Social Change Through Computerized Accessibility of Legal Rules

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This article presents a self-help software system that makes rights accessible through an on-line interview. The interview is based on a formal model of the relevant jurisprudence and does not require the involvement of a service representative, only a user who wants to understand his or her rights. In addition, the article provides a methodology for building models and interviews for similar social contexts and describes building a model for workers' rights according to Israeli law, upon completing their employment. In addition to conducting interviews, these models can be used to create diagrams and perform legal queries. This kind of system can fulfill a central role in empowering disadvantaged populations, as it enables people to asses their rights in a user-friendly manner, which is personalized to the situation of the interviewee and not overburdened with large amounts of information that it is difficult to navigate. PolicyModels—the system presented here—can be used in different contexts, such as modeling privacy requirements in databases.

Keywords: Information sharing, software tools, computational models, information security, labor law, workers' rights

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Introduction

Each day, dozens of workers congregate at the crowded offices of Kav LaOved. These workers come from different backgrounds and countries and speak different languages. Each day is organized so that a specific population of workers is seen by a different set of volunteers. Thus, for example, volunteers who speak Tigrinya and Arabic work at the organization on days designated for receiving asylum seekers, while Thai translators are in the office on days specifically designated for migrant agricultural laborers. The Israeli staff includes Amharic and Russian speakers. The workers ask for information, assistance, and advice, and often legal assistance, in order to understand and exercise their rights. At the center of the room is a counter with informational pamphlets on labor laws, national insurance, health insurance, visas for asylum seekers, information for caregivers, and sexual harassment. Since the workers have trouble finding the right pamphlet for their problem, they are obliged to wait in the long and growing line.

A person whose rights have been violated must pass through several stages before being able to submit a lawsuit. The stages are known as naming, blaming, and claiming.[1] The first stage is naming the violation; that is, giving it a legal definition; the second stage is placing blame, which is mainly understanding who is the party responsible for the violation of rights and taking a stand against it; and the third stage is legal recourse, in which the claims and insights are translated into legal language. This process is lengthy and time consuming, especially for victims who belong to disadvantaged populations.[2] Experience shows that the chances of counteracting a violation and restoring the situation to its previous state (such as in an illegal dismissal) or of filing a lawsuit without fear of exceeding the statutes of limitation for the offense are greater when the first two stages of the process occur quickly after the violation.

We looked for an easy and direct way to provide workers with self-access to the information needed for independently conducting the "naming" and "blaming" stages. A software system called PolicyModels has offered a possible solution. This system enables the creation of a formal model of a legal domain that can be processed in various ways. The term "formal model"

1 William Felstiner, Richard Abel, and Austin Sarat, "The Emergence and Transformation of Disputes: Naming, Blaming, Claiming," *Law and Society Review* 15, no. 3 (1980): 631.

2 Yuval Elbashan, "Access to Justice for Disadvantaged Populations in Israel," *Aley Mishpat* 3 (2004): 501–503 [in Hebrew].

comes from the field of software engineering and refers to a well-defined mathematical description of a certain system (such as set theory or graph theory). Navigation apps, such as Waze, are an example of software tools that are based on a formal model of the built environment. This model allows them to provide their users with directions for reaching a specific destination or with information on all of the gas stations within three kilometers of their current location.

Daily experience at Kav LaOved shows that people, particularly those who are members of marginalized populations, do not know how to describe in legal terms what has happened to them. Therefore, when we dealt with rights connected to the termination of employment, we did not refer to the termination in the model as "dismissal," "resigning" or "resigning under circumstances of dismissal." Instead, we used "the work has ended." From this simplified state, which anyone can understand, a series of questions begins, phrased in simple language and designed to be translated into all languages. Legal conclusions and recommendations for action in various areas are derived from answers to these questions, and the institutions that the person should contact in order to address the situation are determined and named. For example, termination of employment has implications for all areas of life, based upon the person's status in the State of Israel: the law for the termination of employment of a migrant worker in an employer-bound track[3] is different than the law for the termination of employment for an Israeli worker who is pregnant. The former must quickly deal with the issues related to his work permit in order to move to a different employer; the latter will need to contact the commissioner for the Employment of Women Law at the

