Utilizing AI to Improve Efficiency of the Environment and Land Court in the Kenyan Judiciary

Leveraging AI Capabilities in Land Dispute Cases in the Kenyan Environmental and Land Court System

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ABSTRACT

The number of land disputes in Kenya continues to increase with population and economic growth. In 2013, the judiciary established the Environment and Land Court (ELC) to hear disputes relating to environment and land. Unfortunately, the ELC is plagued with the same problems affecting Kenya's other courts; chief amongst these is an extensive backlog of cases. Past attempts by the judiciary to eliminate this backlog have met with varying degrees of success. In this paper, we argue that augmenting human abilities with AI technology is a viable means of tackling this case backlog. This paper outlines AI tools that may aid legal personnel in the ELC in performing their duties and, ultimately, reducing the number of pending cases.

KEYWORDS

Kenyan Judiciary, Environment and Land Court, Artificial Intelligence (AI), Legal Research, Transcription, Online Dispute Resolution

1 INTRODUCTION

Kenya's relationship with land can be viewed in pre and post – colonial terms: a precolonial context of land abundance and relative labor scarcity, and a late colonial and postcolonial situation of rising populations and growing pressure on land [1]. Colonial land policy in Kenya resulted in inequality in land ownership and use, resentment by Africans, landlessness, squatting, land degradation

and poverty that continues to plague the nation [2, 3]. The transition from pre-colonial communal land ownership to private land ownership, which started in the colonial period and has continued in the post-colonial era, produced a number of contradictions in administering and managing land that are present to this day [4]. A large number of land policies enacted in the colonial era persisted even after the country attained its independence in 1963. As a result, despite enacting individual tenure of indigenous land and redistributing the fertile lands in the highlands occupied by colonialists to its citizens, Kenya is plagued with land conflicts and its courts inundated with land dispute cases among individuals and between communities [5].

Changing cultural practices are increasing pressure on the country's land tenure system as well. For example, the Pokot tribe in the highlands of Baringo county traditionally practiced semi-nomadic pastoralism; in recent years, however, the community has adopted a more sedentary lifestyle and taken up rain-fed agriculture [6]. The transition from common property to private tenure has led to increased land disputes within members of the tribe [6]. In the past, people accessed land and asserted their land rights in 3 ways: (i) using clan-based definitions of landholding communities, (ii) through family-based inheritance, and (iii) from claims to rights based on long-term occupancy and use [1]. Tensions between these traditional land administration methods and current land laws are also contributing to land disputes in the nation. The Maasai's customary land holding, for example, is based on long occupation, continuous use, traditional rights, colonial treaty, and the Group Representatives Land Act adopted in the early years after independence [7]. In recent years, the tribe's people are experiencing dispossession from people making claims to their land based on the more formal land laws currently in place [7].

Gender disparities in land ownership and access to land are prevalent in Kenya. Women lag behind in securing land rights. Women, particularly those residing in rural areas, are more likely to be systematically excluded from family and patriarchal land

ownership – only having access to land through a male relative – leaving them in precarious financial situations [8]. This can lead to land disputes. A 2005 study found that widows in the country are 13% more likely to experience land conflicts when their parcels are registered under the names of their deceased husbands than when titles are registered under their names [9].

Generally, the source of land conflicts can be grouped into 3 categories: (i) competing land claims from agricultural and urbanization demands as a result of rural – urban migratory patterns [10], (ii) conflict between the elite and ordinary citizens in terms of land distribution, natural resource extraction and unbalanced rent sharing [11, 12, 13, 14, 15], and (iii) land grabbing using political or civil machinations [14, 16, 17, 18]. The number of disputes over land continue to increase with population and economic growth. As family patriarchs that acquired land in the early Independence era pass there is an increase in land inheritance disputes which also contributes to rising land conflicts.

Prior to 2010, Kenya did not have a comprehensive system of land laws, particularly those pertaining to women's land rights. In 2010, it adopted a new constitution that allowed for the implementation of the National Land Policy through institutions such as the National Land Commission Act (NLC). The formulation of a comprehensive National Land Policy commenced in February 2004 and was completed in 2009. The National Land Policy was commissioned by the government to tackle issues of squatting, landlessness, disinheritance of some groups and individuals, urban squalor, under-utilization and abandonment of agricultural land, deterioration in land quality, tenure insecurity, and conflict [8]. The National Land Policy recommended the creation of mechanisms to ensure access to timely, efficient and affordable dispute resolution to land conflicts. This led to the establishment of the Environment and Land Court.

Following promulgation of the 2010 constitution, an Environment and Land Court Act was approved in 2011 under which a new Environment and Land Court (ELC) was created as a specialized court. Currently, 29 of the country's 47 counties have an ELC. The Environment and Land Court is a Superior Court with the same status as the High Court of Kenya. It has jurisdiction to hear disputes relating to environment and land. Specifically, the court has the power to: (i) hear disputes relating to land administration and management, (ii) hear cases relating to public, private and community land and contracts, (iii) hear cases relating to environmental planning and protection (iv) exercise appellate jurisdiction over the decisions of subordinate courts or local tribunals, and (v) exercise supervisory jurisdiction over the subordinate courts, local tribunals, persons or authorities [19]. The ELC began its operations in 2013. The majority of the cases handled by ELC relate to land disputes rather than environmental matters.

2 CURRENT PERFORMANCE OF THE ENVIRONMENT AND LAND COURT

Unfortunately, the ELC is plagued with many of the same problems affecting Kenyan courts; chief amongst these is an extensive back log of cases. Ironically, establishment of the ELC was largely influenced by the backlog of land cases in the High Court. Case backlog - defined as cases that have been pending for more than one year - and delays in delivery of justice have been main indictments against the Kenyan judiciary.

