An Ontological Analysis of Justice

Paul Johannesson[a], Helena Zhemchugova[a,b] and Susanne Hanger-Kopp[b,c]

[a]*Department of Computer and Systems Sciences, Stockholm University, Borgarfjordsgatan 12, Kista, Sweden*
[b]*Population and Just Societies Program, International Institute for Applied Systems Analysis, Laxenburg, Austria*
[c]*Department for Environmental Systems Science, ETH Zürich, Zürich, Switzerland*

Abstract

IT systems design and architecture have many similarities with the design of organisations and institutions. Both pay attention to social concepts such as rules, norms, and values. Justice is one of the key concepts that can be relevant for any institutional design from a systems perspective. This paper outlines an ontology of justice based on the Unified Foundational Ontology (UFO). We envisage that it can support designers in recognising and addressing the issues of justice during systems design and analysis, including elicitation of requirements, rules analysis, systems evaluation, and policy analysis.

Keywords

justice, justice assessment, social systems, conceptual modelling, ontology, UFO

1. Introduction

Applying ordinary empirical predicates, such as 'sky' or 'blue', is usually straightforward as it solely requires an understanding of their definition and some empirical facts, [1]. In contrast, evaluative predicates, such as 'beautiful' or 'loyal', can be more contentious to apply, as they require a subjective assessment of their applicability in specific cases.

Even if people agree on the definition of an evaluative predicate and the empirical facts, they may still disagree on the applicability of the predicate in specific cases. Such disagreements may depend on subjective factors as well as on how the definition of the predicate is interpreted and applied as people have different conceptions of the predicate, [1]. The concept of *justice* is an example of such an evaluative predicate with different conceptions, [2]. A parallel can be drawn with the concept of beauty: people can agree on how to judge what is beautiful (e.g., it should have structural harmony and evoke joy), but they can have different conceptions of beauty (e.g., having different perceptions of what is harmonious to them and what gives them joy) and, therefore, provide different beauty assessments of one and the same work of art.

Therefore, when analyzing the concept of justice, it pays to start with the concept of a *justice assessment*, i.e., an evaluation of whether something is just or unjust. The structure of the concept captures the basic form and components of an evaluation. The basis of a justice assessment is a combination of grounds and lines of reasoning supporting the assessment. While it should be possible to reach a consensus on the structure of justice assessments, there are many different views on their appropriate or valid bases.

The purpose of this paper is to outline an ontology of the concept of justice, addressing both the structure and the basis of justice assessments. We envisage that such an ontology can find applications in multiple fields. It bridges IT systems design and architecture with the design of organisations and institutions where both pay attention to social concepts such as rules, norms, and values. Justice is one of the key values that needs to be addressed by IT systems designers during requirements elicitation and system evaluation, [3], as well as by analysts, policymakers, and lawyers when building and redesigning institutions to adapt to the global change, [4, 5]. Questions of justice often remain implied in research and decision making on complex problems that are commonly termed as wicked. They combine high stakes, high uncertainties, heterogeneous decision makers and stakeholders – and no one expert can provide all answers, [6]. To assess justice in such cases, a common foundation could facilitate inter- and transdisciplinary communication on its aspects in diverse settings, and a systems approach is an obvious choice for navigating such problems, [7].

The remainder of the paper is organised as follows. Section 2 offers a general overview of justice as discussed and understood in philosophy and ethics. Section 3 introduces an ontology for representing the structure of justice assessments based on the Unified Foundational Ontology (UFO), [8]. Section 4 suggests an ontology for formulating bases of justice assessments. Section 5 uncovers additional concepts for understanding justice in different social contexts to extend the ontologies further. Finally, Section 6 summarises the paper, discusses related work, and points out topics for further research.

2. On Justice and Justice Assessments

Justice is sometimes viewed as such a broad and multi-faceted concept that it only allows for family resemblances in its various uses, [9]. However, it has also been argued that the concept has a core that is present in all of its manifestations. One plausible candidate for such a core is in the definition of justice by the Institutes of Justinian: "the constant and perpetual will to render to each his due", [10]. This definition makes it clear that justice is about a mandatory duty that actors have to others ("to each *his due*"), while other ethical values, e.g., charity and mercy, are voluntary. Furthermore, this definition emphasizes that justice is a relational concept as it tells us how we should treat individuals ("to *each* his due"), which can be contrasted to duties of a collective or a more general character, e.g. a government having the duty to reduce disaster risks. This definition also attempts to capture the strength and robustness of justice claims ("*constant* and *perpetual* will"), meaning that it can be expected that people appealing to justice should not be disregarded, either arbitrarily or deliberately.