3 The employer-bound arrangement was created by the authority of the Interior Minister, according to Section 6 of the Entry into Israel Law. This section grants the Interior Minister the authority "to determine conditions for providing a visa or residence permit and for the extension or replacement of a residence permit," and the authority "to determine for a visa or residence permit conditions whose fulfillment shall be a condition for the validity of the visa or of the residence permit." The Foreign Workers Law, 1991, Law Book 1349 (hereinafter: "Foreign Workers Law") states that "a person shall not accept a foreign worker for employment unless the commissioner or an Interior Ministry worker acting on his behalf has permitted the employment of the foreign worker by that employer in writing, and in accordance with the conditions of the permit" (Section 1.XIII(a)) [in Hebrew]. For a description of this arrangement—"Regulation for transfer from employer to employer"—which was determined in 2002, see High Court 4542/02, *Kav LaOved v. Government of Israel*, rulings book 61(1), p. 346, paragraphs 7, 9–11, from the ruling of Justice Levy (2006) [in Hebrew].

Ministry of Labor, Social Affairs and Social Services, and must know that her dismissal is invalid unless the commissioner permitted the employer to do so.

We tried to estimate all of the possible legal implications of a certain situation, especially as they apply to disadvantaged populations who have difficulty gathering the information by themselves and for whom the power relations as they relate to their matters are extremely unequal, while also addressing their needs in a quick, accessible, independent, and personalized manner. This personalization is a significant improvement over websites that have made information about rights accessible (such as the website Kol Zchut),[4] which are based on textual descriptions of rights. While the descriptions tend to simplify the legal terms, the users still needs to read a large amount of text, especially about legal situations or rights that are not relevant to their individual cases. In addition, translating these websites into other languages requires considerable effort even more so than the legal models discussed here. This is important, as the nature of Kav LaOved's work also necessitates translation into a relatively large number of languages.

This rest of article is organized as follows: First, we discuss the objectives of the project of modeling termination-of-employment rights, upon which this article is based. The section "The transition from the legal field to a computer model" details the challenges in creating a formal description of legal rules and suggests a way to address these challenges. In the section on the PolicyModels system, we provide a general description of the software system that we used to create the legal model and to carry out interviews. Finally, the section on "Method for building policy models" offers a general methodology for building models for making rights accessible.

Objectives

The project is intended for use in the field of workers' rights, and it aims to give the computerized tool a significant role in balancing the inherent inequality that exists between workers and employers.[5] The provision of

4 See https://www.kolzchut.org.il.

5 Judy Fudge, "Labour as a 'Fictive Commodity': Radically Reconceptualizing Labour Law," in *The Idea of Labour Law* ed. Guy Davidov and Brian Langille (Oxford University Press, 2011), pp. 120, 124; Paul Davies and Mark Freedland, *Kahn-Freund's Labour and the Law* 3rd ed. (London: Stevens and Sons, 1983), p. 18: "The main object of labour law has always been, and we venture to say will always be, to be a countervailing force to counteract the inequality of bargaining power, which is inherent and must be inherent in the employment relationship. Most of what we call protective legislation . . . must be seen in this context. It is an attempt to infuse law into a relation of command and subordination."

assistance to workers with limited bargaining power in the labor market is "the moral basis and the founding narrative" of labor law,[6] and, in the words of the National Labor Court, "labor law is a law of 'inequality,' whose purpose is to compensate for the weakness of workers vis-à-vis employers."[7]

Upon this traditional basis of labor law, contrary processes are taking place. Over the past decade, globalization and transformations in Israel's economy and society have led to significant changes in the labor market. International corporations are influencing the local economy more than before; many organizations are undergoing processes of change; the demand for economic efficiency is growing, while values like organized labor and social solidarity have been marginalized; the migration of workers and factories has become routine; the state is advancing processes of privatizing public services in the name of economic efficiency; individualism is growing stronger and free competition is becoming a basic constitutional right;[8] non-Israeli workers are participating in the labor market in increasingly large numbers, influencing employment norms in many industries and they themselves are also influenced by immigration policies, which in turn deeply influence both their labor rights and bargaining power.[9]

On the other hand, public access to information is increasing, and social networks now serve as a primary source of information.[10] Kav LaOved increasingly has recognized the importance of this tool specifically for isolated populations with language barriers and thus operates several

6 Brian Langille, "Labour Law's Theory of Justice," *The Idea of Labour Law*, p. 101, footnote 83, and p. 105. However, the central idea presented in this article is that a new purpose needs to be formulated for labor law instead of the traditional purpose.

