities for the governance or adoption of automated decision-making systems. This

article applies the framework to an exploratory case study focused on automation processes in Germany's lowest ranking welfare provision, the unemployment benefit ALG II (*Arbeitslosengeld II*), through the IT system ALLEGRO, created as part of the Hartz IV reform, which combined assistance programmes in 2005. State-backed welfare in Germany has followed the trend in most modern western states towards conditional models, where benefits are means tested (Schiller, 2016) and dependent on prescribed actions by claimants to take responsibility for their lives (Watts and Fitzpatrick, 2018). Conditionality may depend on demonstrating, with the appropriate administrative documents, levels of income, disability, responsibility for dependents, and details of everyday job seeking activities; it is equally likely to involve behavioural conditionality – sanctions for not complying with a treatment programme (Griggs and Evans, 2010). Established perspectives on welfare conditionality (Wacquant, 2009; Fletcher and Wright, 2017; Fletcher and Flint, 2018) highlight the disproportionate impact these systems have on the most disadvantaged, by imposing behavioural constraints on individuals even when there are no appropriate jobs available, forcing people into precarious and dependent work and treating individuals as deviants in need of reform and subject to a regime of surveillance and deterrence.

This move has gone hand-in-hand with increasing computerisation that shifts how public administration is managed (Mergel, 2021). For example, since the introduction of ALG II in 2005, the Federal Unemployment Agency (*Bundesagentur für Arbeit* or BA) in Germany has deployed IT systems to administer benefit distribution through partly automated processes of assessing a person's eligibility for benefits. Thus, this case study is an exploratory investigation asking if Germany's system deploys automation and data analysis in a similar manner as other countries' systems such as those Eubanks and Alston observed in the US and UK.

The framework we offer below focuses on three inter-related, but distinct concerns around discrimination and automated decision-making in government: 1) increasing surveillance of welfare recipients, as individuals are constituted

and sanctioned though the information collected about them, and the social sorting possibilities of systems that compare and classify individuals against others, leading to new forms of predictive surveillance; 2) the removal of tacit knowledge and human discretion from these systems, which can create punishing hurdles of access and conditions that disregard individual circumstances and can disproportionately affect the most disadvantaged and, as a result of both these phenomena, 3) the ability for these systems to be deployed while avoiding or obfuscating democratic governance and due process. While these concerns are not exhaustive, they fuse two strands of existing research – on surveillance and social sorting on the one hand and human discretion in public administration on the other – to address the prominent issues raised about automated decision-making systems. We subsequently create a framework that can inform hypotheses or empirical accounts to locate if and when discrimination and other harms may occur as a result of automation, both at the levels of design and administrative implementation. We then describe our methodology and present the case study of ALLEGRO, analysed through the framework.

Before introducing these three concerns we provide an overview of types of formalised automated decision-making systems used to administer public social services worldwide.

Rule-based versus predictive systems

In a UN report, Alston (2018) distinguishes four main types of government welfare systems that use automated decision-making: 1) those making eligibility assessment, 2) those that calculate welfare benefits and payments, 3) fraud detection systems and 4) risk scoring and need classification systems. The first two types encompass *rule-based systems* that help determine entitlement of a service – for example, whether a person qualifies for welfare assistance – and, if entitlement is granted, the rate of the service. We draw on Le Sueur (2015) to define ruled-based automated decision-making as the process of turning decisions into ‘if then’ rules that select from predetermined alternatives: if the condition of the rule is met, then the consequence of the rule applies. The rules codify

explicit and transparent policy choices on how people’s circumstances are formally assessed and how benefits are calculated. These calculations are usually set by a public process, and certain classes of people are automatically eligible. For example, the UK Universal Credit system determines monthly payments drawing on a range of personal circumstances, such as housing circumstances and children, but is also based on automatic sharing of data on changing income between employers and tax authorities (Griffiths, 2021). Such calculations could theoretically be done manually by staff, but the automated system enables large scale payment processing to occur regularly without applicants having to submit new evidence manually every time income changes.

These rule-based systems do not cope in situations that involve risk assessment of vulnerability, employability, disability or fraud. Here welfare services may turn to *predictive* risk-profiling tools that help sort clients for different levels of response (Crisp et al., 2007). These indicators of risk may include factors identified by research or mandated by policy; combined, they form a model that returns a probabilistic score for an individual. Companies, professionals and sometimes academics develop these assessment tools in relation to a historic comparative population and past experiences of service provision, often using stakeholder consultation, trials, validity and usability testing and factor analysis. These tools are generally implemented via a checklist with simple scales completed by case-officers and applicants or through more laborious processes, as with a disability assessment. When a score reaches a certain threshold that is statistically related to factors or conditions identified in research and practice, this triggers further action. Examples include the VI-SPDAT scoring system, used to assess individual vulnerability to match people to housing in many parts of the US (Petry et al., 2021) and the more controversial BSP model used by the UK Work Capability Assessment (Shakespeare et al., 2017). The formalisation and standardisation of risk assessment tools has been a long-term policy ambition and requires considerable training to administer (Baginsky et al., 2021; Taylor, 2012; Crisp et al., 2007). While at times controversial, since the score can influence

a person's interaction with public services, these tools are nonetheless transparent in how they categorise people and can be re-evaluated over time with real data on successes and failures.

