

Introduction of Artificial Intelligence in the Judicial System

Justice Raja Vijayaraghavan
Judge
High Court of Kerala

How does technology enhance administration of justice

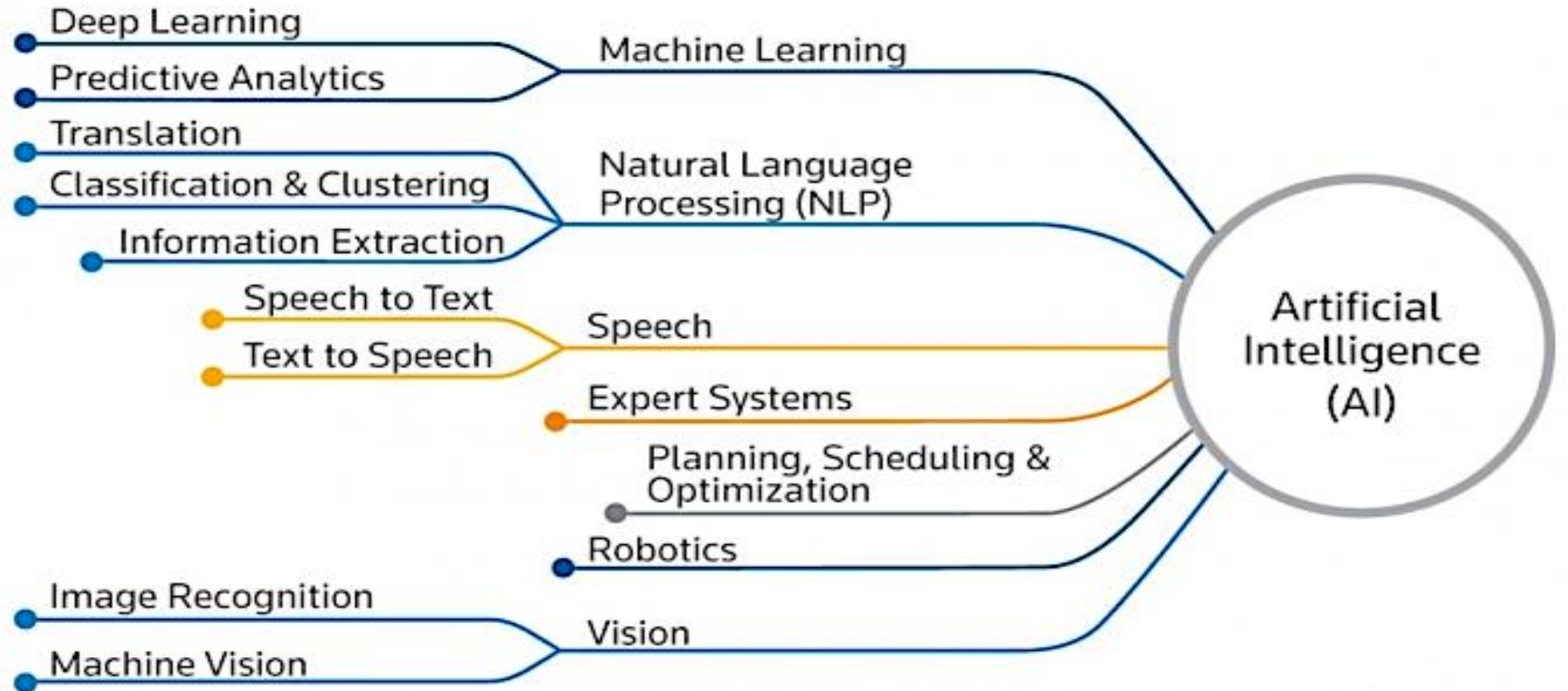
- Processing time is considerably reduced
- Court processes are expedited.
- Interoperable platforms enables seamless communication with minimal effort.
- Transfer of files enables transparency and flexibility
- Less room for human error.
- Reduces the amount of on-site document storage
- Improved access to justice
- Facilitates detailed analysis of information
- Increased Transparency
- Efficiency is greatly increased

- Allows for effective tracking, searching, editing, and archiving using OCR and machine readable data.
- Legal experts such as Richard Susskind and Jordan Furlong have been bemoaning about the legal profession's woes and its stubborn adherence to traditions.
- Marriage of Law and technology would brings a lot of work-flexibility.
- Lack of Restriction of physical space, storage and analysis gives professionals a better work-life balance.