7 National Labor Court hearing 340/2–35, Kozolovitz v. Ordan Ltd., *Rulings of the Labor Court,* 12, no. 1 (1981), p. 200 [in Hebrew].

8 See, among others, Ruth Ben-Israel, "The Management Prerogative of the Employer," *Tel-Aviv University Law Review* 25 (2006) [in Hebrew]; Ruth Ben-Israel, "Social Justice in the Post-Labor Era," in *Distributive Justice in Israel*, ed. M. Mautner (Ramot Publishing House, 2000) [in Hebrew]; Aeyal Gross, "How Did 'Free Competition' Become a Constitutional Right," *Tel-Aviv University Law Review* 23 (2000) [in Hebrew].

9 Guy Mundlak, "Workers or Foreigners in Israel? The Infrastructure Contract and the Democratic Deficit," *Tel-Aviv University Law Review* 27, no. 2 (2003): 423 [in Hebrew].

10 The Pew Research Center compared the use of social networks in the United States in 2005 versus 2011. The study shows that during these six years, the number of social media users increased considerably. In 2005, only eight percent of internet users reported using social media; as of 2011, two-thirds (65 percent) of adult internet users used social media sites—more than two times the figure for 2008, when only 29 percent reported that they used a social network.

dedicated Facebook pages for the various communities of workers in different languages. For example, the Facebook page dedicated to migrant workers in the caregiving industry has more than 48,000 members (two-thirds of the number of migrant workers in this industry in Israel), and each post receives hundreds of shares, comments, and questions. The more isolated a population is, the more important access to information and the power of technology seemingly become for creating community—albeit a virtual one—which eases social isolation and serves as an accessible point of contact for information and advice. In this context, it should be noted that women increasingly are using social media and studies note the role of this use in the gendered power relations.[11] The amount of information available, however, makes it difficult for workers to find independently information that is relevant to them, and their fellow virtual community members are generally not professional enough to help them with this.

We will briefly relate to the "media richness" theory,[12] a perspective that allows for examining different media according to their ability to convey information. The basic assumption is that the more opaque the information is, the more important it will be to choose a richer medium, with the richest one being face-to-face communication. However, the "paradox of richness" holds that a "rich" medium of communication can transmit too much information (some of which is irrelevant), distracting from the main message and interfering with understanding the situation. This paradox could also explain the meager use of the information pages at the offices of Kav LaOved that are packed with information. In most cases, a worker in distress does not have the capacity to find the "needle in the haystack."

Is the worker's situation really so unclear that an in-person meeting with a Kav LaOved volunteer is necessary? The model that we suggest here claims that there is another way. In consumer decisions, the internet influences

11 In its research, the Pew Research Center consistently finds a pattern in which women use social media more than men in the same countries.

12 John Carlson and Robert Zmud, "Channel Expansion Theory and the Experiential Nature of Media Richness Perceptions," *Academy of Management Journal* 42, no. 2 (2017): 153–170; Vivian Sheer and Ling Chen, "Improving Media Richness Theory: A Study of Interaction Goals, Message Valence and Task Complexity in Manager-Subordinate Communication," *Management Communication Quarterly* 11, no. 1 (2004): 76–93; Richard Daft and Robert Lengel, "Information Richness: A New Approach to Managerial Behavior and Organizational Design," *Research in Organizational Behavior* 6 (1984): 191–233.

consumers more than anything;[13] our goal in this project is to maximize the internet's ability to help workers in distress.

The Transition from a Legal Field to a Computer Model

Law and technology are part of "culture."[14] Similar to literature and law, "these are two different cultural phenomenon that have a complex relationship, and despite the difference—they need one another and complement one another."[15] A discussion of the difference between legal rules and a technological model is beyond the scope of this article. It is a known secret that the legal field is not set up for unambiguous structuring, and it is no accident that legal decisions are written over the course of dozens and hundreds of pages. The legal field is composed of primary legislation, directives (secondary legislation), case law that has been set out in court, and even procedures of government ministries. Legal interpretation of a person's situation requires clarifying information from his or her life events and giving them a legal headline, before turning to interpretation.

