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Article

Ethics of Technological Futures: John Rawls' Framework

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Abstract

The article explores the possibility of meta-theoretical framework to navigate the ethical dilemmas of digital futures in light of evolving machine agency and autonomy. The article explores three future oriented scenarios with evolving agential capabilities for machines and utilizes John Rawls' theory of Justice to conduct a hypothetico-deductive analysis at each possible scenario to ascertain what conditions are necessary for social vindication of our technological futures. The analysis indicates that such a framework is indeed possible and necessary for democratic legitimacy of technological futures. It is intricately relevant to the pivotal question of human experience in 21st century namely legitimization of institutions, civic engagement and values of trust.

Keywords

Ethics, Digital Futures, Theory of Justice, Machine Agency, Machine Autonomy

Introduction

Any description of future of government features discussion of data, technology and enablement with a frequency that has almost assumed the proportion of a cliché (Yoon, 2018). This attests to the over-sized influence that technology will play in shaping the meaning of government for the foreseeable future. Discourse over the topic on the other hand, transverses the entire range of spectrum from utopia (Bina et al., 2020) to dystopia (Slaughter, 1998; Slaughter, 2020), with cautious optimism (Luftman & Ben-Zvi, 2011) and fatalistic acceptance of digital eventuality (Milojević, 2020) falling in-between.

The advances in computation capacity, generation, storage, retrieval, transmission and processing of information (Hilbert & Lopez, 2011) have collectively been termed as "Fourth industrial transformation" (Ross & Maynard, 2021). The state of utter non-convergence over the topic is not entirely surprising. It is owed to unavailability of historic analogs of transformation of basic institutions of human social organization, in as short a time as couple of decades. This exponential change over very short duration precludes incrementalism (Quinn, 1978) and path dependence (Levin. et. al., 2009), two primary stock responses of human beings to uncertainty.

As is the case with any emergent paradigmatic shift, there are vast discrepancies in potential and actual adoption (Karahana et. al., 1999), use cases (Yi et. al., 2005), Inter sectoral advances (Corradini & De Propis, 2017), subnational differences (Bayer et. al., 2016), cross-national differences (Bussell, 2011). All of these are predicated upon differences in state of the collectivity, at the time of technological penetration (Lee et. al., 2013). Generally, a description of futures thinking about governments in relation to fourth industrial transformation comes up in one of the three hues, listed in order of ascending machine agency:

1. Data Assisted Human Agency
2. Data Enabled Partial Machine Agency
3. Data Driven Full Machine Autonomy

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Distinguishing features of each epoch is presented in tabular form in Table 1.

Data Assisted Human Agency

The hand holding enabler scenario is the most common state of digital adoption by any social collectivity which is at the "Beginner" level of digital adoption. Governance collectivities, egged on by concerted economic forces of austerity and fiscal compulsions (Dunlevy et. al., 2011), scarcity (Acemoglu, 2010), changing composition of the work force (Meyer, 2011) leveraged digital solutions. The basic imperative for digital adoptions was to enhance efficiency of public works to relieve the cumulative effects of the preceding (Pang et. al., 2014). The substantive changes brought about in the scope of public service signified optimization of performance, elimination of duplication of efforts with efficiency as the prime goal.

Some hypothetical applications of technology at this phase of adoption involves biometric access and digital time keeping in public workplaces, regularization of public workforce (e.g. identification of ghost employees), human resource information systems and self-service portals, optimization of some social collective benefit e.g. optimizing traffic flows through algorithms to target commuting and stall time, optimizing timing and route management of garbage collection to optimize collection per trip etc. It is important to review the nature, timing and targets of these technological adoptions, useful for influencing the pace and direction of future technological epochs. The first and most important feature of these adoptions was that they were entirely made possible by advancements in unrelated fields. So technically, these cannot be termed as adaptations but rather exaptation (Garud et. al., 2016). Some prominent examples of technological exaptation include adaptation of gramophone as jukebox which was originally invented as a dictating machine, adaptation of a speculative scientific invention of LASER to diverse ends, adaptation of engine-gearbox-axle design to build tractors (Dew et. al., 2004) etc. Secondly, this exaptation was made possible by expedient political narrative emphasizing fiscal constraints and balanced budget (Boyabatli et. al., 2016). Thirdly, rate of exaptation was mediated by pre-existing nature and structure of social institutions (Miranda et. al., 2016).

