FOR INDIA'S COURTS, THE PROMISE OF MACHINE LEARNING

Aman Kumar, Student of forth year, College of Law & legal Studies, Teerthanker Mahaveer University, Moradabad, Uttar Pradesh.

Best Citation - Aman Kumar, FOR INDIA'S COURTS, THE PROMISE OF MACHINE LEARNING, 1 ILE HRLR 18, 2022

"ARTIFICIAL INTELLIGENCE & MACHINE LEARNING"

ABSTRACT

Artificial Intelligence and Machine Learning provide new prospects for the Indian judiciary to improve its decision-making capacity and productivity. For starters, algorithmic legal data analysis can provide immediate alerts about biases at important decision-making moments, as well as real-time adjustments for these behaviors. The ability of judges and lawyers to increase their talents and systematize review processes can be enhanced by analyzing texts for prejudice and discriminating patterns. Second, legal data can be cleaned, systematized, and standardized using Machine Learning technologies. Despite the fact that the judiciary has made large investments in data systems, the quality of the data varies significantly among states and administrative boundaries, preventing a more in-depth investigation. Third, the use of Machine Learning technologies opens up new avenues for ensuring procedural fairness while also allowing legal experts to better understand the courts. Researchers can evaluate the impact of judicial decisions when cases are randomly assigned to judges. Because judges in this scenario do not choose their cases and are assigned them at random, observed rulings reflect their deliberations in the case rather than the process of justice that led them to be assigned the case. However, we emphasize that technology should be considered as a supplement to human decision-makers rather than a replacement. In this situation, only technologies that assist humans rather than replace them are appropriate.

KEYWORDS - Administrative, Artificial Intelligence, Lawyer, Machine Learning, Technology.

PREFACE

The Glimpse of India's Court for Machine Learning

Artificial Intelligence ('AI') and Machine Learning ('ML') – adaptive computer programmes that aim to accomplish functions normally associated with the human mind — provide new prospects for large-scale organizations to improve their efficiency.[74] Recent developments in data collecting, aggregation systems, algorithms, and processing power have converted computers from rigidly defined task machines to machines that can learn without supervision and adapt to new inputs without having to be reprogrammed. These breakthroughs have already yielded real results in the fields of commerce, medicine, and large-scale systems in general.[75]

AI platforms can help improve justice systems in a variety of ways.[76] Surveillance systems, digital payment platforms, newly computerized bureaucratic processes, and even social media platforms all have vast amounts of data that may be analyzed to discover abnormal conduct, investigate suspected criminal activities, and improve justice systems.

[74] S Russel and P Norvig, Artificial intelligence: A Modern Approach (3rd edn, Pearson Education 2013).

[75] E Brynjolfsson and A McAfee, 'The Business of Artificial Intelligence' (Harvard Business Review, 18 July 2017) <https://hbr.org/2017/07/the-business-of-artificial-intelligence> accessed 12 October 2021; JH Chen and SM Asch, 'Machine Learning and Prediction in Medicine— Beyond the Peak of Inflated Expectations' (2017) 376(26) The New England Journal of Medicine 2507.

[76] DL Chen, 'Judicial analytics and the great transformation of American Law' (2019) 27(1) Artificial Intelligence and Law 15-42; C Rigano, 'Using Artificial Intelligence to Address Criminal Justice Needs' (2019) 280 National Institute of Justice Journal 1; DL Chen, 'Machine Learning and the Rule of Law' in M Livermore and D Rockmore (eds), Computational Analysis of Law (Santa Fe Institute Press) (forthcoming).