Newer machine learning techniques used for predictive profiling are controversially less transparent in how they come to decisions. These techniques can be found in fraud detection systems that use a range of factors to determine that someone shares characteristics with people who have committed fraud in the past (Elyounes, 2021). An example is the Dutch System Risk Indication (SyRI), which pulled data on claimants from several government agencies for a risk analysis to determine anomalies that might signal fraud (SyRI was halted in 2019 by the Dutch Supreme Court for human rights violations against those it targeted) (van Bekkum and Borgesius, 2021).

The type of automation, along with the kind of data a system draws from and the model it uses, will raise different sets of questions about discriminatory or punitive effects, as we explore in depth in the three subsequent sections on surveillance and social sorting, human discretion and governance.

Automating Decision-making in Social Services – a Framework

Surveillance and Social Sorting

The arrival of increasingly complex regimes of conditionality and computerisation can first be analysed through the lens of surveillance as a mode of power in modern government (Gandy, 2021; Lyon, 1994, 2005). Data-focused surveillance infrastructures, first deployed heavily in the 1990s within security, policing and immigration (Rodger, 2008), have facilitated systems of mass targeted surveillance based on administrative data collection and linkage – the bringing together of information about individuals and populations across organisations. These digital systems also make it easier to socially sort people into categories then compare them to other people in the classification system, based on the idea that unwanted behaviour can be generalised across particular groups or neighbourhoods (Pykett, 2014).

Literature from human rights and data justice frameworks (O'Neil, 2017; Eubanks, 2018; Dencik

et al., 2018; AlgorithmWatch and Bertelsmann Stiftung, 2019; Wacquant, 2009) has drawn on surveillance studies to critique modern state welfare systems as another extension of prison and disciplinary regimes, since claimants are required to provide increasing amounts of information in order to be awarded benefits or avoid sanctions – obligations that are burdensome and erode individual privacy. While collecting personal information can be beneficial – by improving efficiency and reliability and offering administrators an evidence base for decisions – it is only those in a situation of asking for assistance that must enter these regimes of acute targeted surveillance and high visibility not imposed on the rest of the population. Those requiring state support or intervention, in effect, open their lives to scrutiny from multiple government agencies and their databases. Fletcher and Wright (2017) describe, for example, how the UK Jobmatch website, which matches job openings to candidates' skills based on a digital CV, is "a surveillance tool garnering evidence for sanctioning," (Fletcher and Wright, 2017: 332) since Universal Credit benefits are conditional on using the site, and work coaches can check online activity for compliance.

The data collected about individuals can be used in rule-based automated systems to steer claimants towards certain predefined behaviours. Griffiths (2021: 6) argues that Universal Credit's means-testing algorithm enforces "'social and financial responsibilities' by obliging claimants to repay debts, fines and child maintenance based on fixed, generally stricter and less negotiable, repayment terms than under the legacy system". This behavioural modification, argues Griffiths, is a fundamental part of Universal Credit's design.

Beyond controlling behaviour, automation is used for social sorting and risk prediction in ways that are often hidden to claimants. There is a deal of mistrust among the press and public officials that risk profiling systems can embed biases at the level of data ingestion, leading to discriminatory results that target economic or ethnic minorities for surveillance and sanctioning (Metz and Satariano, 2020; Angwin et al., 2016; Alston, 2019; Stop LAPD Spying, 2018). In their report 'Poverty Panopticon', Big Brother Watch (2021) found that several child welfare systems in the UK include

factors that could act as proxies for marginalised social and economic groups, such as data points in a child welfare system showing whether a child gets a free school meal, as certain ethnic groups disproportionately receive this benefit.

Finally, opportunities for surveillance are amplified when agencies share and link data. The Dutch fraud detection algorithm SyRI, for example, combined formerly separated datasets on welfare recipients to calculate their risk of committing welfare fraud (Henley and Booth, 2020). In the UK, local authorities under pressure to combat benefit fraud use risk verification systems that draw on data from multiple Council sources to categorise benefits applicants into different levels of risk to narrow fraud detection to the riskiest cases, putting the most vulnerable people under surveillance without their knowledge (Big Brother Watch, 2021). And in Eubanks' (2018) analysis of Los Angeles County's house matching system for the homeless, the Coordinated Entry System, she finds that the LAPD can ask for access to the intimate information it collects about Los Angeles' homeless population.