Underfunding of the judiciary is one of the main reasons for the increasing case backlog in courts across the country. The entire judiciary system is regularly subjected to abrupt budget cuts from the government; in fact, the Judiciary's funding has been on a downward trend since the 2012 - 2013 fiscal year [20, 21]. Budgetary constraints mean that the judiciary is consistently operating with less than the required workforce (55% of the required workforce in the 2019 – 2020 fiscal year [21]) which inevitably results in an increase in the number of pending cases. For example, in the 2016 – 2017 fiscal year there were 499,341 pending cases, and this number increased to 617,582 by 2019 – 2020 [20, 21]. Other factors that contribute to the backlog include: poor physical infrastructure – there has been minimal progress in the completion of court construction across the country; lack of ICT capacity to assist with core judicial processes; judicial organizational structure; court rules and procedures; and manual management of court records [20, 22].

It is worth noting that the judiciary is actively working on reducing case backlog. In the 2018 – 2019 fiscal year, under Chief Justice David Kenani Maraga, the judiciary significantly reduced the number of cases pending in the court system - bring down cases that are five years old from 110,000 to only 15,278 cases [23]. The issue of case backlog is a perennial headache for the judiciary, though, with Chief Justice Maraga noting that the number of cases filed in Kenyan courts every year exceeds the number of cases the judiciary settles by as much as 100,000, causing an ever-growing backlog [24].

The ELC has one of the highest number of pending cases, 13,630 cases for the 2019 – 2020 fiscal year, across all counties despite an impressive case clearance rate [21]. Of the 13,630 cases, 21%, 2920 cases, have been in the court system for greater than 5 years, 34%, 4628 cases, are aged between 3 – 5 years, and 45%, 6082 cases, have been pending for 1 – 3 years [21]. Most of the disputes in the ELC are family disagreements over land and fraud related cases, 29%; succession cases account for 20%, boundary disputes, 15%, and double registration and double allocation accounted for 10% and 9% of the cases, respectively [2]. The impact of these protracted legal proceedings is devastating to the parties involved in the disputes.

Court Type	Case Backlog by Age as at June 30, 2020			
	1-3 years	3-5 years	5 years and above	All Ages
Supreme Court	29	7	1	37
Court of Appeal	2,963	1,773	246	4,982
High Court	39,701	21,500	7,983	69,184
ELRC	6,929	3,744	255	10,928
ELC	6,082	4,628	2,920	13,630
Magistrates' Court	178,162	57,403	23,954	259,519
Kadhis' Court	1,005	62	0	1,067
All Courts	234,871	89,117	35,359	359,347

Figure 1: The total number of pending cases over a year old across the Kenyan judiciary system as reported in the State of

the Judiciary and the Administration of Justice Annual Report 2019 – 2020 [21].

In order to accurately assess the current performance of the ELC this study evaluated the total number of pending cases and their average age in all 29 ELC county stations. It also examined the average age of cases in terms of those that were ultimately dismissed and those allowed to proceed through the court. This data was obtained by analyzing court fillings in the Environment and Land Court posted on the Kenya Law online website, the official account of the Kenyan judiciary. A computational search of the court case meta-data was performed and the relevant data compiled.

Between 2002 – 2020 the number of land cases filed in Environment and Land Courts increased significantly. The distribution of the number of cases filed each year is shown in Figure. 2. The significant decrease in the number of cases in 2020 was due to a lack of availability in the court's calendar, i.e., the case backlog prevented parties from scheduling new hearings in the ELC. Chief Justice David Maraga announced in January 23, 2020 that the Environment and Land Courts are fully booked until March 2021, and called for urgent measures to fund the Judiciary's bid to employ more judges and magistrates to deal with the case backlog [25].
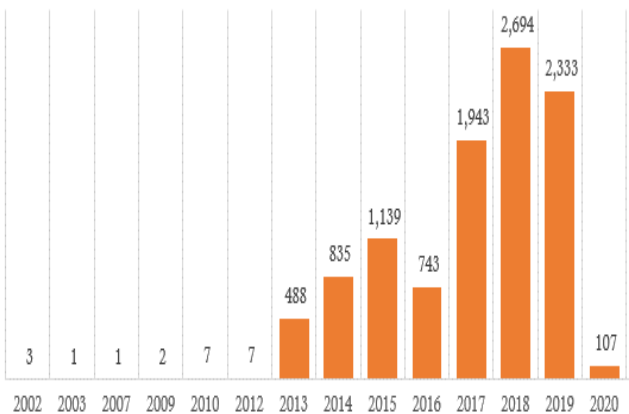

Figure 2: The total number of land cases filed in Environment and Land Courts in 29 counties for the 2002 -2020 period. The cases between 2002 – 2012 are land cases carried over to the ELC from the High Court.

There are a total of 14,686 pending land cases. The distribution of cases across the country is shown in Figure. 3. A total of 127 judges are assigned to these cases, equating to an average of 115 pending cases per judge.
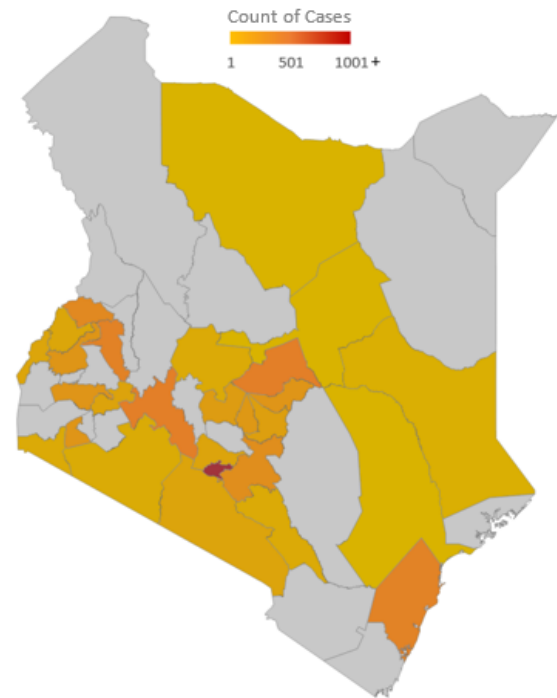

Figure 3: A mapping of the number of pending land cases filed in Environment and Land Courts in counties across Kenya. The highest caseloads are in Nairobi, Nakuru and Meru counties, with 18%, 7% and 7% of the 14,686 total pending cases, respectively.