By giving consumers with timely information directly rather than through lawyers, AI technologies can also lower the obstacles to accessing courts. AI is already being employed in the processing of bail petitions, DNA analysis of crimes, gunshot detection, and crime predictions in the United States ('US').[77]

For the sake of this paper, we'll concentrate on the ability of AI systems to improve data quality and the judicial process itself. AI technologies are not being used to replace human decision-makers in this class of applications. Rather, they aid in the improvement of human decision-making and productivity. An increasing amount of research shows how little external circumstances, most of which are unknown to the participants, can influence the outcomes of judicial proceedings. The tone of words used in the first three minutes of a hearing, the incidence of birth days, the outcomes of sporting events, and even the time of day a hearing or the defendant's name all affect the outcome of cases, according to studies conducted in the United States, France, Israel, the United Kingdom ('UK'), and Chilean courts.[78] Both conscious and unconscious bias can be detected using these methods. The analysis of 18,686 judicial rulings gathered by the twelve US circuit courts (also known as courts of appeals or federal appellate courts) during a seventy-seven-year period revealed that judges show significant prejudice before national elections.[79] Similarly, fresh research suggests that sequencing matters in high-stakes decisions: decisions taken in prior cases have an impact on the outcomes of current cases, even though the cases are unrelated. If their previous judgment granted asylum, refugee asylum judges are two percentage points more likely to deny asylum to refugees.[80]

In India, AI systems offer huge potential to improve the legal system. The system's human capacity has previously been highlighted as a serious constraint. There are just nineteen judges per million people in India, yet there are twenty-seven million (2.7 crore) cases waiting.[81] The justice system has already made significant progress in terms of information technology adoption, having made enormous amounts of data available to court users and encouraging them to use electronic systems. Legislative, institutional, and resource constraints, however, have limited their influence.[82]

We believe that combining Machine Learning methods with newly available legal data provides a mechanism for detecting biases in judicial behavior and proposing real-time fixes'. As a result, the system will be more simplified, and the backlog will be reduced. Such techniques can detect discrimination and bias even when the participants in the courtroom are unaware of it, so bolstering the judiciary's legitimacy.[83] The availability of data permits new types of academic research on the legal system's efficiency and effectiveness: macro-level studies undertaken as a 'far reading' of the system, rather than micro-level 'near reading,' as is often done in legal studies.

The deployment of AI systems, on the other hand, is not a cure-all for the legal system. The 'black box' problem arises as a result of the tools' technological sophistication:[84] Many people find them difficult to understand because of their technological sophistication. The problem of interpretability also raises questions about these systems' accountability and

[77] Rigano (n 3) 7; WJ Epps Jr and JM Warren, 'Now Being Deployed in the Field of Law' 59(1) The Judges' Journal 16-39.
[78] Chen (n 3).
[79] C Berdejo and DL Chen, 'Electoral Cycles Among US Courts of Appeals Judges' (2017) 60(3) The Journal of Law and Economics 479-496.
[80] DL Chen, TJ Moskowitz and K Shue, 'Decision Making under the Gambler's Fallacy: Evidence from Asylum Judges, Loan Officers, and Baseball Umpires' (2016) 131(3) The Quarterly Journal of Economics 1181-1242.
[81] VA Kumar, 'Judicial Delays in India: Causes & Remedies' (2012) 4 Journal of Law Policy & Globalization 16; M Chemin, 'Does Court Speed Shape Economic Activity? Evidence from a Court Reform in India' (2012) 28(3) The Journal of Law, Economics, & Organization 460-485; A Amirapu, 'Justice Delayed is Growth Denied: The Effect of Slow Courts on Relationship-Specific Industries in India' (2020) Economic Development and Cultural Change <https://doi.org/10.1086/711171> accessed on 16 August 2021.
[82] Amirapu (n 8); D Damle and T Anand, 'Problems with the e-Courts Data' (2020) National Institute of Public Finance and Policy Working Paper 314 <https://www.nipfp.org.in/media/medialibrary/2020/07/WP_314__2020.pdf> accessed 16 August 2021
[83] K Kannabiran, 'Judicial meanderings in patriarchal thickets: Litigating sex discrimination in India' (2009) 44(44) Economic and Political Weekly 88-98; M Galanter, Competing Equalities: Law and the Backward Classes in India (OUP 1984); P Bhushan, 'Misplaced Priorities and Class Bias of the Judiciary' (2009) 44(14) Economic and Political Weekly 32-37.
[84] F Pasquale, The Black Box Society: The Secret Algorithms that Control Money and Information (HUP 2015).