How is technology reshaping the justice delivery system

- Assisting to inform, support and advise people involved in the justice system
- Can replace certain functions and activities that were previously carried out by humans
- Optimise operational functions rather than detracting from or replacing legal work
- Can change the way that judges work and provide for very different forms of justice (disruptive technology), particularly where processes change significantly

AI



Source: Neota Logic

Data Mining in Law

- Law technology has taken many forms and one of them is data mining.
- A voluminous amount of data produced is digitized and firms have started to make use of this untapped resource to gain valuable insights.
- While still in the preliminary stages, this technology in the legal profession can bring tremendous changes.
- For example, it can impact how judges treat certain litigants and can help find important evidence imperative to a case.

Natural Language Processing

Natural language processing strives to build machines that understand and respond to text or voice data—and respond with text or speech of their own—in much the same way humans do

- Spam Detection
- Machine Translation (Google Translate)
- Virtual Agents and Chatbots (Apple Siri, Amazon Alexa)
- Social Media Sentiment Analysis (uncovering hidden insights from SM)
- Text Summarization (Blinkst)

Translation Accuracy

A great way to test any machine translation tool is to translate text to one language and then back to the original.

An oft-cited classic example:

Not long ago, translating “*The spirit is willing but the flesh is weak*” from English to Russian and back yielded “*The vodka is good but the meat is rotten.*”

Today, the result is “*The spirit desires, but the flesh is weak,*”

Machine Learning and Deep Learning

- AI teaches computers how to “learn, reason, perceive, infer, communicate, and make decisions like humans do.”
- Machine learning enables the computer make decisions with minimal programming.
- Deep learning uses more advanced algorithms to perform more abstract tasks such as recognizing images.
- Ultimately, with machine learning or deep learning, computers actually become better at their tasks with experience.
- Fundamental to this learning are the three core processes of how cognitive computing works:
 - 1) gather information,
 - 2) analyze and try to understand the information, and
 - 3) make decisions based on this understanding.

- Deep learning networks are bridges between digital computers and the real world; this allows us to communicate with computers on our own terms. We already talk to smart speakers, which will become much smarter. Keyboards will become obsolete, taking their place in museums alongside typewriters. This makes the benefits of deep learning available to everyone.
- Deep learning machines are sometimes likened to auto-educating infants, who can absorb knowledge and skills, such as spatial orientation and language, even in the absence of any formal instruction or “coding.”

Big Data

- The term big data refers to massive, complex and high velocity datasets. It is the fuel that powers the evolution of AI's decision making.
- Big data can be explored and analyzed for information and insights.
- Big Data Analytics is the use of processes and technologies, including AI and machine learning, to combine and analyze massive datasets with the goal of identifying patterns and developing actionable insights. This helps you make faster, better, data-driven decisions that can increase efficiency.

- Technology makes professional work more efficient by automating routine tasks. A lot of low value, tedious, and repetitive legal work that was previously conducted manually can now be handled through automation.
- Automatization can take care of manual or administrative work, allowing judicial staff to focus on more complex or rewarding tasks.
- Advanced technology can assume other aspects of professional work, through the creation of protocols, standardized documents or online services. This should result in enhanced productivity and faster turnaround and delivery of services.

E-filing of cases

- With the ability to read and file from anywhere, it's like having the court at your fingertips.
- Full case information is available immediately to Lawyers, parties, and the general public online
- The judge and Lawyer can review the case file at any place.
- Immense convenience- Even Court Fee can be paid online
- All orders can be served to the Government Departments in real time
- Seamless and accurate
- Decongest Courts
- Environment friendly
- Ascertain pendency and case pattern
- Transparency, inclusiveness efficiency and enhanced access to justice

Inter-operable Criminal Justice System (ICJS)