Technology also contains interpretation choices that can be biased,[16] such as hidden assumptions regarding the abilities of users, which can prevent certain people from using a computer system. One example is design that does not take into account people who are colorblind. In cases where the system's designers let technology make decisions by itself, for example via artificial intelligence techniques or computer learning, real algorithmic discrimination

13 Brian Solis, "Report: The Rise of Digital Influence and How to Measure It," BrianSolis, March 21, 2012, https://www.briansolis.com/2012/03/report-the-rise-of-digital-influence/.

14 See the comprehensive discussion of law as culture in Menachem Mautner, "Law as Culture, Towards a New Research Paradigm," in *Multiculturalism in a Democratic and Jewish State*, ed. Menachem Mautner, Avi Sagi, and Ronen Shamir (Tel Aviv: Ramot Publishing House, 1998), pp. 545–587 [in Hebrew]; Menachem Mautner, "Invisible Law," *Alpayim* 16 (1998): 45–72 [in Hebrew].

15 Shulamit Almog, *Law and Literature in the Digital Era* (Nevo Publishers, 2007), p. 5 [in Hebrew].

16 Kate Crawford and Tarleton Gillespie, "What is a Flag for? Social Media Reporting Tools and the Vocabulary of Complaint," *New Media and Society* 18, no. 3 (2016): 410–428; Sandra Petronio, Jess Alberts, Michael Hecht, and Jerry Buley eds., *Contemporary Perspectives on Interpersonal Communication* (Madison, Brown and Benchmark, 1992), pp. 318–358; Janet Bavelas, "Some Problems with Linking Goals to Discourse," in *Understanding Face-to-Face Interaction: Issues in Linking Goals and Discourse*, ed. K. Tracy (Hillsdale, NJ: Lawrence Erlbaum, 1984), pp. 119–130.

can result. In such cases, a computer system can even demonstrate racist[17] or misogynist[18] behavior.

In order to answer the question of which rights and obligations result from a certain personal situation (such as in the termination of employment of a migrant worker after a heart attack), there must be a willingness to let go of distinguishing between what is set in law, and therefore is ranked higher, and what is determined by the Interior Ministry procedures, which have never undergone judicial review. The law presented in a computer model cannot be complex, as it is in court rulings, petitions, and lawsuits. Working on a computer model requires a willingness to simplify the legal field, make it accessible, and to let go of the hierarchies within it; it must be adapted to a computerized tool with all its limitations, while understanding that these limitations, in the spirit of the "paradox of richness" mentioned above, are also its advantages.

The PolicyModels System—Recognition, Description, Characteristics

The PolicyModels system used here allows for building a formal description of legal rules in a certain field and calculating how they relate to a specific case.[19] The system was originally developed in order to enable researchers to handle sensitive databases without violating laws related to privacy and without requiring expertise in privacy fields or the relevant technologies.[20] Later, this system was used to model the unemployment benefits period in Israel's National Insurance Law.[21]

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17 Latanya Sweeney, "Discrimination in Online Ad Delivery," *ACM Queue – Storage* 11, no. 3 (April 2, 2013); Julia Angwin, Jeff Larson, Surya Mattu, and Lauren Kirchner, "Machine Bias," *ProPublica*, May 23, 2016,https://www.propublica.org/article/machine -bias-risk-assessments-in-criminal-sentencing.

18 Amit Datta, Michael Carl Tschantz, and Anupam Datta, "Automated Experiments on Ad Privacy Settings: A Tale of Opacity, Choice and Discrimination," *Proceedings on Privacy Enhancing Technologies* (2015): 92–112.

19 Michael Bar-Sinai, Latanya Sweeney, and Merce Crosas, "DataTags, DataHandling Policy Spaces and the Tags Language," *IEEE Security and Privacy Workshops* (San Jose, CA, 2016), pp. 1–8.

20 Latanya Sweeney, Merce Crosas, and Michael Bar-Sinai, "Sharing Sensitive Data with Confidence: The Datatags System," *Technology Science*, October 16, 2015, http://techscience.org/a/2015101601.