As must be apparent by now, this stage of technological exaptation in public work comports most clearly with "New public management" theoretical orientation.

Data Enabled Partial Machine Autonomy

This stage of technological exaptation is most clearly observed in governance collectivities which can be conceived as either transitioning from beginner to intermediate level or entrenched at intermediate level of technological exaptation.

This stage is characterized by largish scaling back of direct provision capabilities due to interplay of dual social factors. The first factor is self-perceived efficacy of governance collectivity to be able to achieve social deliverables without direct provision. The sources of this perception can be rooted in satisfactory leveraging of networks in the past (Rethemeyer & Hatmaker, 2008), availability of technical proficiency and infrastructure to design, measure and monitor-in-real-time contract specifications (Lu et. al., 2000), antecedents of successful cross-collaborations (Tang & Ho, 2019) and mutuality of goals to deliver social outcomes. The second factor is sufficient technologic proficiency in the general population to both, supply for such a workforce and general preference to live in conformity with ideal of a digital life (Davies, 2011). An important externality, as in previous stage, was indigenous sophistications in cloud computing, ultra-high speed data transmission, mobile communication which create possibility for this stage of exaptation.

The scope of public work at this stage of exaptation is expanded policy making capacity and expanded oversight with the central goal being management of service quality with better designed; flexible & timely interventions. Clearly, the goal of public work at this stage is an expanded construct than mere efficiency optimization at the earlier stage. Some prominent examples of the nature of public work at this stage include data driven behavioral insights to nudge for better social outcomes, for example analyzing localized predisposition tendencies for diseases and shaping choice architecture in real time and utilizing AI/ML based insights to adapt policy instruments (Ciuriak, 2019).

As must be apparent by now, this stage of technological exaptation in public work comports most clearly with "New public governance" theoretical orientation.

Data Driven Full Machine Autonomy

Hands-off technology enabled scenarios are more of a future vision of technological exaptation than an extant positive reality. However, there are many developments which are all collectively and variously accruing in a direction, which can be conceived as a new synthesis. At this stage, the direct provision capabilities of government would be significantly rolled back because of expectations of individualized and customized citizen experience. Therefore, the digitally competent citizen is an a priori for this stage of exaptation (Berson & Berson, 2003). Secondly, in terms of service delivery, governance collectivity takes a self-service approach, enabled through simultaneous co-existence of digital identity with natural identity (Carrasco-Sáez et. al., 2017) of each citizen. In this self-service form, governance collectivity provides digital architecture e.g. through apps, kiosks etc. to provide information and access services while leaving the discretion of opting in and checking for self-suitability on citizens' themselves (Fotaki, 2011). This service delivery architecture would accrue a trifecta of benefits. First, it would enable citizens to craft localized and personalized service responses. Secondly, it would help provide basis for automatic readjustment of governance collectivity's goals, objectives, work and its routines and processes. Thirdly, it would eliminate the impression of governance collectivity's insularity, estimation and design problems etc.

The scope of public policy and its administration at this stage of technologic exaptation is to enable flexibility and automaticity in readjustment of objectives, work processes, routines and resource deployment by elimination of agency & information based silos & echo chambers. This is brought about by applying advances in machine learning analytics, quantum and cloud computing, deep machine learning and neural networks to approximate human decision processes with the central aim of optimizing throughput of the entire governance collectivity.