oversight. Furthermore, the divide between those who can and cannot access and comprehend these technologies exacerbates societal differences and polarization. For all of these reasons, we oppose the use of AI and machine learning techniques to substitute human decision-making, such as through the automation of bail applications. Rather, we propose using the systems to assist and improve human decision-making within the tools. We believe that the use of AI technologies encourages thought on issues that are actually basic to legal systems on ethical way, and that the benefits of these tools are significant when used properly.

THE CHRONICLES

"The history of emergence opportunity for new Data"

In the last fifteen years, significant attempts have been made in India's courts to acquire and use information technology solutions. The "National Policy and Action Plan for Implementation of Information and Communication Technology (ICT) in the Indian Judiciary," which was originally launched by the Supreme Court of India in 2005, is one of the most important projects.

In India's courts, the e-courts project introduced technology in a variety of methods. The deployment of technology within the courtrooms was the most clear and visible component of the system. Judges were given LCD touch screen devices, displays and projectors were connected via a local network to broadcast information to lawyers, and electronic boards were placed up in courts to display the queue of case numbers for hearings planned on a specific day, among other things. E-filing procedures were established outside of the courtroom, and a data management architecture was created, which included scanning old cases into the electronic system, creating digital archives, and establishing direct electronic communication with litigants as well as an online case management system. These investments eventually led to the construction of the National Judicial Data Grid, a database of 27 million cases that court users can use to check the status of existing cases and obtain information from previous sessions.

The digitized archives of cases have been the most valuable resource available to us through this. We were able to create an e-courts district court dataset of 83 million cases from 3289 court institutions by scraping these publicly available digital archives.[85] We were able to compile details such as the statute under which the case is filed, the case type (criminal or civil), the district where the case is filed, the parties to the case, and the history of case hearings in a way that allows for large-scale analysis.

We use a variety of different data sources to supplement this database. Below are three examples of this.

Judges' information: We created a database of judges for the Indian courts in order to better analyses the impact of specific judges — their identification, training, and experience. We started by pulling data from the Supreme Court of India's Judges Handbooks and supplementing it with information from several High Court websites. So far, we've gathered information on 2,239 judges from the handbooks for the years 2014 through 2020. Most significantly, 93.5 percent of these judges are men, while only 6.5 percent are women, and their combined expertise spans nearly seventy years.

The Central Acts Database: is an auxiliary dataset that provides a definitive collection of standardized act names. This might then be used to standardize the act names used in different scenarios. This enables us to examine all instances filed under a specific statute. For example, we looked at all cases involving the Water Act of 1974 and discovered a total of 978 such cases in India's Supreme Court and High Courts. On the Ministry of Law and

[85] The ecourt data is public and can be accessed via the district court websites, the ecourts Android/iOS app, or the district court services webpage.

Justice's Legislative Department website, you may find a list of central (federal) acts. There is currently no one-stop shop for all state legislation; it must be obtained separately from state websites.

Additional Administrative Information: Information from other institutions can be linked to court information at the district and state levels. The Reserve Bank of India website, for example, has information about Indian banks and their branches. Their name, location, license number, licensing date, address, and other unique identifiers are all stored in this database. This information has been scraped, cleaned, and categorized in preparation for future study. There are approximately 160,000 entries in it. We can combine this data with banks appearing in litigation in courts that are present in the e-courts databases thanks to the unique identifiers and location information. By combining this data with legal data, we can investigate a variety of intriguing questions concerning the growth of financial markets in a given area, participation in the court system, and the consequences of legal decisions.