The average age of these cases is 3 years. The highest average durations from filing to judgement are in Meru county, 4.5 years, Machakos county, 4.3 years and Bungoma county, 3.8 years. Figure. 4 outlines the average duration of cases in the ELC system in counties across the country.

It is clear that the current court system is ill equipped to deal with the demand of cases. In the following section, we argue that AI tools could be used to significantly decrease, or eliminate, the backlog of cases. We outline the different AI tools that the Kenyan Judiciary should introduce to the ELC to aid the legal workforce to efficiently perform their duties and, ultimately, tackle the large number of pending cases.

3   UTILIZING AI IN THE ENVIRONMENT AND LAND COURT

The use of AI in legal proceedings is not as prevalent in Africa as it is in the USA or Europe. A few African firms - Bowman, with offices in Nairobi, Kenya; Webber–Wetzel, headquartered in Johannesburg, South Africa, and KTA Advocates (formerly Karuhanga, Tabaro & Associates) in Uganda, for instance - have adopted AI to improve their legal services delivery; streamlining the mundane, time consuming tasks through the use of AI systems and freeing up their lawyers' time to focus on high level tasks [26].
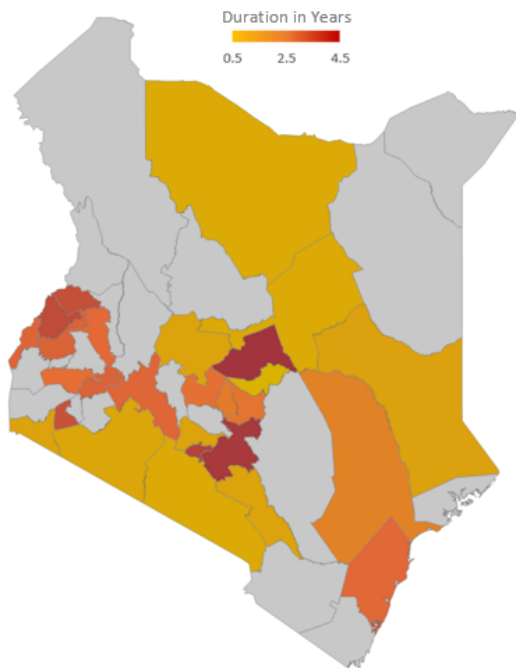
Figure 4: A mapping of the average age of land cases filed in ELC in counties across Kenya. The average age for pending cases in the ELC system country-wide is 3 years.

LawPavillion, a Nigerian legal technology company, launched an AI platform in 2016, LawPavillionPrime, that gives in-depth analysis of the strengths and weaknesses of legal positions and authorities by generating statistical analysis, historical data, precedential value ratings, conflicting judgments, locus classicus, statutory or literary authorities, and opinions [27]. This was the first such platform launched on the continent. In 2018, it released TIMI, Nigeria's first artificial intelligence legal assistant, which assists lawyers with legal research, litigation, opinion drafting, provides notes with legal authorities, and gives a step-by-step guide on drafting and filing court processes [28].

In general, however, law offices and courts on the continent have been slow to embrace technology. In 2018, for example, the Law Society of Kenya (LSK) went to court to oppose a decision by the Ministry of Lands and Physical Planning to digitize the land transactions processes at the land registry through the National Land Information Management System (NLIMS), arguing that the ministry had failed to consult the relevant stakeholders as required [29, 30, 31]. The government argues that digitizing land registration documents will root out corruption in land transactions while the LSK argues that done without appropriate legislation, digitization is likely to increase corruption in land management [32]. Furthermore, it is only in recent years that digital signatures and service of pleadings via email have taken root in the country [33].

Currently, AI is not utilized in the Kenyan judicial system in a substantive manner. There are several reasons for this: (i) poor digital infrastructure and data capacity, (ii) under-digitization of records, (iii) tradition-bound court systems and legal professionals,

and (iv) lack of funding and labor to augment legal proceedings with AI technology. This paper argues that AI holds great potential in increasing the efficiency of the Kenyan courts thereby reducing the current and future case backlog.

3.1   AI in Legal Research for Land Dispute Cases

The Kenyan legal system, like many globally, is based on precedent - judges make rulings consistent with prior cases on the same subject. Judges must therefore identify and retrieve information from relevant cases to support their decision-making. The high number, and high complexity, of cases that judges must sift through makes this aspect of their job highly time consuming and contributes to the length of a trial. AI tools that aid with legal research would ease this aspect of judges' workload.

AI legal research platforms are computer software systems that not only perform pre – programmed tasks but have the ability to learn and refine their searches and outputs. Machine learning (ML) and Natural Language Processing (NLP) may offer affordable ways to obtain precise and relevant legal research results [34, 35, 36, 37]. Some of the commercially available AI legal research platforms use natural language processing to search and process data using pre-defined parameters. NLP uses prior users' queries and results to form a predictive model, expanding or narrowing a search to ensure all relevant cases are identified. The efficacy of these tools is documented. A 2018 study, for example, found that attorneys who used AI tools to conduct legal research completed projects 24.5% faster and the search results were 21% more relevant; the study concluded that use of AI would save attorneys 132 – 210 hours a year when conducting legal research [38].

The cost reduction potential of these AI legal research platforms should also motivate the ELC to integrate them to the current adjudicating process. Understanding the exact fiscal impact of AI solutions in the ELC before implementation, however, is difficult. The cost of software, implementation, training and staffing comparative to current processing and personnel cost may not incentivize utilization of these AI systems if it is prohibitively higher. The previous upgrade to provide internet and Wi-Fi access in 90% of the courts cost KSH 40 Million (£300,000) and stalled shortly after surpassing that sum due to lack of funds [39]. If the cost of deploying AI legal research platforms is similar than the same problem may arise. Fortunately, there are several AI legal research platforms, also known as 'Due Diligence' platforms currently on the market: Kira Systems, Leverton, eBrevia, Ross Intelligence, CaseText, WhatSun, TIMI, and many more, at varying price points depending on the functionality and tools available. Subscriptions can be as low as $59 per month.