Automated decision-making in welfare systems puts the poorest populations under unique systems of surveillance for sanctioning and profiling to control behaviour. We will examine the due process implications of these systems shortly. In the next section, however, we look at a related, but different facet of automation that can lead to discriminatory effects: the reduction of human discretion.

Human Discretion

Computer systems and software that reduce or eliminate discretion by street level bureaucrats have been a topic of policy and government administration research since the 2000s (Jorna and Wagenaar, 2007; Bovens and Zouridis, 2002). Studies in this area have sought to understand the balance between the automatic application of decision rules and the cultural norms of a workplace that shape, interpret and curtail these rules. Jorna and Wagenaar (2007: 191) describe human discretion as "Administrative reasoning, finding out what is reasonable in a given situation, [and] the process of individualizing public law". As Widlack et al. (2020) point out, there can be good rea-

sons to deviate from universal bureaucratic rules when other principles come into play, such as proportionality and fairness. Introducing automation, therefore, can weaken the discretion of bureaucrats to navigate between universal procedures and specific individuals' cases: where staff might give some leeway in response to an individual's circumstance, the automated system would not.

Key pressures to reduce human discretion by procedure or by automation in welfare include political rationales and post-crisis budgetary constraints calling for efficiency and error reduction, all responding to deep cuts to budgets and service elimination associated with austerity (Alston, 2019; Mohabbat Kar et al., 2018; Baginsky et al., 2021). Eubanks (2018) documents the US case of Indiana, which rolled out an automated welfare system in order to make its public workforce leaner; clients who had trouble enrolling for benefits could only call a hotline, not visit in-person case workers, and benefit enrolment numbers plummeted.

Automated systems can range from being *decision-aids* to *decision-arbiters* that enact laws and legal standards. Elyounes (2021) describes how decision-aiding systems that allow 'strong human discretion' (a term she derives from law to describe extra-legal standards judges may rely on beyond the rule of the law) offer a wider range of options to reach a conclusion that takes the particular circumstances of the case, such as a person's intent, into account. The Dutch SyRI system, for example, was a predictive system that did not automatically sanction someone found to commit fraud or instantly trigger an investigation. Instead, SyRI flagged individuals as likely to commit fraud for further inspection, a suggestion that street-level bureaucrats could take up or not, depending on their discretion of the particular case (Elyounes, 2021). Yet human discretion around automatic recommendations can vary widely. In their studies of automated government systems, Veale et al. (2018) found 'automation bias' – either under or over-reliance on the model's results – such as officers keen to follow the suggestions of a predictive policing model, or cases where staff were sceptical or even resentful of the results (their example is helicopter pilots whose routes are created by a machine-learning algorithm).

Beyond decision-aiding systems are systems acting as *decision-arbiters* – systems that make a decision and act on it at the same time. One example is Universal Credit’s Real Time Information system, which determines benefit payments automatically with a data feed based on past employment reporting; if claimants submit proof, such as a payment slip, to refute the employer’s account, they must wait weeks to receive the accurate amount (Alston, 2018). Another extreme example is the Michigan Unemployment Insurance Agency’s system called MiDAS, which cut off benefits automatically to claimants suspected of fraud when they didn’t supply documents proving the contrary. MiDAS would automatically send a letter to an individual asking if they intentionally submitted false information, leaving no space for open ended explanations. In the event that an individual didn’t respond in ten days, or if individual’s responses weren’t sufficient, the system could automatically cut benefits, garnish wages and seize tax refunds. MiDAS replaced around 400 employees who had reviewed the claims with its launch in 2013 (MiDAS had a severely high error rate, as 92% of appeals against MiDAS were successful in court) (Elyounes, 2021). The problems with these pre-emptive calculations about benefits is less about surveillance and control than about how they depersonalise claimants and shift the burden to them to contest any errors (Alston, 2019).

Research at the intersection of data science, public policy and law makes a further distinction between the discretion given to street-level bureaucrats versus the discretion delegated to the engineers of automated systems (Elyounes, 2021; Shroff, 2017; Widlack et al., 2020). The latter is tied to how human discretion becomes operationalised, influencing the type of model used, the data it ingests, and the weighting of the factors of the algorithm. Such engineering decisions will shape not only the decision outputs but how frontline staff relate to them. For instance, Shroff (2017), who worked with Children’s Services in New York City to predict repeat reports of abuse or neglect, describes how staff chose a model that prioritised predictive accuracy over explainability – their ability to understand the results. Shroff argues that tool developers should work with frontline

bureaucrats during the design phase to elucidate how automation could support their work and determine what levels of discretion and explainability it should allow.