THE INDIAN EDICT

"Potential Application of Machine Learning in the Court of India"

The Indian judiciary's legal data is vast, disorganized, and difficult to understand.[86] The typical scenario has clear tags for some key dates (filing date, order date, etc.), key actors (plaintiff, defendant, and judges), and the court name, but information about the type of case, the outcome of the consultations, and appropriate acts cited are not clearly identifiable in the body of the orders or verdicts'. Cleansing and pre-processing content is essential for any sort of analysis, but it is extremely crucial for supervised algorithms that are trained on this data. Traditionally empirically legal studies have traditionally handled this issue by relying on small samples, where legal characteristics are manually coded and the area of interpretation is limited to a small body of appropriate court cases.[87]

The heterogeneity of reporting among states and districts is one of the most difficult aspects of pre-processing the data. There is really no nationally uniform system for defining variables or reporting on them, hence the data quality varies greatly. For example, in some states, the act titles and section numbers are well defined, and a higher percentage of cases have orders uploaded, although this may not be the case in others. This makes comparing particular case types between courts and states challenging.[88] There are no standardised identifiers in the data that can be used to track a case through its potential appeals process in higher courts. In a similar vein, tracking a criminal case from the time it enters the system as a FIR to the time it exits as a judgment is difficult. There are discrepancies in identifying information regarding participants, their characteristics, and the types of laws or acts that apply to the case. There are also concerns with inaccurate reporting and misspellings. Entries from one field can occasionally appear in another, necessitating meticulous cleaning and methodical recoding of variables.

To increase data quality and address the challenges mentioned above, a variety of machine learning technologies can be used. To collect, clean, and prepare this data for analysis, we built a strong pipeline. Some of these strategies are briefly described below.

A. Inferences regarding the participants' identities

B. Laws and Acts Identification

C. Textual Reinterpretations

D. Discrimination and Bias Identification

E. Determining the Causal Effects of Legal

[86] Damle and Anand (n 9).

[87] V Gauri, 'Public interest litigation in India: Overreaching or Underachieving?' (2009) World Bank Policy Research Working Paper 5109 <https://papers.ssrn.com/sol3/papers.cfm?abstract_ id=1503803> accessed 18 August 2021; S Krishnaswamy, SK Sivakumar and S Bail, 'Legal and Judicial Reform in India: A Call for Systemic and Empirical Approaches' (2014) 2(1) Journal of National Law University Delhi 1-25; U Baxi, Towards a Sociology of Indian Law (1st edn, Satvahan 1986).

[88] Damle and Anand (n 9).

Decisions

Inferences regarding the participants' identities;

Some decision databases do not include any identifying information about the parties involved in the cases. We extract litigant names from the raw text of the decisions to better understand who participates in the courts, and then use matching algorithms to identify the sort of litigant (individuals, companies, or state institutions). It can be difficult to categories participants. If we're looking at issues involving the government, for example, we'll need to be able to identify all of the many state, national and other government entities that fall within Article 12 of the Indian constitution's definition of "state." The availability of latent patterns in the names makes this ideal territory for ML applications. Manually categorizing these things is excessively time demanding.

We can make conclusions about the characteristics of individual individuals after we extract names. The gender, caste, and religion of a participant are all apparent factors to consider. These characteristics, on the other hand, are not formally recorded in judicial proceedings. Once again, machine learning approaches offer a potential solution. For the sake of illustration, we've focused on people's first and last names.

Individual names are first formatted to ensure that they may be identified by an honorary title, a first name, and a surname name. We were able to directly determine gender using honorifics such as Shri, Sri, Smt, Mr., Mrs., and Ms. We train an algorithm using a publicly available corpus of labelled common Indian first names to extend this categorization to names without an honorific. The process of learning patterns within the data relevant to the categorization is known as training this algorithm, or training a classifier. The statistics of the co-occurrence of alphabets in names, the length of the name, and other factors that offer some predictive information are used to create these patterns. To limit generalisation error, we construct gender predictions using the majority vote from various trained classifiers, including a logistic regression model and a random forest classifier.[89] The probability of a binary outcome or event is modelled using logistic regression. To create a prediction, a random forest classifier employs decision trees (nested if-then expressions) on data features.