There has long been an accrual of findings in policy studies that components of social systems are linked in very complex ways and their collective interactions produce outcomes vastly more diverse than predicted, much less controlled (Vespignani, 2009). Owing to this, it is very hard to evaluate if any policy ever met its objectives. Results of any evaluation changes dynamically, depending on how wide a net is cast to compute externalities (Steinacker, 2006)

Since this is a prospective future state, therefore, some signals instead of examples are surveyed that point to convergence towards this state. Thirteen agencies collectively looking at various aspects of security function in the United States have developed a private joint cloud which creates integration of databases, work priorities and elimination of duplication etc. to ensure seamless threat detection and response (Abd Al Ghaffar, 2020). The closest approximation of this stage of technological exaptation is "Result10" program initiated by the New Zealand government in 2017. Result10 seeks collaborative reorganization of ten public agencies around major life transitioning events for example child birth, becoming victim or witness to crime, turning 65 etc. where the opting in is discretionary enabled through digital identity (Results 10 Program, 2018).

Table 1: Three Technological Epochs

	Data assisted human agency	Data enabled partial machine autonomy	Data driven full machine autonomy
Level of Technological Sophistication	Beginner	Intermediate	Advanced
Objective	Efficiency, Service Optimization	Service quality, Flexibility	Co-design, Co-production, Throughput optimization
Examples	Traffic flow management, Route optimization to minimize stall time etc.	Choice architecture reshaping based on localized disease predisposition	Results 10 Program
Technological/ Political Imperatives	Fiscal constraints, Balanced Budget	Technological proliferation, Cloud computing, ICT	Personalization of service, AI/ML, Neural networks, Deep learning
Theoretical Orientation	New Public Management	New Public Governance	Emerging paradigm

Normative Anchors for Navigating Third Social Transformation

Related social forces that provided the backdrop for the new synthesis emerged at political and economic fronts. It is essential to visualize solutions to impediments in collective action related to global hunger; illiteracy & climate change, lunar & space mining, environmental engineering e.g. cloud seeding etc. Some scholars call this inaction in face of impending doom the moral bystander effect (Mills, 2020). Similarly, consider inadequacy of the definition of property rights in the face of changing nature of products of 21st century (Brousseau, 2004) e.g. consumer data (consensual or not), citizens' data, digital privacy, Internet neutrality, information curated on clouds (public or private) etc.

Similar conundrums abound regarding politics which can sympathetically be categorized as inadequate at producing solutions to 21st century challenges. For example, political institutions are viewed as insular & distant (Taglioni, 2011). Such state of affairs, taken either way, points to at least one of the two inadequacies- either a distributional inequity (Schneider et. al., 2010) or a communicative inadequacy (Meyer, 1999). The degree of fragmentation can be surveyed by the fact `that even basic knowledge claims about state of political and economic systems are not uncontested. Some important examples include contested evidence about increasing polarization/sorting debate of political systems (Mason, 2015). Also, there is no consensus on which group enjoys the most legislative success e.g. an average voter, economic elite, business or public interest group (De Bruycker & Beyers, 2019). Similarly, there is no consensus on if wealth and income inequities have actually increased or not (Bernard & Jensen, 2000). , Some scholars propose that this fragmentation is a necessary consequence of the modalities of digital communication technologies and resultant rupture (Democracy, 2020).

Given the fragmentary nature of discourses, institutional legitimacy and knowledge claims surveyed above, it is imperative to examine how anticipated digital futures interact with the preceding. For example, personalization and customization of citizen interaction with the state would become a standard expectation The preceding factors dictate that the digital future is re-conceptualized, not in terms of its functions or characteristics, but instead in terms of citizens' lived experience, collectively and individually. All of the preceding has important implications, for shaping relationship of the citizen and the state. But more importantly so, provides a substrate of possibilities for all social relationships.

It would be apparent by the preceding discussion that any discussion of digital futures brings us to the most fundamental question of political and social philosophy i.e. what to optimize, why that particular objective and the legitimacy of governance collectivity to bring such social optimization about.

John Rawls' Theory of Justice

These uncertainties lead to a search for framework that can be used as a litmus test for each technical epoch, not only in terms of performative criteria but also in terms of ethics. Hitherto, there is little research to propose or adapt a normative/ethical framework for systematic evaluation of technological futures. The exponentially rising technological capabilities and resultant uncertainties, make these normative questions paramount.