Effective deployment of these tools will also require extensive personnel and algorithm training. The cost of both of these training is likely to vary. However, these initial costs are likely to be offset in the long term by a reduction in the personnel required to operate the ELC efficiently. The hiring practices in the ELC will need to be drastically altered if these tools are adopted. There will be no need to recruit armies of young lawyers to perform services that are no longer needed, instead the ELC will need to hire a smaller number of legal personnel adept at utilizing AI legal research platforms.

These platforms are only as strong as the data they have access to. Access to comprehensive, robust case data increases the efficiency and accuracy of AI platform searches. Opportunely, in 2017, the Kenyan judiciary unveiled its digital strategy, enshrined in the 2017-2021 Sustaining the Judiciary Transformation Blueprint, to re-engineer its processes through information and communications technology (ICT) [40]. Part of the strategy outlined is the digitization of court records and proceedings, retiring archaic filing systems and modernizing document management [40]. According to the Ministry of ICT, 60 million records were digitized under the High Court Registry pilot digitization project [41]. There are minimal reports on the progress of the digitization project in other courts. Digitization of these records will make the use of AI to conduct legal research a viable strategy.

Access to land records is necessary for effective deployment of these platforms. This means that complete digitization of land records in the country is required. In April 2021, the government launched a new National Land Information Management System (NLIMS), a digital land resource management platform named Ardhisasa; another step in the government's goal to digitize land records and transactions [42]. The phased roll out of the Ardhisasa platform started in Nairobi (where digitalization of all services is complete), with another twenty counties to be on-boarded to the digital system by the end 2021. The platform is expected to be available across the country by the end of 2022 – a goal that falls short of the 2021 completion date of digitization of land records set by the government in 2019. A partial digitization of these records would invariably affect the efficacy of the AI legal research tools.

Digitization of land services is likely to be more cost effective as well. In 2009, the average cost of managing the manual land system was KSH 1,770.00 per file documents; it cost KSH 10,621.00 on average to trace a misfiled or missing documents and KSH 19,473.00 to reproduce a lost file or document in the land registry [43]. These costs were significantly lower in developing countries that had fully digitized their operations [43].

It should be noted that the country's poor digital infrastructure, i.e., lack of internet access, poor internet connectivity, and cost prohibitive internet, may hamper the use of these AI platforms in Environment and Land Courts located in rural counties. There is an ongoing push by the Ministry of ICT to improve access to high-speed internet in rural locations [44]. However, there are number of obstacles hindering this goal. First, rural communities often lack reliable electricity which makes it harder for technology companies to set up internet networks. The quality of available digital infrastructure is also cause for concern. For example, only 57% of the population receives 4G coverage in Kenya, and the majority of places not covered are rural [45]; as a result, even the simplest technologies often don't work as expected in these areas. Finally, the depressed income of many residents in the rural areas mean competing basic needs often impact the ability to access digital services. Perversely, the cost of offering internet services is often higher in rural areas due to greater costs in building, servicing and even fueling those networks [45]. As a result of lower demand,

corporations are hesitant to invest in digital infrastructure in these rural communities. In order to provide digital infrastructure capable of supporting all technologies, the Kenyan government and private industries may have to work together. The government may subsidize some of the costs of construction incentivizing private industries to provide better digital services in rural areas. Alternatively, both parties can opt to share the infrastructure to cut down cost.

3.2 AI for Speech Recognition and Transcription in ELC

The official records of courtroom proceedings are vital in the justice system. Legal transcription is therefore a vital component of the adjudication process. Court transcripts influence, "…*the conduct of the trial, whether by court alone or by court and jury; the relationships between the trial judge and participating counsel; the procedures for review of the trial by the trial judge; and appellate review, including the feasibility of seeking such review and the nature, scope and potential achievements thereof*" [46]. Unfortunately, underfunding of the judiciary affects the number of available court transcriptionists. This shortage of transcriptionists has left many courts on their own when it comes to obtaining accurate transcripts of courtroom events. Many court proceedings in Kenya exist only as audio recordings. In 2019, the Judiciary and the Ministry of Information vowed to digitize all audio court proceedings using the Ajira Digital Program, while employing youth to perform the transcription [47]. This is a worthwhile but slow endeavor. During the COVID-19 pandemic, many Kenyan courts were forced to adopt real – time transcript devices. Data regarding how many, if any, Environment and Land Courts adopted these devices could not be found.

AI can reduce case backlog at the ELC by filling in the gaps caused by the shortage of court transcriptionists. AI coupled with automatic speech recognition (ASR) allows for proceedings to be recorded, processed, and transcribed faster than using traditional court transcriptionists. Generally, ASR in targeted applications (e.g., legal or medical transcriptions) tends to have lower accuracy than in general purpose applications (e.g., regular speech, internet search engines) [48]. However, automated speech recognition (ASR) technology combined with AI improves speech-to-text engines increasing their ability and allowing them to transcribe jargon-heavy legal proceedings highly accurately [49]. In general, the most effective application of these AI transcription tools augment the automated process with human oversight; the automatically produced transcripts are reviewed and edited by professional transcribers to ensure the highest level of accuracy [49]. This would be especially critical in this context since ASR is less accurate when dealing with accented speech [48, 50]. Corrections or enhancements are fed back to the ASR via adaptive algorithms, allowing the technology to constantly improve [49]. A review of a transcript should take much less time than manually transcribing audio recording of court proceedings.

Additionally, AI transcription service systems provide high searchable features, allowing for targeted data to be easily identified using relevant keywords and dispersed files to be

consolidated in the form of an organized digital database [51]. This would further streamline case management flow in the ELC and mitigate case backlog.

Funding is both an obstacle and motivation in deploying AI transcription platforms in the ELC. In the USA, the most commonly recommended AI services cost around 25¢ per minute of audio, and services employing human transcriptionists cost up to $2 for a minute of clear audio [52]. One transcription service operating in Kenya offers rates of $1.00 per minute for legal transcription with 5 - day delivery [53]. Therefore, in addition to increasing the speed of the transcription process, use of AI transcription platforms would save the perennially underfunded ELC money. It is worth noting that during the 2019 fiscal year, the Directorate of the ICT developed specifications for the procurement of a speech to text software system, however, the procurement process was halted due to lack of funds [21]. The judiciary will have to overcome this short term funding obstacle to enjoy the long term cost savings from utilization of the AI transcription platforms.