We've used similar methods to make religion and caste predictions. Muslims may be identified in the data by their different Muslim names: common names like Khan and Ahmed can be simply assigned and tagged, but for others, we use the incidence of particular alphabets (like Q and Z) with proper classifiers to identify extra names. By recognizing commonly occurring patterns within names associated with a specific group, these algorithms codify our intuitive beliefs of why a name belongs to that team. Because the same last name might be connected with different caste groups, caste assignment is more difficult. Kumar, for example, could be the name of a person from the SC, ST, or 'Other' ethnic groups. We create the distributions of the last name among the different caste categories in the event of such names. To provide a robust prediction, we use this distribution to make a prediction, which we then combine with predictions from other models. Based on a simple majority vote amongst these models, we give a caste to each family.

Laws and Acts Identification;

There is presently no defined citation style for referring to acts or legislation in legal writings. The Hindu Marriage Act, for example, can be referred to as "u/s 13 clause 2 of the Hindu Marriage Act," "u/s 13(b) Hindu Marriage Act," or "u/s 13 of the Hindu Marriage Act 1995." Again, machine learning tools can be utilised to solve this problem.

We use a variety of tools to produce mathematical

[89] The features (x-values) in all the models were hand-engineered co-occurrence statistics of blocks of alphabets in various locations within the names; the voting procedure is a way to ensemble models so as to reduce the generalisation error. For instance, if we had three pre- diction algorithms for gender and all of them make a prediction of M or F, then we use the majority vote as the final prediction of the ensemble. In this case, at least two of the algo- rithms would have predicted the same class and we use this as our final prediction. We used the cross-entropy function as the loss function to quantify how well a given classifier did and obtained an accuracy of 0.92 for the ensemble model.

representations of text in the form of vectors in our work. One prominent way for representing a string of words as a vector of scores that indicates how frequently a word is used inside a given text and how infrequently it appears in the corpus is 'Term Frequency - Inverse Document Frequency' (TF-IDF). [90] For additional analysis, we apply many different unsupervised clustering algorithms with this representation of the act names as vectors.[91] These algorithms allow us to convert phrases into mathematical objects and turn the challenge of separating them into one of calculating distances between them. To put it another way, in order to achieve the classification, this uses an inductive method to group the underlying data in a way that best retains coherence within groups and distance across groups.

The identification of individual laws and acts brings up additional legal analytical possibilities. We can, for example, compare the types of cases and the time it takes to handle them in different courts. This is crucial for figuring out where the system's major bottlenecks are coming from and how to fix them.

Textual Reinterpretations;

For a long time, legal experts have been captivated by judges' ideology and how it influences their decisions in individual instances.[92] However, it is impossible to make empirical estimates of ideological impressions on cases and judgments. This is a new potential thanks to recent progress in natural language processing and computational linguistics.[93] Instead of looking at clusters of individual words, as explained above for acts and rules, neural network algorithms can study the circumstances in which words are used and build vector representations of these phrases so that words used in similar situations are close together in this vector space. Mathematical relationships between these vectors, it turns out, encode semantic relationships between the encoded words. Word2Vec, for example, is an algorithm that 'learns' conceptual relationships between words. For a given term, a trained model may generate synonyms, antonyms, and analogies. These vectors, also known as 'word embedding's,' can be utilised to detect data structure and make predictions. "Document embedding's" have lately built on the success of word embedding's to represent both words and documents in a shared geometric space.[94] These document embedding's, like word embedding's, can be used to interpret and categories enormous amounts of text.