The choice of an ethical framework to be adopted for technological initiatives is notoriously difficult for many reasons but most conspicuously the breadth and scope of technology in the public sector and its applications, makes it intractable for a generalized frame of reference. Consequently, the framework should be generalizable enough to cater to the scope and breadth but also, granular and concrete to provide actionable decision rules under changing & complex circumstances. I propose that John Rawl's Theory of Justice (Rawls, 2004) is highly apt for the task at hand.

Rawls developed his celebrated framework to optimize conditions of social justice and/or fairness in a society. The crowning achievement of this framework is that it makes no *a priori* assumptions and instead starts from the condition of ignorance about the distribution of values, burdens and benefits in a society. Thus being at this stage of ignorance and no prior knowledge, any rational individual would choose a system that is just to secure best outcomes for oneself. An additional benefit is that it distinguishes a fine point of non-zero sum or synergetic effect of social systems. Thus the framework recognizes that just distribution maybe suboptimal for collective optimization thereby reducing the collective well-being. Based on this realization, it provides a rational criterion for tolerating social inequality i.e. an unequal social system/technological future can be better than a just future, based on the argument that worse-off segment of society is better-off in an unequal system than in a just system. Finally, it allows for venues for deliberation and adjudication of social interests to allow for systematic change.

The sequential derivation of Rawls' system is reproduced below:

1. Optimal system of social organization should provide greatest liberty possible to all, with only condition of no infringement upon rights of others.
2. Inequitable inputs, outputs & outcomes, be they economic or social, have only one condition of tolerance i.e. even the inequality of inequitable system should be beneficial than the equality of equitable system for the lowest strata (residualised).
3. If a society accepts inequitable system based on meeting condition (ii), that it ensures that the residualised are not effectively hobbled from access and positions of power or other opportunities that enables them to change system design to their benefit.

Having stated the proposition of the framework, we survey each tech epoch and deduce what kind of conditions does the framework necessitate for it, to achieve the ethical/normative touchstone. A brief synopsis of Rawls' framework to each digital future is appended at Table 2.

Data assisted human agency

The overarching aim of a tech initiative at this stage is performance/efficiency optimization as measured through various objective and quantifiable measures e.g. increasing per trip efficiency of garbage collection routes or decreasing collective traffic stall time etc. The universality of Rawls' framework for ethical consideration in technological initiatives at this stage is demonstrated through examining the implications of each ordered condition.

First order condition/vindication

The most important consideration at this stage is to consider that the initiative increases the efficiency of what? and for whom? How are the costs and benefits of this initiative distributed? How this initiative reallocates/reprioritize the values in a governance collectively?

Taking the empirical case of a static algorithm that optimizes traffic stall time by integrating traffic lights system in a particular geographic vicinity. optimization initiative these considerations take empirical form of decrease fuel consumption & emissions of vehicles and collective commuting time. It largely benefits the public road users and especially those commuting during rush hours. The initiative prioritizes the values of environmentalism.

Second order condition/vindication:
At this stage the most important considerations are if there is any particular residualization created by the initiative, how does it impact the residualized group and what are the justifications for still going ahead on base of enhanced collective well-being argument. How a particular initiative enhances collective well-being despite the residualizations it creates?

Working with the stall time optimization initiative, these questions take the empirical form: How does it impact the rights of non-motorized road users e.g. cyclists. How does it impact the rights of citizens in affiliated social systems e.g. curb-side walkers, elderly whom the slow traffic benefits etc., what are the mechanisms through which a collective well-being argument for this initiative can be justified, while accounting for the residualizations it creates?

Third order condition/vindication
At this stage the most important considerations are the existence of avenues that can serve the role of adjudicative forums for the ongoing evaluation of the initiative and bring to the fore hitherto new groups who are impacted by the initiative, adversely or favourably. These evaluations serve as continued justification and validation of the initial assessment and its assumptions or revise the viability of the initiative.