AI transcription service systems also provide high searchable features, allowing for targeted data to be easily identified using relevant keywords and dispersed files to be consolidated in the form of an organized digital database [51]. This would further streamline case management flow in the ELC and mitigate case backlog.

3.3 Predictive Analysis on Case Duration and Dismissals

One of the most frustrating aspects of the prolonged adjudication process in the ELC is that it is just as likely to result in a case dismissal as it is to result in a ruling in favor or against the aggrieved party. In fact, in the survey of ELC done in this study, the cases that were ultimately dismissed were in the courts longer than those that resulted in a judgement for or against one of the parties.

County	Allowed Avg. Duration	Dismissed Avg. Duration
Meru	3.9	5.2
Machakos	4.1	4.5
Bungoma	3.6	4.0
Nairobi	3.6	3.9
Trans-Nzoia	3.5	3.5
Kisii	3.0	3.4
Mombasa	3.0	3.3
Kakamega	2.7	2.9
Kericho	2.7	2.8
Nakuru	2.7	2.8
Uasin Gishu	2.5	2.7
Busia	2.9	2.4
Kilifi	2.4	2.7
Nyeri	2.5	2.5
Kisumu	2.4	2.3
Embu	2.1	2.4

Figure 5: The average age of cases in ELC in various counties in 2 categories: cases that are ultimately dismissed and those that are heard by the court. In general, cases that were

dismissed were pending for a longer duration in most of the counties surveyed.

Predicting judicial matters is an ongoing and longstanding preoccupation in legal circles that continues to be an open issue in both the theory practice of the law [54, 55, 56, 57, 58]. In recent years, AI based approaches have been increasingly utilized for legal predictive analysis. AI can be used to identify patterns in a judges' rulings, allowing lawyers and other legal professionals to predict how the court may rule. Algorithms and machine-learning can interpret data and predict a logical outcome for a case before filling. Environment and Land Courts publish case details including judgements online making big data analysis possible.

Researchers in the United States were the first to determine whether machine learning techniques could be used to predict courts' decisions or the voting behavior of judges [59, 60]. Katz et al. developed a prediction model that aims to predict whether the US Supreme Court as a whole affirms or reverses the status quo judgement, and whether each individual Justice of the Supreme Court will vote to affirm or reverse the status quo judgement; the model achieved an accuracy of 70.2% at the case outcome level and 71.9% at the justice vote level [61]. Medvedeva et. al. found that Natural Language Processing techniques could predict (future) judicial decisions in the European Court of Human Rights with an average accuracy of 75% [62]. The study used a computer to perform quantitative analysis on words and phrases used in a court case and then based on that analysis trained the computer to predict the decision of the Court [62]. It is feasible that similar approaches may be used to predict whether a case may or may not be dismissed by the ELC. This approach is likely to reduce the number of land dispute cases filed in the ELC – a prediction of dismissal may force the aggrieved parties to seek alternate dispute resolutions. The ethical ramifications of this type of predictive analysis would need to be taken into account, however. There are concerns that the use of this sophisticated AI prediction models may only be accessible to wealthy litigants, leaving those that cannot afford them in a less powerful position of legal armament [63]. Issues of AI bias are well documented [64]; pro-active measures will need to be implemented to identify any bias present in the predictive AI platforms.

Predictive analytics may also be used to predict the duration of a court case [65]. This would allow courts to give priority to cases that are predicted to consume less processing time in order to reduce the average total time in adjudicating cases on the docket. Knowledge on the duration of a case might also quell litigants' desire to submit cases to the ELC, instead seeking alternate routes of dispute resolution.

3.4 Online Dispute Resolution

There are 3 reasons that the Kenyan judiciary should embrace online courts as platforms for providing justice. First, some of the farthest regions of the country, largely rural areas, still do not have physical court buildings, which means that advocates and witnesses travel long distances in search of justice [66]. In fact, Environment and Land Courts are only present in 29 counties in the country. Second, in instances where legal representation is cost prohibitive,

litigants may use these online courts and represent themselves. Finally, online courts may expedite adjudication of a case by eliminating the need of legal counsel or judges for hearings by fully automating the legal process or requiring human input only in the 'ruling' portion of the proceedings. In this case, Online Dispute Resolution (ODR) utilizing online courts would provide means of settling land disputes via a hearing using technology but outside of the courtroom. There are several such AI platforms in use. ODR platforms such as Rechtwijzer, MyLaw BC, and the British Columbia Civil Resolution Tribunal, utilize AI to determine which cases may be adjudicated using the platform, and to automate decision-making and settlement or outcome proposal [67]. Similar platforms could be deployed by the Kenyan judiciary system. By mining data from prior related court cases and decisions these platforms could autonomously decide settlement options or fair adjudication. Judges could review the platform's decision to ensure it is just. AI could help parties reach an equitable settlement in land disputes.

The issue of digital literacy, especially in rural counties, must be considered and addressed for the government to effectively utilize ODR platforms across the country. The number of people in the country who are able to effectively use digital technologies is still low; only 25% of the population are mobile internet users according to a 2019 study compared to 95% of the population in the USA in the same year [68].The absence of networks in many rural counties means that fewer people acquire devices such as computers or laptops which in turn feeds into the high rates of digital illiteracy in these communities. The ELC may have to tailor its approach in deploying AI online resolution tools in courts in rural counties. The interface for these applications must be simple enough to use so that even people with limited skills will find them easy to navigate. Moreover, in deference to the poor digital infrastructure in rural counties, the ODR platforms deployed should work on simple smart phones or other devices that can work with lower bandwidth Wi-Fi and don't need constant access to the power grid. It is also crucial that the systems be user friendly to self-represented litigants as well as those represented by law firms.