When these algorithms are applied to a large number of cases, noteworthy patterns can be identified. They investigate the distinct ideology of judges in the United States, as well as differences in this ideology based on birth cohort, partisan affiliation, and/or legal training.[95] We can detect related cases using the embedding technique to the citation network by looking at how frequently they are cited together. Identifying legal analogies using document embedding's a more intriguing case. From the way the four words are employed in the English language, word embedding has been documented to know that man is to woman as king is to queen. When the later situation represents a related application of a legal concept described in the previous case, a document embedding may be used to identify it.

Discrimination and Bias Identification;

Concerns concerning stereotyping and discrimination in

[90] 'Term frequency' measures the number of times a term appears in a document. 'Inverse Document Frequency' refers to the log (N/D), where N is the total number of documents, and D is the number of documents that contain that specific term. The TF-IDF is the product of these two terms.
[91] Examples of this are the 'agglomerative hierarchical clustering' and 'k-means' algorithms. The latter first assigns 'K' random data points (TF-IDF vectors generated from text of acts in our case) as cluster centroids (or means) and then categories the rest of the data points to the means closest to them. After this, a new position of the centroid (mean) is calculated, taking the average of the data points categorised in that mean. This process goes on iteratively till the centroid stops moving, or say is at the center of the final cluster.
[92] GH Gadbois Jr, Judges of the Supreme Court of India: 1950–1989 (OUP 2011); GH Gadbois, 'Indian Supreme Court Judges: A Portrait' (1969) 3 Law & Society Review 317- 336; T Mikolov and others, 'Distributed Representations of Words and Phrases and their Compositionality' (2013) 26 Advances in Neural Information Processing Systems 3111-3119.
[93] GH Gadbois Jr, Judges of the Supreme Court of India: 1950–1989 (OUP 2011); GH Gadbois, 'Indian Supreme Court Judges: A Portrait' (1969) 3 Law & Society Review 317- 336; T Mikolov and others, 'Distributed Representations of Words and Phrases and their Compositionality' (2013) 26 Advances in Neural Information Processing Systems 3111-3119.
[94] E Ash and DL Chen, 'Case Vectors: Spatial Representations of the Law Using Document Embeddings' in M Livermore and D Rockmore (eds), Law as Data: Computation, Text, & the Future of Legal (Santa Fe Institute Press 2019).
[95] D Kahneman, Thinking, fast and slow (Farrar, Straus and Giroux 2011).

Indian courts often focus on a single case or a small group of cases. Bias displayed by a court, or even a single judge, is difficult to detect and carefully analyses. Of course, courts aren't the only ones who face this problem. Many scholarly publications have shown that human decision-making bias can have both conscious and unconscious motivations, and that it can emerge in complex ways that are difficult to prove in a range of circumstances.[96] Algorithms — rules that take 'inputs' (like a job applicant's attributes) and predict some consequence (like a person's salary) — have been found to create new forms of transparency and serve as techniques to discover discrimination in different settings, such as labour markets and educational institutions.[97] Algorithms in India's courts may be able to assist judges in making important case decisions (for example, dismissals or bail applications). They may also be used to help courts assess a judge's performance.

Developing such algorithms necessitates a large dataset with variables such as litigant characteristics (creed, sex, destination, nature of the crime committed), lawyer character traits, court attributes, case details (filing details and available evidence), additional variables (day, month, year, weather, etc.), and case outcomes (such as granting of bail or dismissal of a case). An algorithm developer would create a 'learning technique' that aimed to predict a result from a wide range of inputs using a range of models such as support vector machines, decision trees, Bayesian networks, and artificial neural. Multiple consecutive layers of intermediate variables connect input features and output classes in these models' topologies, so that the outputs of one layer become the inputs of the next.[98] Traditional statistical approaches such as linear regression, which is more deductive (assuming a linear fit between a few sets of variables) than inductive (assuming a linear fit between a few sets of variables), are in stark contrast to these models (allowing the data to report the best fit between a large set of variables).