As argued, the surveillance and social sorting capacities of large scale informatised welfare systems subject certain sectors of society to mechanisms of punishment and control. Reduced human discretion introduces other problems: a rule and standards-based approach to the application of the law that can reduce attention to individual circumstances and intent and put the burden on recipients to challenge punitive decisions. Weaker human discretion can also create hurdles for agencies to comply with due process and accountability requirements under GDPR and other laws. Because due process and accountability are also fundamental to questions about the data collection and surveillance aspects of these systems, we treat this issue separately and more in-depth in the next section.

Governance

Both the surveillance aspects of these systems and their reduction or reshaping of human discretion raise questions about due process and accountability – how these systems can be queried regarding the personal information they store, the decisions they make, and their accuracy and legality. Several EU laws, such as the Code of Good Administrative Behaviour, article 41 of the EU Charter of Fundamental Rights (‘the right to good administration’), and European Union’s General Data Protection Regulation, which seeks the protection of natural persons with regard to the processing of personal data, support the right for citizens to receive justification for the decision-making steps leading to an administrative outcome (Widlack et al., 2020). However, scholars and civil society groups have pointed out that automated decision-making systems can make these steps opaque or obscure the origin of the underlying data upon which the decision was based (Grimmelikhuijsen and Meijer, 2014; Big Brother Watch, 2021).

Rule-based systems that significantly weaken discretion and enact laws and standards automatically raise issues of due process when those affected may have little time to appeal before the

action results in negative consequences. With MiDAS the automatic sanctions resulted in bad credit reports and fines that led to bankruptcy for some, and in 2015 three claimants brought a lawsuit, ongoing at the time of writing, against the agency that deployed MiDAS to contest the lack of due process citizens had against its accusations of fraud that were false in most cases (Thompson, 2018).

Due process can also be complicated or slowed down when the decision-making agency draws on data that has been shared automatically by another agency that is the data holder. Widlak et al. (2020), for instance, describe the case of a Dutch family charged by a public agency, the Central Administration Office (CAO), for their personal contribution to three months of state-provided elder care they did not receive; the judge ruled that the agency was not at fault because it had simply acted upon information automatically received from another body, and so the CAO was not responsible for the accuracy of the information given to it by the other agency. Here, Widlak et al. (2020) argue that ‘automated network decisions’ – data shared automatically between agencies – make it possible for an administration to evade accountability of the decision.

Predictive systems raise further issues around due process. One concerns the ability of staff to understand and explain how a decision was made by the system if it uses machine learning techniques. In the SyRI court case, for instance, plaintiffs pointed out that public officials did not know why a person was flagged by the system (Elyounes, 2021). Another issue is that citizens often do not know they have been flagged by a risk model, much less their risk scores (Metz and Satariano, 2020). The Poverty Panopticon report (Big Brother Watch, 2021) found that many UK Councils using analytics for children’s welfare and crime do not have robust policies in place to reveal how their probabilistic systems work or how they impact individuals.

Due process – a citizen’s ability to query the system – is somewhat distinct from internal or external accountability processes that check the performance of these systems (Widlak et al., 2020). In addition to being able to provide information to a person about the basis of an automated

decision, an agency should also conduct procedural audits over time to check on both the accuracy and also fairness of decisions, in compliance with national equality and anti-discrimination laws. Many internal audits, however, are often not easily available – Big Brother Watch (2021) submitted Freedom of Information Requests to gather examples of equality impact assessments across the UK; in several cases, agencies would not disclose audits or the algorithms used.

Transparency and due process can be further complicated if a system is designed by commercial vendors with the ability to hide operations under intellectual property claims and confidentiality clauses. In the UK, Councils in Hackney and Thurrock have worked with a company called Xantura to develop a predictive model for their children’s services teams; council officials have refused to discuss the variables that go into the system, citing commercial sensitivity (though an investigation found that one variable is age, a protected characteristic under UK law) (Booth, 2021; Big Brother Watch, 2020). Responsibility for failures and bias also becomes an issue with these public-private partnerships; in the case of Michigan, the private vendors who designed MiDAS were named as defendants along with the Unemployment Insurance Agency, allowing all parties to point at each other to deny their own culpability (Egan and Roberts, 2021).