Finally, there is evidence that ODR platforms are likely to be embraced by the Kenyan populace. With the onset of the COVID – 19 pandemic many courts in Kenya are engaging in some form of ODR, from communicating with litigants via email, to utilizing electronic disclosure platforms to manage disclosure, submission of documents via online portals, and even providing rulings online. These new procedures have ultimately been accepted, begrudgingly in some instances, within the legal sphere and by the general public. Given this acceptance of various ODR practices by both the public and legal personnel, it is reasonable to conclude that online conflict resolution platforms would be similarly embraced. A 2020 study also found that a majority of Kenyans are satisfied with justice outcomes from the various avenues from where they seek justice – this does not have to be in court or even within the conventional court system [69]. In fact, in general, the citizenry has greater trust in the integrity of the judiciary compared to other governmental institutions and because of this may be more willing to embrace new platforms of justice introduced by the judiciary. In the coming years, with greater exposure, familiarity and uptake, ODR may become the commonly chosen, if not the default option, of arbitration in the ELC. This is especially likely given the sluggish pace of construction of ELC courts across the country and the staggering distances that parties in more remote locales must travel for in – person hearings.

5   CONCLUSION

Kenya's judiciary is stuck in a perennial battle against an ever increasing case backlog. Despite small successes in recent years in reducing the number of cases pending in the court system, it is clear that human efforts alone are not sufficient to tackle this problem. AI offers a great opportunity for the judiciary to achieve its service delivery goals. The problems caused by insufficient funding and workforce could be mitigated by utilizing AI tools.

In this paper we introduce 4 ways that AI may be used to ease the pressure on the Environment and Land Courts; emphasizing that augmenting these tools to existing human abilities would be the best way of leveraging both AI and human abilities. While the country's poor digital infrastructure and data capacity does create obstacles in deploying these AI tools, we believe that these are not insurmountable and that the strategies outlined in this paper are the best way forward.

REFERENCES

[1]   C. Leonardi and A. Browne, "Valuing Land in Eastern Africa," *Critical African Studies,* vol. 10, no. 1, pp. 1 - 13, 2018.

[2]   Land Development and Governance Institute, "An Assessment of the Performace of the Environment and Land Court," Land Development and Governance Institute, Nairobi, Kenya, 2014.

[3]   P. M. Syagga, "Land ownership and use in Kenya: Policy prescriptions from an inequality perspective.," *Readings on Inequality in Kenya. Sectoral Dynamics and Perspectives, Nairobi.,* pp. 289 - 344, 2006.

[4]   T. Ndege, "Evolving land tenure and agricultural systems.," in *Ethnography of the Gusii of western Kenya: A Vanishing cultural heritage.*, Lewistion, NY, Edwin Mellen Press. , 2006.

[5]   R. Southall, "The Ndungu report: land & graft in Kenya.," *Review of African Political Economy,* vol. 32, no. 103, pp. 142 - 151, 2005.

[6]   C. Greiner, "Pastoralism and Land-Tenure Change in Kenya: The Failure of Customary Institutions.," *Development and Change.,* vol. 48, no. 1, pp. 78 - 97, 2017.

[7]   J. Munei and K. Galaty, "Maasai Land, Law, and Dispossession," Cultural Survival Quarterly Magazine, December 1998. [Online]. Available: https://www.culturalsurvival.org/publications/cultural-survival-quarterly/maasai-land-law-and-dispossession. [Accessed 21 April 2021].

[8] Ministry of Lands, ""Sessional Paper No. 3 of 2009 on National Land Policy," Ministry of Lands, Nairobi, Kenya, 2009.

[9] T. Yamano and K. Deininger, "Land Conflicts in Kenya: Causes, Impacts, and Resolutions.," Foundation for Advanced Studies on International Development, 2005.

[10] J. Mwita, "Ethnic Land Conflict a Constant Struggle in Kenya: A Critical inquest on the role played by the Methodist church in Meru County, Kenya.," Norwegian School of Theology, 2017.

[11] T. Janus, "Natural Resource Extraction and Civil Conflict.," *Journal of Development Economics,* vol. 97, no. 1, pp. 24 - 31, 2012.

[12] K. Kanyinga, "Politics and Struggles for Access to Land: "Grants from Above" and "Squatters" in Coastal Kenya.," *Kanyinga, K. 1998. "Politics and Struggles for Access to Land: "GranEuropean Journal of Development Research ,* vol. 10, pp. 50 - 70, 1998.

[13] C. Greiner, "Guns, Land, and Votes: Cattle Rustling and the Politics of Boundary (Re)making in Northern Kenya," *African Affairs,* vol. 112, no. 447, p. 216–237, 2013.

[14] J. Klopp, "Pilfering the Public: The Problem of Land Grabbing in Contemporary Kenya," *Africa Today,* vol. 47, no. 1, pp. 7 - 26, 2000.

[15] W. Abuya, "Resource Conflict in Kenya's Titanium Mining Industry: Ethno-ecology and the Redefinition of Ownership, Control, and Compensation.," *Development Southern Africa.,* vol. 34, no. 5, pp. 593 - 606, 2017.

[16] P. A. Nyong'o, "The land question, land grabbing and agriculture in Africa.," *International Journal of African Renaissance Studies-Multi-, Inter-and Transdisciplinarity.,* vol. 8, no. 2, pp. 23 - 31, 2013.

[17] A. Manji, "The grabbed state: lawyers, politics and public land in Kenya.," *The Journal of Modern African Studies.,* pp. 467 - 492, 2012.

[18] L. Apiyo, "Land-grabbing" and evictions in Kenya.," *Habitat Debate.,* vol. 4, no. 1, pp. 18 - 19, 1998.

[19] "Environment and Land Courts," Judiciary, [Online]. Available: https://www.judiciary.go.ke/courts/environment-and-land-court/. [Accessed 24 April 2021].

[20] The Judiciary of Kenya, "State of the Judiciary and the Administration of Justice Annual Report 2018 - 2019," The Judiciary of Kenya, Nairobi, Kenya, 2019.