Similar to many other evaluative ethical predicates, justice can be applied to entities of fundamentally different kinds. Pogge [1] identifies four kinds of *judicanda*, i.e., entities that can

be assessed as just or unjust: "(a) individual and collective actors; that is, individuals as well as organized and unorganized groups such as a family, firm, state, or mob; (b) the conduct of such actors, their actions and omissions; (c) social rules, such as laws, social institutions, and conventions; (d) states of affairs and events, such as the fact that some are much worse off than others or that some good persons suffer while some bad ones enjoy good fortune." In addition, it is recognised that justice has two dimensions, which reflects its complex nature: first-order vs procedural justice and formal vs material justice, [1]. Material justice is further subdivided into distributive, commutative, restorative, and retributive.

First-order justice is concerned with the outcome of a process, which may be a particular state of affairs or some social rules. For example, a division of the work between all team members can be (first-order) unjust if it is highly unequal. However, another kind of injustice takes place if the division of work has been brought about through a process in which some team members had no influence or voice. The latter is an example of *procedural* injustice that occurs when some parties are advantaged while others are disadvantaged in one and the same process.

Formal justice requires that relevantly similar cases are treated in similar ways. The main challenge is determining which cases and treatments are relevantly similar. At least justifications should be provided when cases are deemed dissimilar. Actions can be unjust even if they uphold formal justice. For example, punishing all their children without cause constitutes unjust behaviour on the part of the parents even if all the children are treated in the same way, [1]. This example is about *material injustice*, which applies when a judicandum in itself is deemed just or unjust independently of its relationships to other judicanda.

Speaking further of the kinds of material justice, *distributive justice* is about the allocation of scarce resources or burdens among the members of a community. *Commutative* justice addresses the exchanges of resources among actors. *Restorative* justice focuses on how to repair the harm caused to an actor by another actor who committed a wrongdoing. *Retributive* justice addresses the punishment of actors who have committed a wrongdoing.

3. Ontological Basics for Justice Assessments

A justice assessment evaluates whether something is just or unjust and to what extent. In many respects, it is similar to a value ascription, [11], as it expresses how somebody assesses the value of something. Thus, the ontology of justice assessments outlined in this section has several similarities to the value ascription ontology suggested by Andersson et al. [12] and the Common Ontology of Value and Risk proposed by Sales et al. [13]. Similar to [13], our proposed ontology for justice assessments is based on UFO, [8]. However, it should be noted that the grounding of the ontology in UFO is still early work that needs further consolidation.

The ontology depicted in fig. 1 shows that a *Justice Assessment* is a *relator* that relates the following entity classes:

- a *Justice Assessor* is an actor who makes a justice assessment – an individual or a group of individuals, e.g., a judge in a court or a jury.
- a *Justice Object* is an object being assessed from the perspective of justice – a judicandum, i.e., something that can be assessed as just or unjust. Judicanda are highly heterogeneous, indicated by the class *Judicandum* being stereotyped as *type*. Judicanda include *Actors*,

Actions, *Rules* and *States of Affairs*, which makes the ontological classification problematic, as actions are *perdurants*, while other judicanda are *endurants*.

- a *Justice Recipient* is an actor to whom justice or injustice is done. According to the formula of "to each one his due", a justice recipient should be restricted to being an individual. However, it is also argued that injustice can be done to groups of animate beings, e.g., people, or animate organisms and inanimate beings, e.g., ecosystems.
- a *Justice Principle* is a principle on which the justice assessor bases her assessment. Examples of three distinct justice principles are that resources should be distributed in an egalitarian way, according to need, or according to merit. Even if justice principles provide a foundation for a justice assessment, they are based on subjective factors of the justice assessor. Ontologically, a justice principle may be viewed as a *normative description*.