This three-part rubric (surveillance, human discretion and governance) raises a set of questions that we can ask about the design of automated decision-making systems in social services: What is the type and function? Does the system conduct surveillance on users through data collection, data sharing or statistical profiling? Does the system reduce human discretion and to what degree? Does the system allow public oversight and due process to query its outcomes? In the next section, we introduce our methods and case study of a particular rules-based system, asking how this system interacts with the environment around it and how it may enact the various harms described so far.

Method

In order to apply our framework to the sociotechnical elements of an automated decision-making system, it is useful to look into its historic development, its institutional incorporation and the “reasons for subjecting the system to the logic of computation in the first place” (Kitchin, 2017: 25). This study uses primary source and media documents and explorative interviews carried out with administrative staff and benefit recipients to understand ALLEGRO. The analysis included reviewing 30 legal and administrative documents from the Federal German Labour Agency, the *Bundesagentur für Arbeit* or BA, and the implementing JobCenters, detailing the unemployment benefit program ALG II and the administrative software ALLEGRO and a dozen newspaper reports covering the system. We retrieved the documents from the homepage of the BA and from previous freedom of information requests; they consist of user manuals for the administration software, internal communications, legal texts and information provided for the public and were used to gain a deeper understanding of the phenomenon.

This information was complemented by six approximately one-hour exploratory interviews conducted over two months in 2019. We selected interviewees to give insights into different aspects of ALLEGRO: two employees of the department of automation processes in the BA, one business consultant, a JobCenter employee and two benefit recipients. The BA experts were administrative staff who had some knowledge of the technical part of the system, while the benefit recipients have experienced the workings of the system first hand. The interviews were conducted as semi-structured interviews, open to emerging issues but structured around the questions drawn from the framework about 1) type of system, 2) whether surveillance and behavioural control occurs through data collection, data sharing or statistical profiling, 3) whether the system reduces human discretion and to what degree and 4) whether the system allows public oversight and due process. The interviews with the BA experts were more formalised and targeted at understanding the technical layout of ALLEGRO, while the interviews with the benefit recipients and

the JobCenter employee focussed on their experiences of interacting with the system and the application process in general, including interactions with front line staff.

While it would have been valuable to ask software developers in the BA to identify if they had any discretion or input over trade-offs and concerns at the level of technical design – data sharing, interface, etc – the BA did not agree to interviews with their developers. Hence, this article focuses on the software from the user perspective, specifically the data input and the interactions between different interfaces.

These insights are therefore based on limited research data. The people interviewed about the software were all employed by the administration; potentially, they cannot speak openly about discriminatory structures, or problems with operation of the systems, and we did not get approval after requesting interviews with software developers about choices in building the systems or policy makers managing specifications and delivery. To get an outside view, we talked to an external business consultant, who shed light on the development process of ALLEGRO, and to two benefit recipients about their experiences of applying for and receiving unemployment benefits. We analysed the data with the earlier described questions in mind, using thematic analysis to draw out emerging themes (Evans, 2017).

As the scope of the document analysis and the qualitative interviews is too limited to map the system conclusively, this article develops hypotheses for further research. In the following sections, we describe ALLEGRO and its predecessor and the political and administrative motivations behind them. We finish with hypotheses about how the system might discriminate against claimants.

Automation of Unemployment Benefit Distribution in Germany

Background of the Hartz IV Reform

The coalition of Social Democrats and the Green Party reformed Germany’s labour and welfare sector in the early 2000s, reshaping the labour market and restructuring the social insurance sector (Bundeszentrale für Politische Bildung, 2007). Here

we focus on Hartz IV, the reform of unemployment protection.

Germany's Hartz IV reform merged social assistance and unemployment assistance into one means-tested benefit system, which was officially called ALG II. ALG II is administered by the BA (*Bundesagentur für Arbeit*, the Federal Unemployment Agency) and implemented by the local JobCenters,¹ where unemployed people can apply for benefits and get help finding new employment (Butterwegge, 2018). As of 2020, ALG II recipients are entitled to a maximum of €432 per month; the JobCenter also pays for their rent and utilities (either sending payment to the claimant or directly to the landlord), health insurance and public broadcasting fee, and it provides reductions on local transport and cultural institutions (Bundesministerium für Arbeit und Soziales, 2019). Applying the law is very complex because case workers must assess the life circumstances of the benefit recipient in order to calculate the appropriate rate. Considerations include existing assets, additional needs and the 'community of dependence', which means that if the benefit recipient lives with a spouse, a child or parent of working age or in a relationship with a partner without being married, this community of dependence is responsible for providing an income, and the ALG II rate will be reduced accordingly. Another integral part of the Hartz reforms was a focus on activating job-seeking (Stiller, 2010: 71). One activation measure is the sanction; if a person fails to write the required number of job applications or misses appointments at the JobCenter, they can be punished, potentially losing up to 100% of their benefits (hartz4.org, 2019). These reform processes are some of the political and legal dimensions that help us understand why the BA developed the IT systems as they did – a process we look to next.