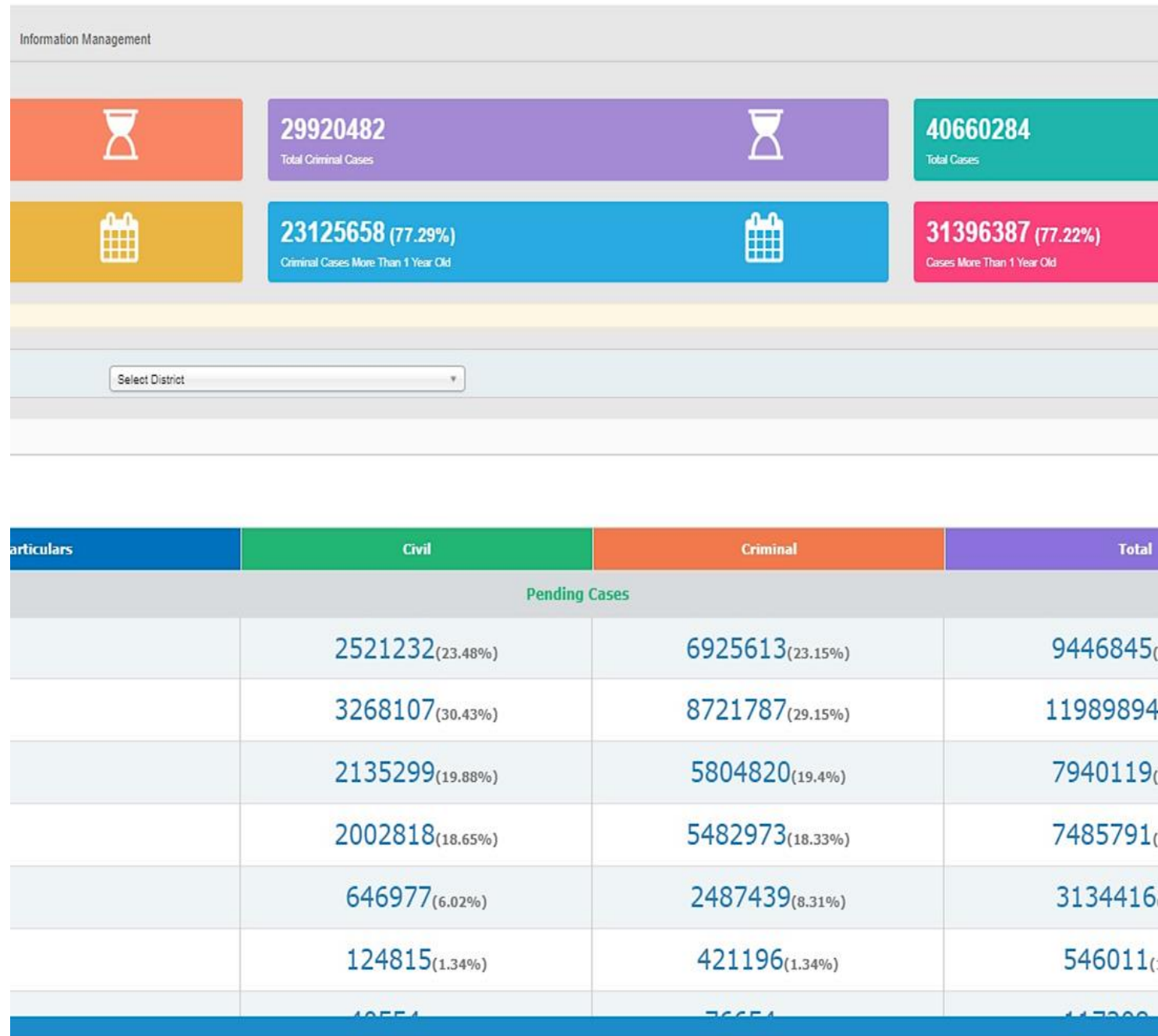
- The Inter-operable Criminal Justice System (ICJS) enables seamless transfer of data and information among different pillars of the criminal justice system, like courts, police, jails and forensic science laboratories, from one platform.
- With the aid of the ICJS platform, FIR, case diary and charge sheet can be accessed by Courts
- Speedy Disposal of Bails- VC in Jails for remand prisoners

N Step

- The service of summons and processes by traditional methods are often a cause for inevitable delay in speedy disposal of cases.
- NSTEP is a centralised process service tracking application comprising of a web application and a complementary mobile app designed to streamline the process.

NJDG

- NJDG is a national repository of data relating to cases pending and disposed of in all district and taluka courts of the country and also the High Courts
- Enables efficient case management and monitoring of cases leading to effective disposal of cases.
- Data uploaded and collated on the portal can be accessed and analysed in all parameters
- NJDG gives the consolidated figures of cases instituted, disposed and the pendency of cases in all courts across the country.