Justice is modelled as a *quality* inherent in a value assessment, meaning that it can be measured according to a scale that can be discrete or continuous.
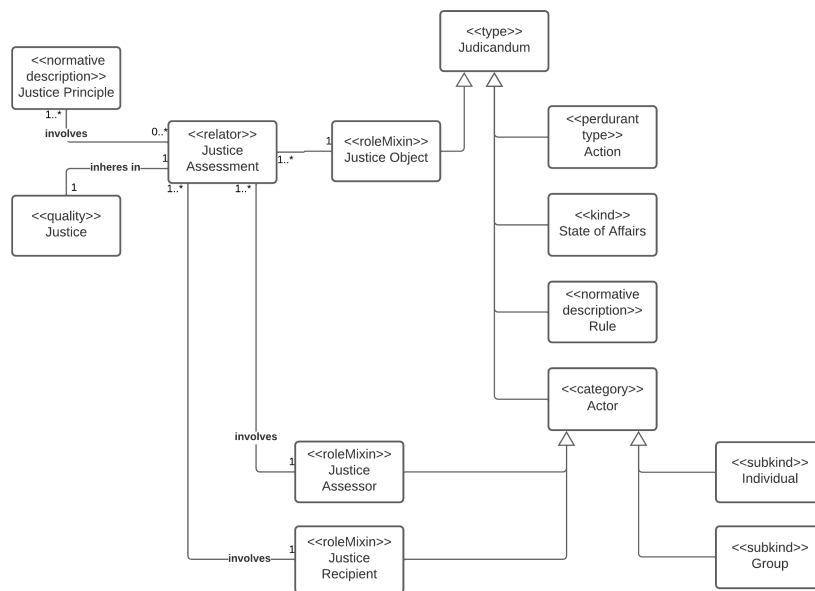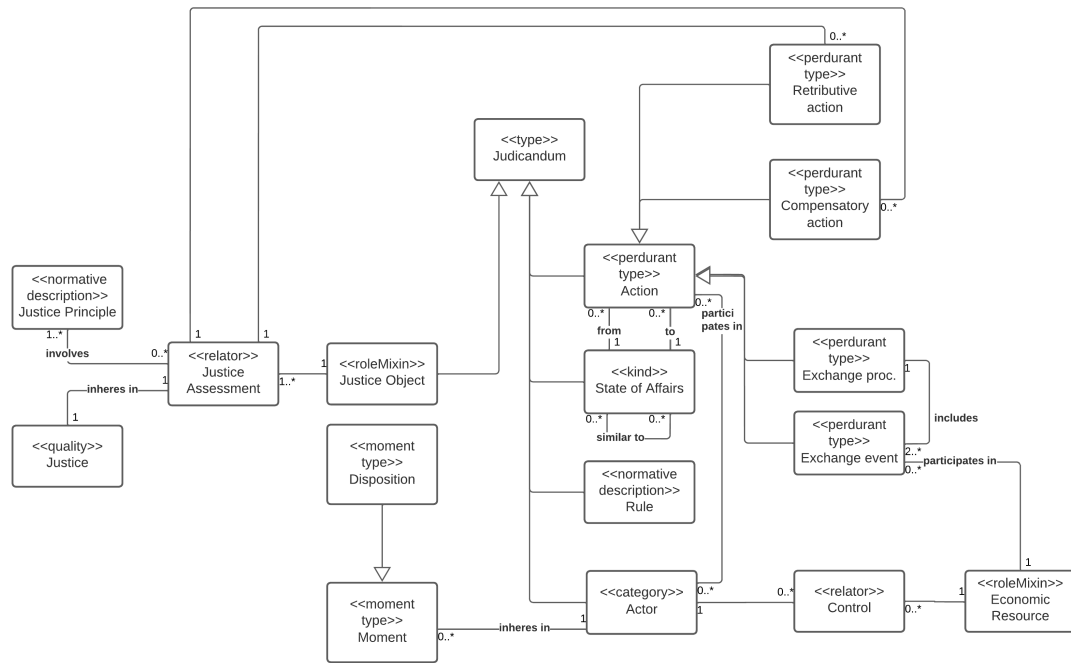

Figure 1: An Ontology of the Basics of Justice Assessments

4. Ontological Basics for Justice Principles

The ontology presented in fig. 1 describes the formal structure of justice assessments but does not cover their underlying grounds or justifications. The justice principles should address any issues concerning these grounds, but the ontology does not acknowledge them. Thus, the question arises whether it is possible to develop another ontology that captures the key concepts needed for formulating justice principles. Answering this question may seem a daunting task as justice principles are defined by their function and not by their contents or structure – they

could be about anything. With this in mind, we expect that it can be both feasible and helpful to identify the most common concepts associated with *justice principles*; some of these are included in fig. 2.