[21] The Judiciary of Kenya, "State of the Judiciary and the Administration of Justice Annual Report 2019 - 2020," The Judiciary of Kenya, Nairobi, Kenya, 2020.

[22] J. Makau, *Factors Influencing Managemet of Case Backlog in Judiciary in Kenya: A Case of Courts within Meru and Tharaka Nithi Counties.,* Nairobi, Kenya: University of Nairobi, 2014.

[23] C. Oyugi, "Kenyan Courts Record 84 % Reduction in Case Backlog," Reporting on Good Governance in Kenya., 21 August 2019. [Online]. Available: https://roggkenya.org/2019/08/21/9720-2/. [Accessed 30 April 2021].

[24] C. J. D. Maraga, Interviewee, *CJ Maraga: I have no problem with President Uhuru.* [Interview]. 23 August 2020.

[25] N. Kihiu, "Land, Environment Courts In Nairobi Booked To March 2021 Amid Acute Staffing Gap.," Capital News, 23 January 2020. [Online]. Available: https://www.capitalfm.co.ke/news/2020/01/land-environment-courts-in-nairobi-booked-to-march-2021-amid-acute-staffing-gap/. [Accessed 27 April 2021].

[26] A. Adeyoju, "Artificial Intelligence and the Future of Law Practice in Africa," 15 December 2018. [Online]. Available: http://dx.doi.org/10.2139/ssrn.3301937. [Accessed 26 April 2021].

[27] LawPavillion, "LawPavilion Launches the First Legal Analytics Software in Africa at the 56th Annual General Conference of the NBA In Port-Harcourt.," LawPavillion, 2016. [Online]. Available: http://lawpavilion.com/blog/lawpavilionlaunches-the-first-legal-analytics-software-in-africa-at-the-56th-annual-general-conference-of-the-nba-in-portharcourt/. [Accessed 26 April 2021].

[28] P. Ifeoma, "LawPavilion Unveils 'TIMI'; Nigeria's First Artificial Intelligence Legal Assistant.," DNL Legal and Style, 21 August 2018. [Online]. Available: https://dnllegalandstyle.com/2018/lawpavilion-unveils-timi-nigerias-first-artificial-intelligence-legal-assistant/. [Accessed 27 April 2021].

[29] Business Daily, "'Land Ministry in Fresh Bid to Digitise Records.," Business Daily, 18 March 2018. [Online]. Available: https://www.businessdailyafrica.com/economy/Land-ministry-in-fresh-bid-to-digitise-records/3946234-4347056-goa3sg/index.html. [Accessed 26 April 2021].

[30] "Lands Ministry Wants Orders Stopping Digitisation Lifted," Daily Nation, 2018. [Online]. Available: https://www.nation.co.kehttps/www.nation.co.ke/dailynation/news/lands-ministry-wants-orders-stopping-digitisation-lifted--38664. [Accessed 26 April 2021].

[31] K. Muthoni, "Lawyers sue ministry over digitisation of land records," The Standard, 17 April 2018. [Online]. Available: https://www.standardmedia.co.ke/nairobi/article/2001277226/lsk-sues-ministry-over-online-land-transactions. [Accessed 26 April 2021].

[32] K. Mwanza, "Kenyan lawyers wrangle with government over land registry digitization," Thomson Reuters Foundation, 7 May 2018. [Online]. Available: https://www.reuters.com/article/us-kenya-landrights-idUSKBN1I81K1. [Accessed 30 April 2021].

[33] K. Muigua, "Legal Practice and New Frontiers: Embracing Technology for Enhanced Efficiency and Access to Justice," June 2020. [Online]. Available: http://kmco.co.ke/wp-content/uploads/2020/06/Legal-Practice-and-New-Frontiers-Embracing-Technology-for-Enhanced-Efficiency-and-Access-to-Justice-Kariuki-Muigua-Ph.D-June-2020.pdf. [Accessed 26 April 2021].

[34] D. Lat, "How Artificial Intelligence is Transforming Legal Research," Above the Law 2020, [Online]. Available: https://abovethelaw.com/law2020/how-artificial-intelligence-is-transforming-legal-research/. [Accessed 30 April 2021].

[35] M. Neary and S. Chen, "Artificial Intelligence: Legal Research and Law Librarians," *AALL Spectrum,* vol. 21, no. 5, pp. 16 - 20, 2017.

[36] A. Wilkinson, "How Natural Language Processing Can Improve Legal Search Results," Kira, 20 July 2020. [Online]. Available: https://kirasystems.com/learn/how-natural-language-processing-improving-can-improve-legal-search-results/. [Accessed 30 April 2021].

[37] N. Black, "Lawyers have a bevy of advanced and AI-enhanced legal research tools at their fingertips," ABA Journal, 22 November 2019. [Online]. Available: https://www.abajournal.com/web/article/lawyers-have-a-bevy-of-advanced-and-ai-enhanced-legal-research-tools-at-their-fingertips. [Accessed 30 April 2021].

[38] National Legal Research Group, Inc., "The real impact of using artificial intelligence in legal research.," National Legal Research Group, Inc., Charlottesville, VA, 2018.

[39] J. Waguma, "Kenya's Judiciary Ups Online Game," Africa Legal, 8 June 2020. [Online]. Available: https://www.africa-legal.com/news-detail/kenya-s-judiciary-ups-online-game. [Accessed 12 June 2021].

[40] The Judiciary of Kenya, "Sustaining Judiciary Transformation (SJT): A Service Delivery Agenda 2017 - 2020," The Judiciary of Kenya, Nairobi, Kenya, 2017.

[41] ICT Authority, "Digitisation," ICT Authority, [Online]. Available: https://icta.go.ke/digitisation/. [Accessed 30 April 202`].

[42] Ministry of Land and Physical Planning, "Digital land transaction platform to curb fraud, says President Kenyatta," Ministry of Land and Physical Planning, Republic of Kenya, 27 April 2021. [Online]. Available: https://lands.go.ke/digital-land-transaction-platform-to-curb-fraud-says-president-kenyatta/. [Accessed 9 June 2021].