Alerts **Drill Down** Pending Dashboard Disposed Dashboard Pending Drilldown

10739802
Total Civil Cases

29920482
Total Criminal Cases

40660284
Total Cases

8267600 (76.98%)
Civil Cases More Than 1 Year Old

23113099 (77.25%)
Criminal Cases More Than 1 Year Old

31380699 (77.18%)
Cases More Than 1 Year Old

The above shown figures are upto Current Date

Select State Pathanamthitta

23449 Total Civil Pending Cases of -->Pathanamthitta

110075 Total Criminal Pending Cases of -->Pathanamthitta

133524 Total Pending Cases of -->Pathanamthitta

Drill Down

Search:

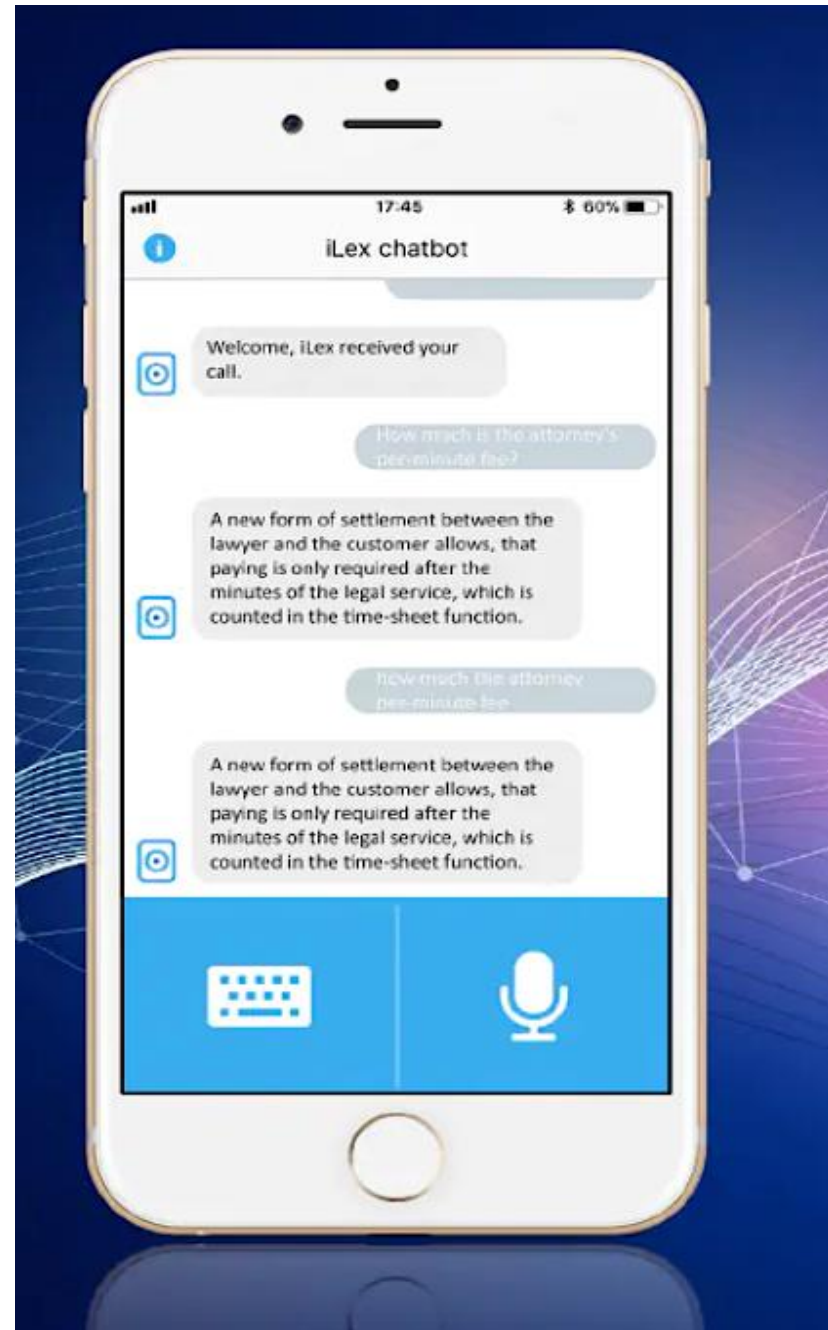


Particulars	Civil	Criminal	Total
Pending Cases			
0 to 1 Years	5922	24747	30669
1 to 3 Years	9175	36048	45223
3 to 5 Years	4757	27832	32589
5 to 10 Years	3141	20438	23579
10 to 20 Years	429	1003	1432
20 to 30 Years	21	7	28