21 Michael Bar-Sinai and Rotem Medzini, "Public Policy Modeling using the DataTags Toolset," *The Network for European Social Policy Analysis*, 2017, http://mbarsinai.com/files/inii/ESPAnet17-Final.pdf.

When given a policy model, the PolicyModels system can present an interactive interview that applies it to a specific case. In addition, the system can draw flow and structure charts of the model and can identify all of the cases in which a certain condition holds true (for example, all the cases in which a worker can sue her employer). The system's structure enables carrying out additional analyses as needed.

The system itself is composed of a core software component ("library") and several tools. The core software component enables computer programs in which the software is included to work with policy models. Two programs have been developed around this core component: one is used for developing the models, and the other is a website that can perform interviews based on the models. The PolicyModels system has been released under an open source, industry-friendly license (Apache v2.0). This license allows anyone to read the system's source code and to develop additional systems based upon it, including commercial systems, without having to pay. These licenses prevent vendor lock-in and thus maintain the bargaining power of its users, who can switch software providers if they wish. In addition, these licenses allow programs to be written by volunteers and encourage the creation of communities of users and developers.

Below we will present the PolicyModels structure, as well as the existing tools for developing these models and for making them accessible.

Policy Model

As already stated, a policy model is composed of two parts: a policy space and a decision graph. The **policy space** describes all of the possible situations in which a person can be within the legal context that the model describes. It is a multidimensional space, in which each point describes one possible situation according to the law. Each dimension in the policy space describes a single legal aspect, and each coordinate in a given dimension describes a possible condition of this aspect. For example, the coordinates for the aspect of "age group" can be "before working age," "of working age," "voluntary pension age," and "pension age" (in this order). The dimensions of the space are ordinal; that is, the coordinates are in a certain order, but there is

no significance to the distance between them.[22] This order enables phrasing rules formally, such as "from working age on, a worker is entitled to X."

The greater the number of dimensions, the more precise the description of a given legal situation will be. However, this increases the number of questions that must be answered during the on-line interview. Thus, an effective policy space will include enough dimensions to describe all of the relevant aspects of the situation, but no more than this. For example, in the policy space of the model for termination-of-employment rights, it is relevant to specify whether the worker has a disability, but there is no point specifying what the disability is. This is because the details of the disability do not affect the worker's rights when his employment ends.

A typical policy space contains a large number of dimensions: the termination-of-employment rights model mentioned above contains 62 dimensions; the model of unemployment benefits according to the National Insurance Law contains 13 dimensions. For people used to a three-dimensional world, it is difficult to work intuitively with such a large number of dimensions. Against this backdrop, we developed several displays that make multidimensional policy spaces more accessible. In addition, the language for describing the policy spaces of PolicyModels includes means to hierarchically group the dimensions; for example, dimensions related to rights are in one group and those related to the situation are in another group. This hierarchy helps the builders of the model to organize the space for their work but does not substantially affect the space, because when the calculations are carried out, the system ignores the groups and relates only to the dimensions themselves.[23]

The **decision graph** is the second part of the policy model. Here too, the term "graph" is taken from the computer sciences, and it describes a mathematical structure that is made up of points ("vertices") and possible lines between the points ("edges"). It is possible to move between two vertices only if they are connected with an edge. It is customary to describe a graph visually using a group of circles connected with arrows. The circles describe the graph's vertices, and the arrows describe the edges. The calculation in

22 In this, the dimensions described are different from discrete dimensions, which use whole numbers, have an order, and for which distance is significant, and from continuous dimensions that use real numbers.

23 For details on the algorithm that enables the system to ignore the groups, see Bar-Sinai and others, "DataTags, Data Handling Policy Spaces and the Tags Language," *IEEE Security and Privacy Workshops (2016)*, https://doi.org/10.1109/SPW.2016.11.

the PolicyModels system starts with a designated vertex in the decision graph, and from there it continues along the edges of the model's decision graph. When the computer reaches a new vertex, it carries out an action that depends on the type of that vertex. This action can be, for example, updating the location in the policy space, presenting a question to the user, or running another part of the graph.