[43] J. Kariuki, W. Karugu and M. Okode, "Challenges Facing Digitization Projects in Kenya: Case of Implementation of National Land Information Management System.," *International Journal of Technology and Systems,* vol. 3, no. 1, pp. 23 - 42, 2018.

[44] Ministry of Information, Communications and Technology, "National Information, Communications and Technology (ICT) Policy," Ministry of Information, Communications and Technology, Nairobi, Kenya, 2019.

[45] J. Mugendi, "Challenges in Implementing Digital Technologies in Rural Kenya," Engineering for Change, 15 December 2020. [Online]. Available: https://www.engineeringforchange.org/news/challenges-implementing-digital-technologies-rural-kenya/. [Accessed 10 June 2021].

[46] D. Louisell and M. Pirsig, "The Significance of Verbatim Recording of Proceedings in American Adjudication," *Minnesota Law Review,* vol. 1100, 1953.

[47] Star Reporter, "State to digitise courts, create jobs for youth," The Star, 15 March 2019. [Online]. Available: https://www.the-star.co.ke/news/2019-03-15-state-to-digitise-courts-create-jobs-for-youth/. [Accessed 26 April 2021].

[48] B. Worthy, "Word Error Rate Mechanism, ASR Transcription and Challenges in Accuracy Measurement," GMR Transcription, [Online]. Available: https://www.gmrtranscription.com/blog/word-error-rate-mechanism-asr-transcription-and-challenges-in-accuracy-measurement. [Accessed 30 April 2021].

[49] Verbit Editorial, "Why AI Transcription is a Court Reporter's Secret Weapon," Verbit, 17 February 2019. [Online]. Available: https://verbit.ai/why-ai-transcription-is-a-court-reporters-secret-weapon/. [Accessed 26 April 2021].

[50] K. Wiggers, "Study finds that even the best speech recognition systems exhibit bias," Venture Beat, 1 April 2021. [Online]. Available: https://venturebeat.com/2021/04/01/study-finds-that-even-the-best-speech-recognition-systems-exhibit-bias/. [Accessed 30 April 2021].

[51] F. Ilma, "How and Why AI-Powered Transcription Services are Taking the Legal Industry by Storm," Tarajama, 30 August 2020. [Online]. Available: https://www.tarjama.com/how-and-why-ai-powered-transcription-services-are-taking-the-legal-industry-by-storm/. [Accessed 27 April 2021].

[52] S. Brewster, "New York Times Wirecutter," New York Times, 30 June 2020. [Online]. Available: https://www.nytimes.com/wirecutter/reviews/best-transcription-services/. [Accessed 9 June 2021].

[53] Qual Transcribe, "Legal Transcription Services," Qual Transcribe, 2020. [Online]. Available: https://www.qualtranscribe.com/deposition-transcription. [Accessed 14 June 2021].

[54] L. Baum, The Puzzle of Judicial Behavior, Ann Arbor, Michigan: University of Michigan Press., 2009.

[55] M. Hall and R. Wright, "Systematic Content Analysis of Judicial Opinions.," *California Law Review,* vol. 96, no. 1, pp. 63 - 122, 2008.

[56] F. Schauer, "Prediction and Particularity," *Boston University Law Review,* vol. 78, no. 3, pp. 773 - 790, 1998.

[57] X. Nuo, P. Wang, L. Chen, L. Pan, X. Wang and J. Zhao, "Distinguish Confusing Law Articles for Legal Judgment Prediction.," in *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics.*, 2020.

[58] L. Eliot, "Legal Judgment Prediction (LJP) Amid the Advent of Autonomous AI Legal Reasoning," Cornell University, Ithaca, NY, 2020.

[59] D. Katz, "Quantitative legal prediction-or-how i learned to stop worrying and start preparing for the data-driven future of the legal services industry.," *Emory Law J.,* vol. 62, p. 909, 2012.

[60] P. Wongchaisuwat, D. Klabjan and J. McGinnis, "Predicting litigation likelihood and time to litigation for patents.," in *Proceedings of the 16th edition of the international conference on articial intelligence and law.*, 2017.

[61] D. Katz, M. I. Bommarito and J. Blackman, " A general approach for predicting the behavior of the Supreme Court of the United States.," *PloS ONE,* vol. 12, no. 4, p. e0174698, 2017.

[62] M. Medvedeva, M. Vols and M. Wieling, "Using machine learning to predict decisions of the European Court of Human Rights.," *Artifical Intelligence and Law,* vol. 28, pp. 237- 266, 2019.

[63] A. D'Amato, "Legal Realism Explains Nothing," Northwestern School of Law, Evanston, Illinois, 2010.

[64] E. Ntoutsi, P. Fafalios, U. Gadiraju, V. Iosifidis, W. Nejdl, M. E. Vidal, S. Ruggieri, F. Turini, S. Papadoulos, E. Krasanakis, I. Komptasiaris, K. Kinder - Kurlanda, C. Wagner, F. Karimi, M. Fernandez, H. Alani, B. Berendt and S. Staab, "Bias in data-driven artificial intelligence systems—An introductory survey.," *Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery.,* vol. 10, no. 3, 2020.

[65] S. Nagel, "Predicting and Reducing Court-Case Time through Simple Logic," *North Carolina Law Review,* vol. 60, no. 1, 1981.

[66] The Judiciary of Kenya, " State of the Judiciary and the Administration of Justice Annual Report, 2017 – 2018," The Judiciary of Kenya, Nairobi, Kenya, 2017.

[67] J. Wu, "AI Goes to Court: The Growing Landscape of AI for Access to Justice," Stanford Legal Design Lab, 6 August 2019. [Online]. Available: https://medium.com/legal-design-and-innovation/ai-goes-to-court-the-growing-landscape-of-ai-for-access-to-justice-3f58aca4306f. [Accessed 27 April 2021].

[68] GSMA, "Mobile Internet Connectivity 2019: Sub-Saharan Africa Factsheet," GSMA, 2019.

[69] AfroBarometer, "Access to justice in Kenya: experience and perception," IDS-University of Nairobi in partnership with Katiba Institute, Nairobi, Kenya, 2020.