ALLEGRO

The conflation of the benefit systems in the early 2000s demanded a new software to administer the large amount of unemployed people eligible for ALG II. The first system the BA developed, called A2LL, was error-prone and expensive; the BA had outsourced its design to T-Systems, an

affiliated firm of the Deutsche Telekom, Europe's largest telecommunications company. In 2014 the BA developed a completely new system called ALLEGRO – 'Unemployment Benefits II – Output Procedure Basic Security Online', which solved the previous issues, according to BA and JobCenter employees we spoke to. Learning from past experiences, the BA decided to keep the development process of the new system in-house and employ individual specialists from other companies on short-term contracts (Interview 140619, 2019; Interview 260619, 2019). Due to a high rate of personnel turnover, the IT development took two years longer than planned (Interview 260619, 2019). The system that rolled out in 2014 responded to legislative amendments, correctly calculated benefit levels according to the statutory rate, and greatly relieved the workload of the front-line JobCenter staff (Interview 020619, 2019).

ALLEGRO performs calculations and connects the operator to other external interfaces. When someone applies for unemployment benefits, the operator will first query ALLEGRO for any pre-existing information on the applicant. No data is stored within ALLEGRO, so the query is passed on to another system, STEP (*Stammdaten-Entwicklungs-Projekt*, Historical and Core Data Development Project), the central database that stores information about anyone applying for or receiving unemployment benefits. Since 2016, the BA stopped using paper files, so all information and documents belonging to a case are now stored digitally on a server in an 'E-File' (*E-Akte*) (Interview 140619, 2019).

At this data entry point, the complexity of ALG II comes into play. Two principles are important: the subordination principle and the community of dependence inspection. ALG II is subordinate to all other income, assets or other benefits. If someone receives a pension, for example, the pension will be deducted from the ALG II rate. If someone has savings in the bank, they will not receive ALG II until those savings are used up. These two examples are straight-forward calculations; things become more difficult when the operator or the applicant is asked to input more subjective numbers, such as evaluating the value of a property. If the house or flat is 'appropriate', that is, the person is inhabiting it themselves and

it is not an estate that surpasses the value of an average living space, the property is not counted as an asset. But should a dwelling be evaluated as too large or expensive, the owner must sell the house or flat and make a living off the profit before they receive ALG II. Additionally, the operator will inspect if the claimant lives in a community of dependence from which they receive support. If a person does, it is the responsibility of the claimant to prove the nature of the relationship, and a certain amount will be deduced from the ALG II rate (Interview 140619, 2019; Interview 260619, 2019).

Entering the appropriate data into the system therefore leaves room for administrative discretion, which – at this point in time – is not automated. After the data is entered, ALLEGRO automatically calculates the eligibility of the claimant and issues an assessment verified by the operator and sometimes by a second member of staff. The BA head of department clarifies that “there is no end-to-end automation. In the beginning of the process is the input of data; in the middle the automation is well advanced; in the end is the manual completion of the process. For now.” (Interview 140619, 2019) ALLEGRO saves the assessment in the E-File and transfers it to INVARIS, a document composition software that compiles the up-to 50-page long report, which is automatically sent to the claimant. ALLEGRO then instructs another system for money transactions, ERP, to commence payment to the recipient (Bundesagentur für Arbeit, 2014).

ALLEGRO has other functions beyond benefit calculation. For instance, when a client receives ALG II, the JobCenter will cover some of their medical and retirement insurance. To facilitate coverage, ALLEGRO provides data to two interfaces, COLIBRI and BabR, which connect ALLEGRO with systems held by insurance companies to register the clients for these benefits. The JobCenter staff are also tasked with helping unemployed people find a job as part of their activation role. In order to target employment options, the JobCenter operators access the claimant’s data via a program called VerBIS that connects to ALLEGRO and transfers the job seeker’s data to the operator. Through this interface, JobCenter employees can access some, but not all, of the data, much of it in

a read-only mode, to see what a person’s benefit status is and if they are on sanctions.

Finally, ALG II automates data sharing with the retirement insurance fund to detect fraud, though it limits the amount of personal data shared. Every three months, both the BA and the retirement insurance fund send personal and benefit data to a third system called DALG II, which compares the datasets to identify if a person is receiving benefits from both. ALLEGRO data is first transferred through an external system, DALEI, so that no external institution has direct access to ALLEGRO or the STEP database, where the personal data is stored. (SGB II, 2014; JobCenter Berlin Spandau, 2013). Upon receiving results, a BA employee will check each case in which someone receives two kinds of benefits to ascertain if further fraud investigations need to be carried out. Even people who do not receive ALG II but solely retirement money are checked in the system, as they may belong to a community of dependence with an ALG II recipient, who in turn, may get a lower ALG II rate (Interview 140619, 2019; SGB II, 2014).