PolicyModels' decision graphs are able to find the location of a certain person's legal status in the model's policy space. They create synergy between the computer and the person, in which the computer handles the well-defined parts (for example, maintaining the locations in the policy space and the decision graph), while the person handles the parts that require knowledge of the details of the case or answers to "soft" questions, such as "does the termination of employment result from a significant violation of the worker's rights?" This division of responsibility between the person and the computer enables the PolicyModels system to overcome the built-in challenge of computers dealing with complex legal cases, as it does not rely on computerized judgment of "soft" questions, which are human in nature.

It is important to note that the interviewee's answers do not directly change the case's location. Such changes are carried out by the computer when it reaches vertices that instruct it to change the location. The person's answers can navigate the computer to such vertices in the decision graph. This separation between the person's answers and the change of the location in the policy space enables the builders of the graph to ask the person questions in a language that he understands but to manage the situation in formal terms. In addition, a person can be asked a number of guiding questions before changing the case's location in the space. In this sense, the shared computation process is similar to a conversation between a vehicle owner and a mechanic in a garage: the mechanic asks questions that the vehicle owner understands; for example, do you hear knocks from the engine at high speeds. In accordance with the answers, the mechanic makes a note for himself of whether to check the spark plugs, the engine head gasket, or the timing belt—terms that are too obscure for the average vehicle owner.

The process represented by a decision graph is not necessarily the only one possible. For example, the order and type of questions appropriate for an expert in labor law would be different than the order of questions appropriate for a layman in this field. Different decision graphs can work with the same

policy space. In terms of the system and its formal definitions, the important factor is the result of the interview—the coordinate in the policy space that describes the case, which is reached at the end of the interview. The process of reaching this coordinate is not important for later processes, such as the recommendations presented to the interviewee.

The decision graph can be very large; the current version of the graph in the termination-of-employment rights model includes 216 vertices. In order to enable effective work with this many vertices, the vertices can be grouped by topic; the graph can be divided into several sub-graphs; and the description of the graph itself can be separated into a number of files.

Texts and Translation

As presented so far, the policy model mainly contains data structures—the policy space and the decision graph. These structures contain considerable information but include very little text intended for humans. This text is maintained separately in "localization packages." These include a long text for each question, names and explanations for each value and each dimension in the policy space, and a translation of the model's meta-data (title, explanatory text, and so on). The texts for questions can include links to external sites, tables, and highlights. The values in the policy space represent concepts that are not always comprehensible to people who are not familiar with the field of the model, such as "in lieu of advance notice"[24] or "final pay." Therefore, the explanations for each value and dimension include three levels: the name of the dimension; a short explanation that appears in a text bubble above the value when the user moves the cursor over it; and a detailed explanation that can include several paragraphs, links, and tables.

A single policy model can include a large number of "localization packages." Thus, it is possible to make a single model accessible to speakers of different languages. Similar to translating programs, writing a new "localization package" requires little technical knowledge; thus, translators do not need to undergo extensive training in order to perform this translation.

24 This is a situation in which the employer waives the worker's work for the duration of the advance notice period, and instead pays full wages for this period.

User Privacy

During the interview, the user provides the system with personal information. Thus, it is worth addressing the topic of maintaining the privacy of users. The principles of Privacy by Design,[25] which have guided us in writing this system, state that user information must only be saved if it is required for the user's benefit. Thus, for example, users are not required to identify themselves to the system before the interview, as their first name, last name, or visa number do not affect the rights to which they are entitled by law. Although the system's default is not to save the interview and its results, for certain models, the system's administrators can ask to save statistics for use, for example, in order to understand which questions confuse users. While such statistics allow restoring an entire interview session, they do not connect that session to a specific person and instead use a random identifier created by the server.

Verifying the Policy Model

During the interview, the system takes the user through the decision graph, such that with each question, the interviewee chooses one answer that is the most appropriate to the case in question. It is also possible to choose all the answers for each question. In this method, the program runs through the decision graph independently without the help of an interviewee, and when it reaches a vertex with a question, it chooses one answer. From there, it continues to the next question and chooses the answer to it, and so forth until the interview ends. In this way it is possible to check the results of all possible interviews in the model.