These findings could be extremely useful not only in the courtroom, but also in judicial training. Experiments are presently underway, for example, at the Peruvian Judicial Academy, to evaluate approaches to improve case-based teaching by using the history of a judge's previous rulings, which can identify potential prejudice or inaccuracy.[99] The data can also be used to create tailored dashboards and interfaces that give judges, mediators, and other decision-makers real-time information on their own performance in comparison to previous decisions and to others in a similar situation.[100] This data could be utilised to improve judges' and lawyers' abilities, raise their productivity, and dedicate more time to complex cases.

Determining the Causal Effects of Legal Decisions;

Jurists and judicial officers have long argued for and against the application of various laws and regulations, justifying their positions with ideas regarding the implications of these laws and regulations. This position is similar to that of medicine a century ago, when there were only hypotheses and no rigorous causal evidence before the emergence of clinical trials.

In judicial studies, a growing corpus of empirical research shows that causal inference is conceivable. In situations where cases are randomly assigned to judges, for example, the random assignment can be used as an exogenous source of variation to assess the impact of judicial decisions — because judges in this scenario do not choose their cases and are assigned them at random, observed rulings reflect their deliberations in the case rather than the process of justice

[96] A Banerjee and others, 'Labor Market Discrimination in Delhi: Evidence from a Field Experiment' (2009) 37(1) Journal of Comparative Economics 14-27; M Bertrand and S Mullainathan, 'Are Emily and Greg More Employable than Lakisha and Jamal? A Field Experiment on Labor Market Discrimination' (2004) 94(4) American Economic Review 991- 1013; M Ewens, B Tomlin and LC Wang, 'Statistical Discrimination or Prejudice? A Large Sample Field Experiment' (2014) 96(1) The Review of Economics and Statistics 119-134; J Kleinberg and others, 'Discrimination in the Age of Algorithms' (2018) 10 Journal of Legal Analysis 113.

[97] J Kleinberg and others, 'Algorithms as Discrimination Detectors' (2020) 117(48) Proceedings of the National Academy of Sciences 30096; Y LeCun, Y Bengio and G Hinton, 'Deep Learning' (2015) 521(7553) Nature 436-444.

[98] DL Chen, M Ramos and S Bhupatiraju, 'Data and Evidence for Justice Reform (DE JURE)' (Development Impact Evaluation (DIME) Group, World Bank, November 2019).

[99] JR Kling, 'Incarceration Length, Employment, and Earnings' (2006) 96(3) American Economic Review 863-876.

[100] ibid.

that led to their assignment.

The inference on the long-run causal implications of sentence length is generated by randomly assigning cases to judges who are expected to be harsh or lenient.[101] A randomised control trial would need to randomise the sentence length to determine the causal effect of an eight-month or eight-year sentence. However, allocating a prisoner to a court who is likely to sentence them to eight months or another judge who is likely to sentence them to eight years results in the causal impact of sentence duration on later life outcomes. The causal impacts of debt relief on individuals' incomes, employment, and death can all be studied using the same paradigm.[102] Discretion in decision-making illuminates a wide range of issues where judicial practices exist. The choice to protect patent rights is one example of this. Judge predictions can be created using machine learning, and the causal implications of their anticipated choices on long-term outcomes can subsequently be estimated.

CONCLUSION & SUGGESTIONS

"A Modern Human-Machine Relationship"

So far, we've argued that machine learning is a powerful tool for better organizing and comprehending the massive, unstructured, and complex data that the Indian judiciary has produced over the last fifteen years. Algorithms can be created to infer information about participants' identities and to research the deliberative processes they use in courtrooms. Machine learning algorithms can also translate a large amount of textual data into numerical estimations that can be used to better understand the processes and consequences of justice systems. The ability of judges and lawyers to increase their talents and standardize review processes can be enhanced by analyzing texts for prejudice and discrimination patterns.