Discussion

In the next section, we apply the framework presented earlier using available data, then form hypotheses in the discussion about where ALLEGRO may introduce harm.

First, what type of automated system is ALLEGRO? ALLEGRO is both an eligibility assessment and welfare benefit calculation system, as part of a network of systems that also engage in automated fraud detection, link to immigration control and feed into job seeking support; the data it ingests relates to individual’s current financial assets and income and to their community of dependents. ALLEGRO does not include codified predictive elements based on historic data; it processes each applicant according to a rule-based system. Claimants are not subject to some of the potential structural biases found in risk probability algorithms, but may be subject to the discretionary decisions of the case workers made as they attempt to calculate financial support and cajole and pressure their clients into work.

We can also ask what role ALLEGRO plays in imposing surveillance and behavioural modifica-

tion through automated sanctioning or predictive assessments. When a person applies for benefits, they must submit sensitive information about their assets and life circumstances. A person's relationships, housing circumstances or state of assets all become rateable by JobCenter employees. While JobCenter staff may use this information to generate work requirements and monitor any changes in circumstances, the data collected does not lead to automated sanctioning or loss of benefits and, as mentioned, it is not used for predictive risk assessments. Nor is the system made opaque through black boxing the data inputs or by using outsourced proprietary systems.

ALLEGRO *does* engage in personal data sharing in three ways. First, ALG II has a data sharing agreement with the retirement insurance fund to identify fraud automatically through DALG II. The data sharing, which limits the transfer of personal details, is set up to flag any data matching with the retirement insurance fund, which an administrator then investigates; this system does not score each claimant for levels of risk on other factors. Second, the BA cooperates with Customs to locate persons and detect casual work. When Customs suspect a person of informal labour, they call a BA service centre to query ALLEGRO for the persons' benefit status (Interview 140619, 2019). If the person is a recipient, the JobCenter will start making short-notice phone calls for an interview; this effectively interrupts the person's other work commitments during the day. The business consultant interviewee said this tactic was useful because people voluntarily quit ALG II after two or three such calls (Interview 260619, 2019).

Lastly, the police and the BA also collate data to ascertain foreigners' identities, since both have access to the Central Register of Foreign Nationals. JobCenter employees access this outside database to identify a person when they first apply for benefits (Deutscher Bundestag, 2019). The BA head of department stated that, due to a high influx of refugees in 2015, the cooperation with the police "was provided with an improved technological base" due to these systems (Interview 140919, 2019).² The BA interviewee was also pleased with the reduced level of illicit work and incorrect benefit receipt due

to these data collations (Interview 140619, 2019). So, we find that ALLEGRO does share personal information with Customs and police in ways that could make claimants more visible to law enforcement, though this process doesn't happen automatically.

As with most welfare systems, ALLEGRO's approach to behavioural conditionality does not currently depend on automation. JobCenter employees decide themselves whether or not to compel recipients to certain measures, such as writing a fixed number of job applications per month or attending workshops and trainings and keeping appointments; failure to comply can result in benefits being cut up to 100%. The JobCenters also have informal ways of exerting power over benefit recipients. Both BA employees and ALG II recipients told us that the JobCenters do not actively inform applicants about their legal entitlements and that it is difficult to find out which steps need to be taken to get benefits. The recipients interviewed described that documents needed went missing, that they were pressured by JobCenter staff not to apply for support they were entitled to and that they were asked to pass on sensitive health data to prove a condition.

Does ALLEGRO reduce human discretion? According to interviewees, the system is a decision-aiding, not a decision-making tool that allows strong human discretion; it was not designed to move staff out of the JobCenters to replace them with an IT system, and the software does not make overriding decisions about whether to give or cut a person's benefits. The input and output to the systems both were, and still are, supervised by a human, and hence, benefit recipients can still discuss their case with a human.

The safeguards provided by law in Germany play a part in why the process can currently not be fully automated. ALLEGRO is based on the principle of 'individual case justice' (*Einzelfallgerechtigkeit*), which means that the life circumstances of every benefit recipient must be ascertained to identify if they are eligible to special benefits on top of the fixed rate. JobCenter employees must ascertain and document many complex details about a person's life, such as checking assets owned and wage statements. As the assessments of benefit recipients are always carried out by humans,

case-by-case discrimination against recipients can still be traced back to a person, and administrators are allowed strong discretion to take individual circumstances into account. Greater automation, however, may still be on the horizon. In 2019, the BA introduced JobCenterDIGITAL that allows benefit recipients to file to continue ALG II; this application needs to be filled in every six to 12 months. If the recipient's circumstances are exactly the same as before, it is possible to process their claim in a mostly automated way because no discretionary decisions need to be made. The BA is lobbying for this requirement to make full automation possible.