Figure 2: An Ontology of the Basics of Justice Principles

In order to model formal *Justice* for actions, we make use of the fact that an *Action* transforms one *State of Affairs* into another while *Rule* operationalises *Justice Principles*. We introduce a *similarity* relationship between the states of affairs to make it possible to express that two actions violate formal justice if they transform similar states of affairs into dissimilar ones. Such a similarity relator is highly context-dependent and should be defined in relation to some justice principle, meaning that different situations require different similarity relators.

Distributive justice principles are about distributing resources among actors in a community. Thus, we introduce the concept of an economic resource, as defined in REA, [14]. Furthermore, *Control* is a relator that expresses that an *Actor* can control an *Economic Resource.* As suggested by Scheller and Hruby [15], it can be specialised into *possession*, *ownership* and *availability.* These concepts provide the basis for formulating those principles of distributive justice that are so simple that they disregard the varying circumstances and needs of actors, e.g., some conceptions of the egalitarian justice principle or the difference principle of Rawls [16]. However, more plausible conceptions of these principles would also involve the characteristics of actors, e.g., by acknowledging that economic resources, in some contexts, should be distributed according to needs. Thus, we include the concepts of actor *Moment* and actor *Disposition.*

Commutative justice is about exchanging resources between actors, and we introduce the concepts of *Exchange events* and *Exchange processes* to model it. Similarly, we address corrective

justice with the concept of *Compensatory action*, and retributive justice – with the concept of *Retributive action*. Both are related to a *Justice Assessment* that provides the reason for the action, e.g. a court sentence (retributive action) may be based on a justice assessment of a jury.

The ontology in fig. 2 resides on a highly general and abstract level, meaning that it may not be immediately applicable for analysing and designing specific tasks and situations. The ontology needs to be extended with additional concepts to cater for particular circumstances. We expect many of them to be specialisations of those already included in the ontology, e.g., different kinds of economic resources. Thus, the ontology can be used as a starting point for designing application ontologies and relating existing application ontologies.

5. Additional Concepts for Capturing Social Context

We view justice as a socially-bounded concept that only comes to force within social systems that possess internal structures and are guided by intrinsic rules. Organisations, institutions, and societies are examples of such systems. A holistic analysis of justice needs to address the social context within these systems explicitly. The models in fig. 1 and fig. 2 need to be expanded with additional concepts to capture it.

5.1. Organisation View: Role, Membership, Function

Any actor who performs an action within an organisation will do so in a role that the organisation provides to her through organisational membership. Being an actor with a role endows the actor with the power to perform that action. For example, a teacher has the power to carry out examinations and grading at a university only in her role as an examiner. Other actors without membership or a similar role cannot perform it. The role would also be associated with a function that may or may not include liabilities. This view suggests *role*, *membership*, and *function* as additional concepts for modelling the concept of justice. One way to model the relationship between these concepts and the concept of an actor who performs an action is by using qua-objects of UFO, [8].

5.2. Process View: Trigger, Consequence, Contingency

Some dictionary definitions of justice propose that it attributes a quality to a state of affairs as being just or unjust, e.g., [17]. In contrast, others connect it to upholding the rules of law, e.g., [18]. Our preliminary models reflect the former views as we model justice as a quality inherent in justice assessments. However, an assessment of justice often addresses an action that takes place in some context and a context-dependent judicandum, i.e., that which can be viewed as just or unjust. By taking the perspective of justice as a product of human agency rather than its qualifier, we can extend this conceptualisation to include a process view of justice, i.e., the dynamic aspects of social systems where justice is done.

The process view requires us to consider the system's environment: it may include subsystems, be isolated from other systems or be part of a larger system. By tracing the connections between the system and its external environment as well as those among its internal parts, we can see how an action can provoke feedback in some or all of its parts. According to this view,

justice principles can be thought of as "loaded" in the system (e.g., subjective moral values of a person or a group) but dormant until a triggering event (e.g., somebody's wrongdoing that contradicts those subjective moral values) sets them in motion and opens the floor for making a justice assessment that considers the consequences. Further, the process view allows us to reason about contingencies before a triggering event occurs and thus, inform decisions on preemptive change. For example, it can be flagged when rules themselves may be unjust – e.g., assigning excessive punishment to individuals for minor mistakes, or "useless," [19] – e.g., offering additional insurance coverage that is redundant but requires payment. Alternatively, it can be flagged when policies may not recognise grave issues – e.g., not urging to follow the precautionary principle for activities with environmentally harmful consequences.

The concepts of a *trigger*, *consequence*, and *contingency* can possibly be modelled as a disposition of a system related to justice principles.