However, these instruments have a number of limits and criteria that must be addressed before they may be used effectively in the courts. At the onset, there are serious concerns about data privacy and the protection of personally identifiable information, as well as data security and legal data governance. Following then, data pre-processing, training on huge and high-frequency datasets, and iterative refining with respect to the actual scenarios where they are deployed are all required. This necessitates robust pilot initiatives that are investigated in randomised control trials. These pilots must be built on a suitable scale in order to gain insights into data privacy, costs, and outcomes.

In the courts, only technology that help humans rather than replace them should be adopted. This is due to a number of factors. As previously stated, algorithms suffer from the 'black-box' problem of interpretability, in which it is difficult to trace the output of sophisticated algorithms back to the data inputs.[103] The algorithms used in word embedding, for example, learn biases that exist in the corpora. Using these in downstream tasks and choices without careful control increases the potential of biases spreading across the system. The inherent biases of decision-makers within the system can be reinforced by model architectural choices. To address these difficulties, a collaborative and deliberative approach to the design, implementation, and evaluation of these technologies' uptake is required.

What role may AI and machine learning play in human decision-making?

An AI-based recommendation engine may begin by providing a judge with the best prediction of them, based on the judge's previous decision-making and derived from a model employing only legally permissible features. At the very least, it can assist Judges in maintaining consistency across similar instances by providing the most important reference points — as well as limiting the impact of

[101] W Dobbie and J Song, 'Debt Relief and Debtor Outcomes: Measuring the Effects of Consumer Bankruptcy Protection' (2015) 105(3) American Economic Review 1272-1311.

[102] B Sampat and HL Williams, 'How do Patents Affect Follow-on Innovation? Evidence from the Human Genome' (2019) 109 (1) American Economic Review 203-236.

[103] Pasquale (n 11).

unrelated issues. Getting away from defaults can help you think more clearly and slowly. Furthermore, by explicitly leveraging reasons for judges to want to self-improve by presenting them statistics about oneself, it explicitly leverages motives for judges to want to self-improve.

Presenting how the other judges could reach the decision based on the machine's model of the other judges is another way for AI to assist rather than dictate decision-making, this time by assembling a tailored community of instantly available experts (trained based on data from the behavior of other experts, possibly over time and across geographic and subject matter contexts). By displaying statistics from other judges, you can tap into self-image worries about becoming a better judge, which might inspire moral action. In being sure, this might contribute to 'group thought,' but research in the United States has found that judges have a strong sense of individuality and seek to stand out. This part of the AI system can be toggled on or off depending on a judge's predisposition to conform or the contrary in a way that is detrimental to effective justice.

A prediction system for detecting judicial error could help judges make better decisions. The anticipated errors allow researchers to investigate how systematic factors influence the predictability of judges' errors. By forecasting errors, we can identify places where decision-makers may require additional guidance. Of course, it's always possible that the AI system's recommendation will overlook some important private information that the judge has access to. When this happens, rather than compensating for the judge's inconsistencies, the AI system will steer them off track. As a result, a conversation between the judge and the AI system might be promoted in order for the AI system to gain this personal information from the judge.

The ability to interpret algorithms is a realistic requirement for ensuring trust and fairness. A court may ask for an explanation as to why the divergence could lead to errors. Judges' normative commitments and self-perceptions of being a good judge are used in this progressive integration to assist the acceptance of these systems.

Given the complexities of working with AI and machine learning algorithms, each rollout must be preceded by a period of thorough research and testing of the systems themselves. To appropriately evaluate the costs and advantages of these algorithms, randomized controlled studies that carefully estimate the causal implications of their adoption are required. A well-designed trial can give critical benchmarks on cost, efficiency, user happiness, and outcomes, all of which are necessary for a justice system to serve citizens credibly. Overall, we feel that AI and machine learning have enormous potential for India's courts when used carefully and ethically.