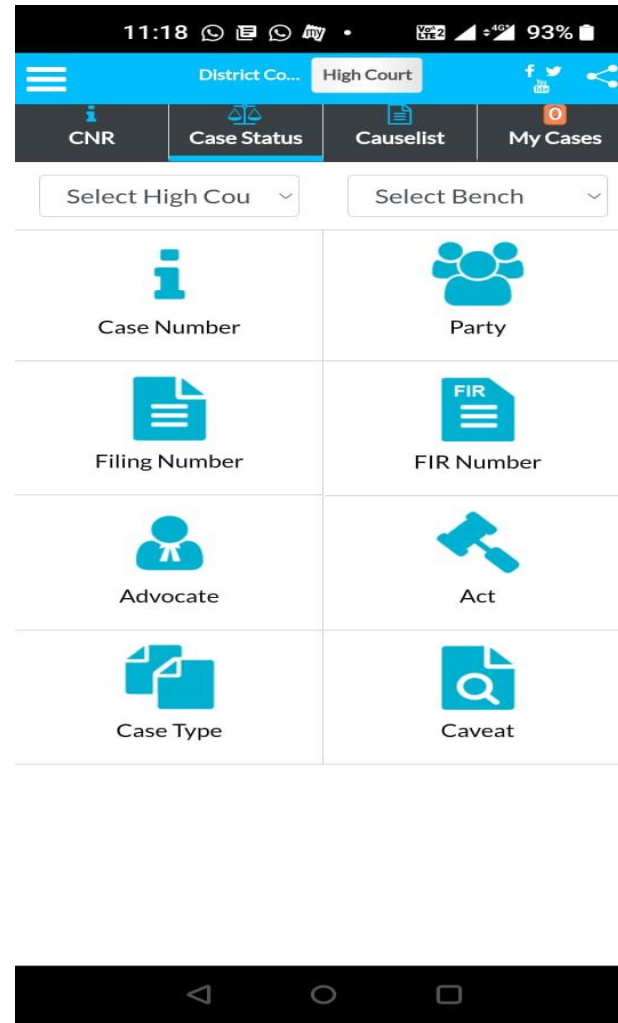
E-challan

- Efficient use of technology in providing an easy, efficient and comprehensive traffic enforcement system
- Nation-wide data sharing and lead to better traffic discipline and road safety.
- Issuance of traffic challans, managing records/ back-end operations, tracking offence history, payments, reports etc. by leveraging latest technologies
- Connecting all the stakeholders through a common system which is ensuring data integrity, reliability and transparency.
- Minimizing time and efforts of citizen in making payments or follow-up actions which they face after getting challan on Road

- Mobile applications are being made to provide legal device to litigants in natural language.
- In the near future 24/7 personalized legal advice would be given to litigants in natural language.