Since the role, function, design and decision rules of such adjudicative forums are common to all three technical epochs, please see the "Adjudicative forum" section below.

Data enabled partial machine agency
The scope of tech initiative at this stage of exaptation is service quality optimization enabled through expanded oversight, better contract monitoring to offer better designed, targeted, flexible & timely interventions enabled by data. Each ordered condition of Rawls' framework is explored to examine its potential to provide normative anchors for epoch of digital initiatives.

First order condition/vindication
The most important questions at this stage are that the initiative improves the service quality of what kinds of goods/services, how does it measure those improvements, how are the costs and benefits distributed and what values does it encapsulate?

An additional set of considerations at this stage are those arising out of data collection/utilization methodologies and transparency about it. The critical consideration here is the awareness that the existent social biases & exclusions are embedded into the data because data is encapsulation of social structures and interactions. An important example in this regard can be systemic under representation of minorities in centralized databases due to structural and other barriers.

Utilizing the example of pervasive recidivism prediction algorithms in criminal justice system, the essential question asked here are what are the objectives of the use of these algorithms in criminal justice system? Is it to alleviate the administrative pressure on judicial staff or alleviate resource burden? It is to protect society from crime? Is it to rehabilitate the offenders? Or Is the algorithm being retributive in nature? What are the patterns of socio historic inequities embedded into the algorithm that may accord differential treatment to different class of offenders? Is it justifiable to determine sentence for an individual based on generalized group characteristics or statistical similarities? How does the concern for procedural justice or fairness balance with the identified interest for adoption of such algorithms?

Second order condition/vindication
The important set of questions at this stage are what are the justifications of initiative viability despite residualizations created by choice of objectives, parameter measurements and data generation processes, if any. How can the enhanced collective welfare argument still be justified in light of the preceding?

E.g. in the case of recidivism risk prediction algorithms at this stage we ask the questions such as how the collective welfare argument can be justified in light of objections like fairness of applying group characteristics to individual, social-historic basis of over and under representations in data, how social change over time may make the data generated predictions irrelevant however, what normative justification may still exist for using the same, it any.

Third order condition/vindication

At this stage the most important consideration are the existence of avenues that can serve the role of adjudicative forums for the ongoing evaluation of the initiative and bring to the fore hitherto new groups who are impacted by the initiative, adversely or favourably. These evaluations serve as continued justification and validation of the initial assessment and its assumptions or revise the viability of the initiative.

Since the role, function, design and decision rules of such adjudicative forums are common to all three technical epochs, please see the "Adjudicative forum" section below.

Data driven full machine autonomy

The scope of the tech initiative at this epoch is automaticity, real time adaptation of service delivery to citizen needs, citizen centric governance with default opt in options left at discretion, automatic adjustment of public workforce and cross-silo collaboration to adjust to demand patterns of citizenry and their fluctuating needs and tastes, integration of digital and natural identity to provide individualized and response services. We now examine the application of Rawls three orders of vindication to see how best to navigate the ethical considerations for this technological future.

First order condition/vindication

Since the goal at this epoch is automaticity and full customization with default opt in, the essential questions to be asked is what are the systematic factors that may hinder opt in by certain segments of population or individuals. How certain systematic opt out can skew the capabilities of the system, what are the data generation processes and rules of statistical evidence that generate customizable outcomes. How transparent, accountable and more importantly explainable are those underlying data and statistical processes that generate customization.

Examples include some deep learning technological affordances like neural networks. Although, it provides capabilities to approximate human reasoning process, the problem remains with explaining its continually evolving decision rules. Another important consideration is as machines have considerable agency at this epoch, the importance of data security and the system integrity is paramount which does not allow for any backdoor to tinker with these processes.