This method, borrowed from the field of formal verification of software, enables asking broad queries about the policy model. For example, it is possible to ask in which cases a woman of working age would be eligible immediately for unemployment benefits. The answer to this question verifies that the policy model matches the law. If the model accurately describes the law, the answers to this question enable discovery of cases that the law does not cover.

25 Ann Cavoukian, "Privacy by Design [Leading Edge]," *IEEE Technology and Society* 31, no. 4 (2012).

Limitations of the Model

The main limitation of modeling polices with the PolicyModels program is the requirement that the dimensions of the space be ordinal and have a finite number of coordinates. Thus, open questions cannot be asked; the answers must come from a predetermined group of answers. For example, it is not possible to ask the interviewee his age (a numerical answer), but only what age group he belongs to and the interviewee must choose from a limited list. Similarly, dates cannot be input.

The program can be expanded to include numerical dimensions, and we are planning to explore this direction in the future. However, it is already possible to overcome the limitation described above in two ways: the first is by dividing the numerical field into ranges between which the law in question distinguishes. For example, instead of asking the interviewee for his numerical age, it is possible to ask him whether he is of working age or pension age; the second method is, at the end of the interview, to direct the interviewee to a rights calculator that was written especially for the field modeled. This calculator will receive the results of the interview and then ask the interviewee for the relevant numbers and carry out the final rights calculation. This method, for example, enables precise calculation of the severance pay to which the worker is entitled.

The Method of Building Policy Models

In this section of the article, we offer a method for building policy models, based on our experience in creating several of them. Policy models are similar to small computer programs, and thus, the process suggested is based on software engineering methodologies. We do not claim that this is the only method of building such models, or even the best method (assuming that there is such a thing); rather, our intention is to offer a sufficient method in order to allow others to start writing models and to initiate discussion on the issue. First, we will discuss the challenges facing teams wishing to write policy models; then we will examine the existing tools; and finally, we will suggest a methodology.

Policy models are legal-technological hybrids. Building a policy model for a certain legal field requires expertise in two areas—the legal field and the PolicyModels system—and poses the challenge of fruitfully combining them. Thus, a model-building team will usually be made up of two experts

from different backgrounds who will not be familiar with the complementary field. It is important to note that the level of expertise necessary in each field is different. Legal expertise requires deep understanding of the legal field, in addition to remaining up-to-date in it (for example, being familiar with recent rulings). In contrast, a person with basic training in computer programming can use PolicyModels after a relatively short amount of study; indeed, computer science students have succeeded in using the system after reading the training documents. Therefore, we estimate that a programmer with little experience can build models after one day of self-teaching. Clearly, the programmer's efficiency will increase with the more experience accumulated.

"Cultural" differences between computer programmers and jurists are another challenge that must be bridged, especially at the beginning of the work process: Many computer programmers have difficulty coping with obscure fields, such as the legal field, which have a range of contradictory opinions; jurists, for their part, must become accustomed to thinking about legal situations in formal terms, such as the policy space and decision graphs.

The PolicyModels system offers several tools that help address these challenges. First, it is possible to automatically create diagrams of the policy space and of the decision graph. These diagrams are user-friendly or, at least, less threatening than the textual code of the model. Second, the web-based system that is used for conducting the interviews can collect comments before the model is published, with the help of private links and an internal system of comments. Third, the modeling language itself supports the possibility of marking certain sections as "to do." The system is able to produce a detailed report of these parts and also automatically identifies parts of the policy space that the decision graph does not make use of.

In addition to these tools, the model's development team can use existing tools for software development, such as version and task management systems. These systems enable saving versions of the model at different times, examining different possibilities based on an existing version, connecting between tasks and updates to the model, and discussing updates to the model before accepting them. The possibility of working with these systems stems from the fact that the PolicyModels system is based on textual code and not on a special, closed file structure. An example of a popular open source

system is GitHub,[26] which we used when developing the termination-of-employment rights model.

The policy development methodology suggested here is based on an iterative software development process.[27] In this process, the model is developed over a number of rounds ("iterations") and at the end of each round, a working model is created, which can be presented to experts and users. With each progressive round, the model addresses the law more accurately.