From a due process perspective, how transparent is ALLEGRO to claimants? ALLEGRO is straightforward with its calculations, because recipients are in full possession of the information decisions are taken on, and the policies around standard requirements and entitlements are a matter of public legal record. Any disputes a person wants to make can be done in person at the JobCenter. Further, ALLEGRO was designed in-house, not through a private contractor, a situation that allows the BA control over its design and development. However, claimants may not be aware that ALLEGRO has flagged them for fraud nor understand how ALLEGRO shares their data with other systems and agencies, and it is not clear if frontline staff are able to challenge the results of data sharing from other agencies if they suspect errors.

In sum, and going back to our three original concerns, we find that, looking from the lens of *human discretion*, this system does not impose harm in the form of undue burdens through automation, as humans are given strong discretion to apply subjective and tacit knowledge at each point in the automated process. The implementation of ALLEGRO does not adhere to the same narrative of austerity and job cuts found in the UK and US contexts, although a repeated mention of relieving the staff and releasing capacities for more complex tasks could be the cloaked intention of reducing staff, even though this was squarely denied upon questioning.

Attending to the concerns from *surveillance* studies, our study shows that the system does not use automated means for behavioural

control – humans appear to do this work based on outcomes from ALLEGRO – and it does not draw on historic data that could embed biases. However, the system does create new data flows that could make claimants visible to law enforcement and customs. This, of course, is deliberately done to prevent misuse of benefits and illegal working: the BA and the police increased data sharing cooperation due to the influx of refugees in 2015, and it would be useful to investigate further the kinds of data sharing that occur about people who do not hold German citizenship. The system opens the potential for greater visibility through data exchanges with authorities, and possibly the ability to coerce this sector of society. Note, however, that this data sharing is not automatic, but an effect of the automated system, which requires such data to be digitised.³

Finally, from a *governance* perspective, the JobCenters allow due process in the event that a person wants to query or dispute the welfare calculation. The data sharing with law enforcement and customs, in contrast, does not seem to allow due process, as individuals may not know when their data is exchanged with authorities. The distribution of welfare benefits in Germany is under great public scrutiny, so the German agency followed due public procedures when developing the decision-making processes of the new system. By contrast, the flows of welfare and migration data attract less public interest and could prove valuable as a further field of research.

Conclusion

Our main question is how to identify potential or actual harms introduced by automation in welfare and why these might emerge, attending to the interlocking of technology, policy and practice. To answer this question, we derived an analytic framework that is novel for bringing together three related but distinct sets of concerns: those found in surveillance studies and studies on human discretion in public administration, along with those based on a burgeoning set of literature on algorithmic governance. Each of these areas leads to distinct questions about automated systems that can help pinpoint different types of harm to claimants, from data-driven discrimina-

tion and behavioural control to absence of due process and depersonalised services that make no appeal to individual circumstance. This framework also suggests that concerns raised in one of area could be mitigated by attending to the other two areas – for instance, potential harms wrought by surveillance could be addressed by attention to the other dimensions: greater human discretion and better governance through due process and public oversight. Rather than stopping the analysis after identifying problems based on one set of concerns, this study urges researchers and policy-makers to attend to the mitigating or reinforcing factors of the other two.

We demonstrate the utility of this analytic through a particular case found in the German welfare system. An advantage of this framework is that it can be applied to other types of systems

in other contexts, and it allows comparison between systems, prompting reflection on the differences between them. We invite readers to build on this framework beyond what we offer here – for instance, we do not discuss the distinctions between the various harms examined, which range from the legal to the psychological. These distinctions among harms are also worth probing in greater depth, as they could yield different technical, policy-based and political responses to address them once identified.

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Notes

- 1 It should be noted that one third of the municipalities decided not to use software provided by the BA in their JobCenters. Hence, the results of this research apply only to two thirds of German municipalities.
- 2 Unfortunately, this was not elaborated by the interviewee and no further information could be found in official documents.
- 3 Note that the law, based on which payments are calculated according to individual circumstances, requires this kind of granular data collection. The law is the effect of a range of court cases in which the benefit recipients successfully contended to be assessed in respect to their individual cases instead of being provided with fixed rate benefits. While this reduced the level of automation, it increased the amount of data collected and held on individuals.