Second order condition/vindication

This stage of vindication requires that a system justifies its residualizations based on enhanced collective welfare argument. For this technological feature that relies on automaticity, data driven self-learning and considerable machine agency, some factors are paramount. First, ensuring that there are not systematic characteristics to set of individuals opting out of the system. If so, then there should be explicit examination and explanation of why the technological system is still justifiable on collective welfare argument. Secondly, there should be a flexibility to alternatively provide the service through conventional means. Thirdly, in case of self-learning systems that are necessary for automaticity and customization, the explainability of their evolving decision rules is paramount. The decision rules should be understandable to a lay person.

Third order vindication/Adjudicative forums

Third ordered condition for technological choices, as per the Rawlsian framework to ensure justice, is the right of the people adversely effected to have power to suggest changes to the system design. This provision for the disadvantaged to change system design necessitates adjudicative or deliberative forums where the ill effects of

technological choices can be deliberated upon. A related question during such process is proof of burden, rules and quality of evidence and who is to bear such burden. Although the question of who is to bear proof of burden might be simple to answer i.e. the group which claims to have been adversely impacted, the question of what evidence is admissible and how to substantiate is quite nuanced. For example, there is a whole body of literature in legal theory about the balance of probabilities vs. beyond reasonable doubt doctrines. Another complexity is apportioning costs of bring forth claims of adverse technological impacts. For example, the disadvantaged are most often the segment of population lacking means and resources to bring their claims to standing. Therefore, costs of bring forth such claim is also another problem. Despite these obvious difficulties, the necessity of such deliberative forums to continually re-examine the social justification of technological choices is crucial.

The necessary flexibility required to adjust technological parameters to evolving public consciousness is a very complex and challenging task but the express and explicit intention to tackle this challenge is necessary to social legitimacy of technological choices.

Table 2: Digital Futures & Rawls' Framework

Tech Epoch	Rawlsian Criteria of Justice
Data Assisted Human Agency	**First Order Vindication** Efficiency of what? Whom does it benefit? Distribution of costs & benefits Distribution of values **Second Order Vindication** System for viewing system output if creating systemic or structural exclusions System of justification of those exclusions Documentation of effects of exclusion
Data Enabled Partial Machine Autonomy	**First Order Vindication** Fairness in data collected Fairness in methods to process data **Second Order Vindication** What kind of residualizations the data contains? What methods of inference are used to justify choices? What are rationalization of those choices?
Data Driven Full Machine Autonomy	**First Order Vindication** Transparency of data analytic methods Explainability of data analytic methods Sociology of numerology-how existence of data prioritizes outcomes over others for which data doesn't exist **Second Order Vindication** Justification for data prioritized outcomes over subjective assessment Justification for unexplainable data processes e.g. Neural networks, Justification for Black boxing of administrative and bureaucratic decision making
Deliberative Venues (Common to all three futures)	Sunshine clauses-periodic right to challenge exclusions Well defined methods and avenues to challenge exclusions Burden of proof or process (Administrative, juridical or etc.) not be transferred to mobilized groups Transparency in process of adjudication Adequate recording of the process of adjudication Open access to record of adjudication Criteria of justice not on definitive but balance of probability approach if challenge does not infringe upon others' right

Conclusion

The article examines how various technological futures can solutions can be made fair/just by adopting a systematic approach. To this end, Rawls theory of justice is adopted as a theoretical lens. However, there are some real world impediments that prohibit post implementation ethical legitimacy of technological choices. Foremost is the prevailing models of public procurement for technological solutions. The most important aspect of public procurement is that proof of work is output driven instead of outcome i.e. the installation of technological solution instead of achievement of outcome that it purports. Although, there is legitimate necessity of recompense for work gone into building such systems, it does not further the purpose of achieving outcomes that technological solutions purport. Secondly, for continued legitimacy of technological solutions, it is important that solutions are flexible which often is not technologically possible. Thirdly, technologies co-constitute a matrix of possibilities by how they are taken up in societies, allocate resources, redistribute values and shape norms. Thus technological legitimization is a dynamic and continually evolving process. The milieu of shifting norms and values make it increasing complex to socially legitimize technologies but it is paramount if we have to sidestep what Gilles Deleuze calls "Societies of Modulating Control".

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