E Services App





Search

My Profile

Dashboard

CR -Judgment

VC List

Work Assessment

Case Search

Chat

Reports

Online Causelist

Books & Journals

Report - Graph

Disposal

Judge wise

Organization

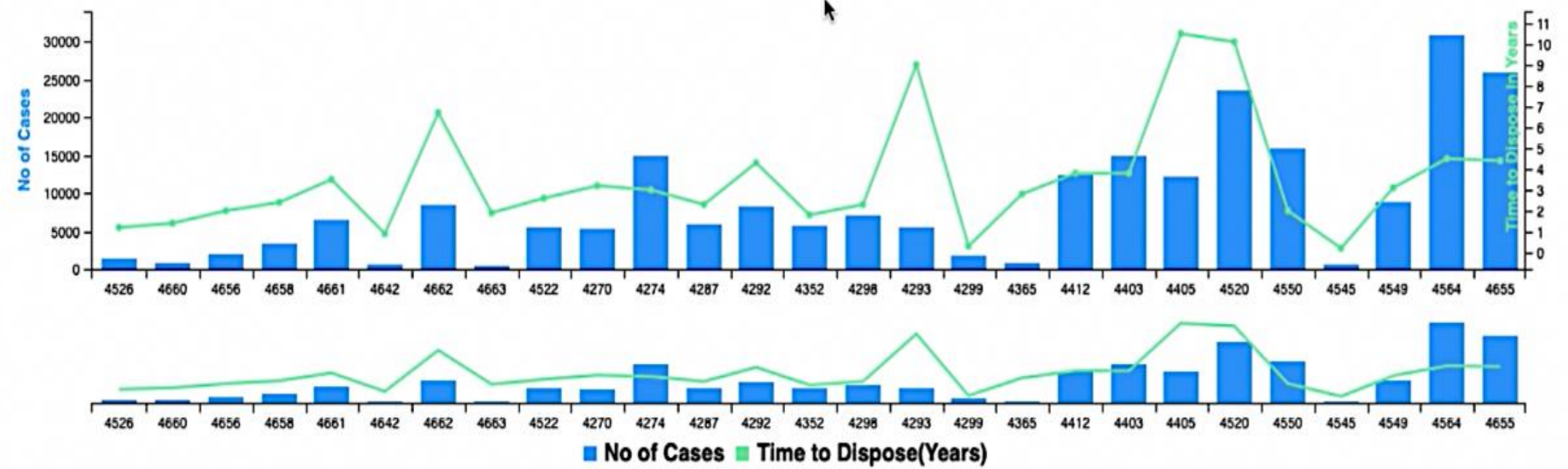
Organization Judgewise

Organization Judgewise

Admission Roster Analysis [» overview & stats](#)

261714 Pending	228438 Registered	228233 With Subject	202453 In Admission	25780 No Roster
--------------------------	-----------------------------	-------------------------------	-------------------------------	---------------------------