5.3. System Interface View: User Access

Sustainable Development Goals (SDG), [20], adopted by the United Nations as part of the 2030 Agenda, [21], reflect a democratic view of global governance and express a call for action towards global peace and prosperity. Justice is explicitly addressed in SDG 16: "*Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels*," [20].

Access to justice can be understood using the rights-based approach that asks: "What rights are being neglected?" and "Why are the people unable to access their rights?" [22]. The former relates to the concepts of *actions* and *judicanda* discussed in the previous sections, while the latter introduces an interface view of justice. The issues of *inclusion* and *access* to justice can be viewed as issues of having access to interacting with the social system's *interface* in exactly those points of contact that operationalise the delivery of *justice claims*, i.e., *entry points.* Here, the concept of a *user* may be relevant for denoting an actor or a group of actors, and the delivery can be characterised by *input* and *output*. Further, *entry points* are controlled by either formal institutions (e.g., court) or informal clubs (e.g., an activist community), which may follow either formal or informal dispute resolution strategies, [23], respectively.

According to our interpretation of SDG 16 and our analysis of justice thus far, not all actors holding a universal membership within subsystems of the global community may have direct access to the system's interface to deliver justice claims. Therefore, different types of *user access* may exist. In particular, the concept of a *justice caller* – something we have not come across in the literature as of today – seems important to introduce. A justice caller delivers a justice claim on behalf of an actor who cannot exercise her rights directly. For example, a lawyer is formally responsible for delivering a claim of her client, and an ombudsman – to make sure the government meets the interests of its citizens. With relevance to sustainable development and climate justice, we note that some actors may not be able to come in contact with the system directly. However, they may have justice claims to deliver for assessment. Separate individuals and activist groups may act as justice callers for future generations who do not yet have a voice in climate issues or on behalf of ecosystems that cannot speak for themselves by definition. An example of the latter is the holy river Ganges that now can receive support in raising its case after acquiring a legal status of a 'person,' [24].

6. Summary and Future Work

When analysing the concept of justice, it proves to be useful to distinguish between the concept itself and its various conceptions. The former relates to the formal properties of justice on which everyone can agree, while the latter is about different substantive views on justice where much disagreement exists. In this paper, we have attempted to capture this distinction by separately analysing justice assessments and justice principles with UFO as a top-level ontology. We suggest that people can agree on the structure of justice assessments regardless of the differing conceptions of justice they may have as members of different social systems, including different views about what is just or unjust. The ontological nature of the concepts introduced needs further investigation. While UFO offers a strong foundation for the analysis, some open questions remain.

Justice is closely connected with crime and policing in law enforcement, [25], and thus, can be investigated using methods of legal informatics. In particular, UFO-L, [26], can be used to relate the justice ontologies to legal ontologies. Meta-ethics focuses on moral judgment, [27], and thereby can provide insights into justice principles, [28]. Ontological analysis of justice using UFO can help us further clarify the relationship between justice and morality as well as support the validity of the investigation by virtue of its consistent and rule-based approach, [29]. It is clear that justice does not exist independently of human agency, i.e., action and inaction, and its social context. Therefore, modelling the concept from the systems perspective can provide us with a better understanding of how we can think and reason about its boundary and thus, make any future investigation more manageable.

Although this paper considers many things, it merely starts the conversation. Directions for future research include adding granularity to the proposed ontologies and extending them with other modelling approaches. It can be worthwhile to follow up the discussion of the process view of justice from Section 5 with a process model that accounts for triggering events, subsystems, and system environments. Moreover, we can test whether justice principles can be treated as goals that focus on the relationship between judicanda and justice recipients and analyse them with goal modelling, [30, 31]. In such a case, justice assessments could be viewed as statements about the degree of goal fulfilment. Furthermore, it can be useful to investigate how to model related evaluative predicates such as compliance, social value, and use value – to generalise the justice assessment ontology. Access to justice can be conceptualised in other social systems, i.e., societies that are not Western democracies – to extend the systems view of justice further. The task of identifying the intricacies of social systems that differ from the ones we 'know best' may not be trivial. Nevertheless, such an exploration can expand our understanding of the legitimacy of diverse sources and forms of knowledge, not least when reasoning about such a demanding concept as justice.

Most importantly, to avoid making unsubstantiated claims, the models and modelling concepts presented in this paper should be tested in application to real-life scenarios to validate the approach further.

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