There are four stages of development. First is the initial preparation stage. Before the work begins, a focused meeting should be held in which the modeling staff present the capabilities and limitations of PolicyModels, and the jurists survey the law in the field in question. For example, before developing the termination-of-employment rights model, we held a meeting that lasted four hours and included legal experts from Kav LaOved and the project's software engineering team. In this meeting, we presented a survey of both the relevant laws and the PolicyModels system, and we chose appropriate fields for modeling.

The second stage is the development. As part of this stage, a sub-field is chosen from within the field that is being modeled and the level of detail for building the model is planned. For example, in the first stage, broad areas are modeled with a low level of detail; in more advanced stages, specific areas are modeled more in depth. Automatic reports detailing which specific areas have not yet been completed can serve as a tool for choosing a sub-field for the next iteration.

In this stage, the legal knowledge relevant to the field is surveyed, including laws, directives, interpretations, and so forth. Based on this survey, an initial version of the policy space is built. Areas that are not fully detailed need to be marked as "to do" so that they appear in reports as requiring further detail. In this stage, the decision graph is written. Here too, parts that are not fully detailed are marked as "to do." Computer-generated diagrams of the decision tree are very useful at this stage in order to ensure that the order of questions in the interview accurately reflects the intention of the developers. This stage usually also includes changes in the policy space and sometimes also in other parts of the tree. Detailed texts are written for the new questions, dimensions, and values.

26 "Built for Developers," *GitHub*, July 2019, https://github.com.

27 Craig Larman and Victor Basili, "Iterative and Incremental Development: A Brief History," *IEEE Computer* 36, no. 6 (2003): 47–56.

The third stage is the testing stage, in which the newest version is uploaded to the server and defined as "private," so that only authorized users can see it. This version is tested with several cases. Feedback from experts in the field is collected, by presenting the interview or sending a link and listing comments in the system. The model is updated according to the feedback.

The fourth and final stage is when the final version is released. The model is uploaded to the server and defined as public to enable all internet users to use it.

From our experience in developing the model for termination-of-employment rights and the model for unemployment rights according to the National Insurance Law, we learned that a series of weekly meetings between the legal expert in the field and the PolicyModels programmer is a relatively effective way to build the model. The length of each of these meetings ranges between two and three hours, and sometimes even more—depending on how much time the staff members have and their stamina.

Conclusion

One of the objectives of developing the model described in this article was to examine its ability to simplify legal information and make it accessible to disadvantaged populations. The assumption was that a series of simple questions could lead to identifying the user's unique legal situation. Such a questionnaire has an advantage, especially for populations that are not used to reading long texts and filtering information, and thus are reluctant to browse text-based websites that aim to make rights information accessible (such as Kol Zchut, mentioned above).

We found that a model can be built, and even though it presents a rather superficial picture of the legal situation, its personalization is useful for the user. That being said, this modeling has a disadvantage, which lies in its oversimplifying of the legal picture and in its inability to address the nuances of interpretation that are quite common in the legal field. Therefore, a field or sub-field should be chosen in which there is a reasonable level of legal agreement (disagreements between jurists tend to be more common than between engineers; this is a cultural difference that engineers are surprised by, but must also get used to). In addition, modeling legal fields that require the use of open questions is more difficult and could even require additional processing of the results by a designated system or by a human expert.

The transition from law to a format of unambiguity and simplicity, which is required in using a computerized tool, is undoubtedly complex and is not suitable for all fields of law. It is necessary to choose a specific situation, whose legal conclusions are relatively simple, and to remember that this is a tool and not a definitive answer. Thus, in cases where our questionnaire indicated severe harm, such as sexual assault or exploitation, we refer the interviewees to the proper aid services. It is worth emphasizing that the very acts of identifying the offense and locating the right institution to contact are part of the solution.

The requirement to choose one correct way of addressing a situation often helps to focus agitated workers, who are in a state of confusion and stress. It also defines for themselves and for those assisting them the right that has been violated. Every jurist who has volunteered or worked at aid organizations for disadvantaged populations knows that the critical task, in many cases, is to understand—in the midst of all the experiences, feelings, and narratives—the legal issue at stake that requires and permits treatment. Modeling the law using the method offered here may therefore benefit both the workers and those volunteering to help them.