Total Pending (Registered) : 228233



Roster

BenchName ▾

Case Type ▾

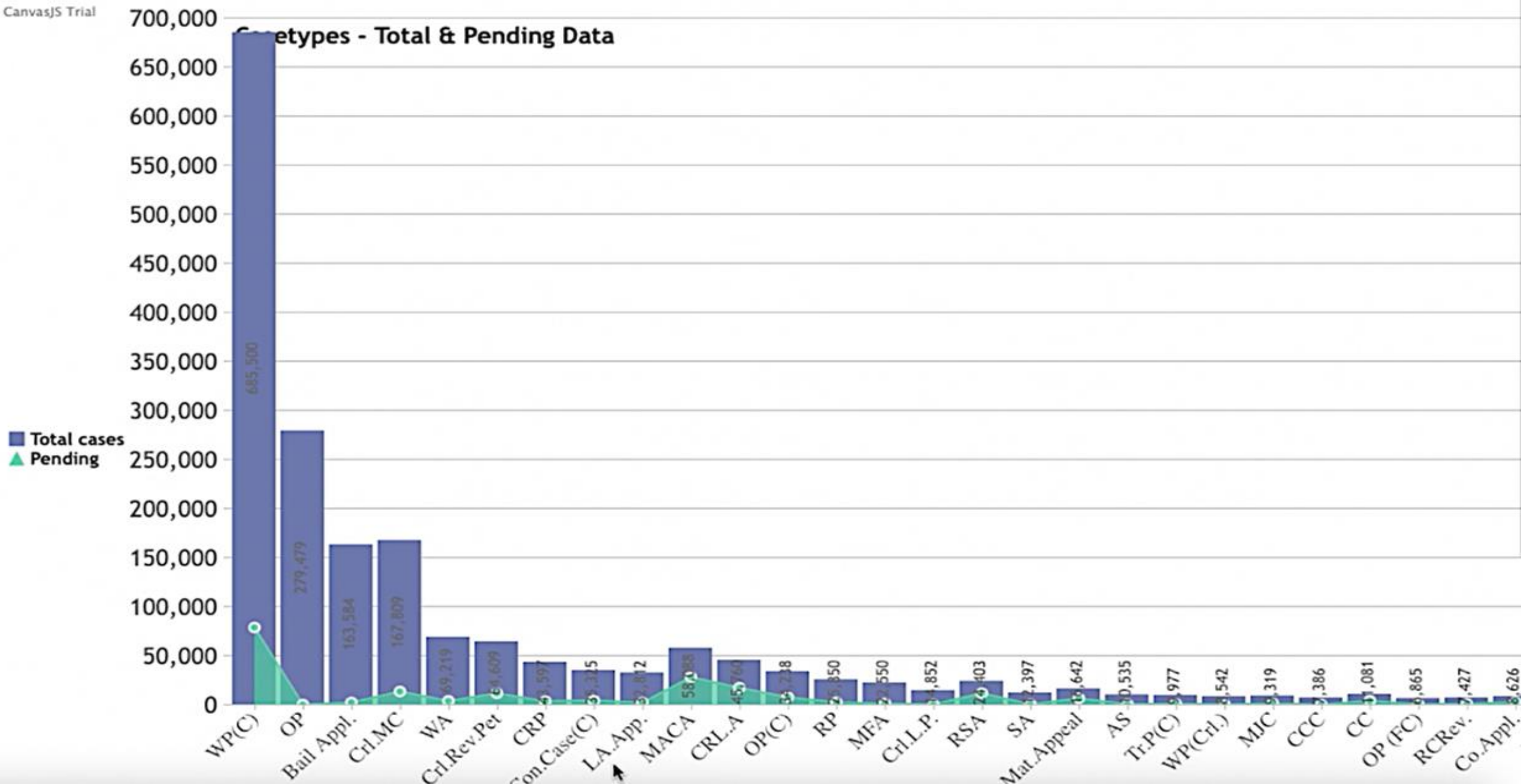
selected Roster

BenchName ▾

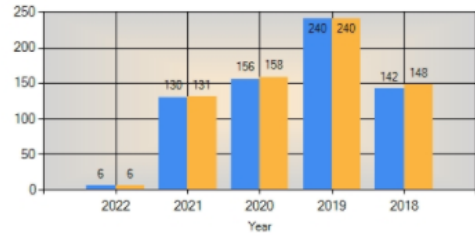
Case Type ▾

Case Type - Total & Pending » overview & stats

CanvasJS Trial

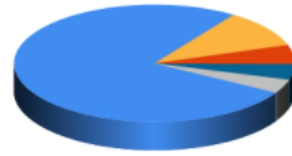


Judge Analytics



Legend
■ Judgement Authorized ■ Part of Bench

← Flip to Grid



Legend
■ Criminal (602)
■ Service (82)
■ Civil (42)
■ Property (34)
■ (30)

← Flip to Grid

Disposition Wise Judgement Pronounce



Legend
■ Appeal/Petition/Application Allowed (225)
■ In Favour of Accused (198)
■ Appeal/Petition/Application Dismissed (123)
■ Disposed off (118)
■ In Favour of State (71)

← Flip to Grid

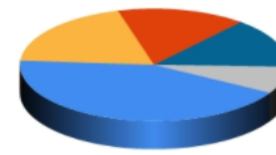
Judge Cited



Legend
■ Arijit Pasayat (41)
■ S.B. Sinha (32)
■ S.S. Chauhan (31)
■ K.T. Thomas (24)
■ Dipak Misra (22)

← Flip to Grid

Judge Cited By



Legend
■ Alexander Thomas (33)
■ P.V. Kulkarni (15)
■ R. Narayana Pisharad (12)
■ M.R. Anitha (11)
■ Ashok Menon (5)

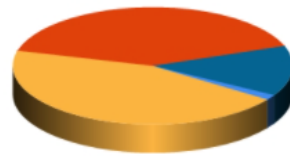
← Flip to Grid

Judgement Pronounced Citing Reference (SC)

Legend
■ Default

← Flip to Grid

Judgement Pronounced Citing Reference (HC)



Legend
■ Affirmed (1)
■ Discussed (32)
■ Mentioned (25)
■ Relied On (10)

← Flip to Grid

AI Basics

- AI can be described as “allowing a machine to behave in such a way that it would be called intelligent if a human being behaved in such a way”. (John McCarthy, considered to have invented the term “Artificial Intelligence”, in 1956.)
- The *Oxford Dictionary* defines Artificial Intelligence as the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- AI is a very broad term comprising a variety of components. These include cognitive and machine learning such as intelligent personal assistants like Siri and Cortana and at a much more simplistic level grammar and spell-checkers and robotic learning where a person shows the machine how to perform a task and it then mirrors the steps taken (for example automatic invoice scanning and processing).

- Since the turn of the 21st century, AI has made remarkable progress with the development of deep neural networks or DNN.
- The precise mechanics of how these work is somewhat similar to human brain.
- DNN consists of thousands of simulated neurons that send and receive signals to and from each other and enables deep learning. In short, they can teach themselves how to do things with little or no human supervision.
- By harnessing the deep learning power of DNNs, AI was able to defeat the ancient Chinese board game of Go.

What can artificial intelligence do for courts?

- Organizing Information
 - Recognising patterns in text documents and files (Eg E Discovery)
- Advise
 - AI can look out for relevant information and provide answer.
- Predictions
 - AI that claims to be able to predict court decisions (applications which predict the outcome of a case at SCOTUS with an accuracy of 70.2%)

- AI can act as catalyst in lessening the burden of the judiciary, especially in those cases that involve menial offences, leaving the complex cases to be decided by human judges.
- In order for AI to be able to process legal information effectively, the legal information must first be made machine processable.
- As technology progresses, more and more tasks will be performed by non-specialists with the assistance of digitized processes and systems.
- AI, in order to work, needs 'big data'. Luc Julia, one of the creators of the digital assistant Siri, evokes this image, 'if a machine is to be able to recognize a cat with 95% certainty, we need about 100,000 pictures of cats.'

- AI and big data can work together to achieve more. First, data is fed into the AI engine, making the AI smarter.
- Next, less human intervention is needed for the AI to run properly.
- And finally, the less AI needs people to run it, the closer society comes to realizing the full potential of this ongoing AI/big data cycle.
- AI is already able to help individuals, litigants and judges with organising information. As the library of legal information is enriched, Artificial intelligence can also help with advice and suggestions.

- The legal profession uses AI technology for research more than any other law related application. Westlaw, LexisNexis, Google Scholar, Fastcase, and Ross Intelligence are among the most recognized names providing legal research tools.
- Companies like Casetext and Ross Intelligence are building research platforms that have more sophisticated semantic understanding of legal opinion's actual meanings and enable them to provide nuanced perspectives on how different cases relate to one another.
- Ross, developed by IBM, has been adopted by many law firms worldwide, particularly in the USA and is primarily used to vet legal contracts, conduct legal research, and briefly summarize case laws etc.

- Deloitte UK has developed a tax-related application which goes beyond rules-based solutions, using ‘human eye matching’ (fuzzy) and Artificial Intelligence, where the tool ‘learns’ from the user’s tax decisions. The tool can rapidly analyze complete sets of data, eliminating both the risk of human error and sampling risk.
- An assessment of the impact of AI requires an understanding of both the practice of law and technology. A recent study by McKinsey & Co estimates that 23% of lawyer time is automatable. Another reliable research shows 13% of lawyer time can be performed by computers.

- A group of American academics has developed a machine learning application that claims to be able to predict the outcome of a case at the Supreme Court of the United States (SCOTUS) with an accuracy of 70.2%, and the voting behavior of individual judges with 71.9% accuracy.
- Correctional Offender Management Profiling for Alternative Sanctions (COMPAS), is used in practice by U.S. criminal judges in some states when assessing the recidivism risk of defendants or convicted persons, in decisions on pre-trial detention, sentencing or early release. The tool has its flaws and is often criticised. By using data from the past, it systematically overestimates recidivism among African American defendants compared to Caucasian Americans

- The technologies developed by ManCorp Innovations Lab (MCIL) could prove crucial for judges, especially at a time when all courts have gone online and the use of paper has largely reduced.
- For Jharkhand High Court, the company had developed two pieces of technology
 1. **Optical Character Recognition (OCR)** - which converts scanned documents into computer readable text, corrects the orientation, etc.
 2. **ChatBot** - controlled by both voice commands and text.
- In order to make this operational, an exhaustive list of about 120-150 questions that would naturally crop up in a judge's mind when looking at criminal cases, especially cases of murder, were framed. Thereafter, a bunch of similar cases were labelled in the system, which made reading of files a smooth and quick endeavour.

The system will be able to tell the specifics of a particular case, like

- number of victims,
- number of accused persons,
- what are the crimes committed by the accused,
- what was the severity of the injury caused to victim,
- how long did the police take to reach the scene of the crime,
- what was the cause of death according to post mortem,
- whether the blood samples collected matched the blood samples on the weapon match the wound, etc.

- ‘JUDi’ - an entire smart office solution powered by AI is a solution where everything from managing documents to assigning tasks to communicating via emails, video calls, instant messaging, reading and highlighting scanned documents, researching on any aspect in the files, adding notes, making illustrations, tables and charts and drafting documents or performing simple tasks like approval and rejections - all of these can be done on a digital platform which also enables the software to track an individual’s digital footprint, eventually leading to automation

SUPACE

- The Supreme Court through this a portal intends to use machine learning to deal with the amount of data received regarding the various cases.
- It is a hybrid system and a perfect combination of human intelligence and machine learning that works wonders in combination with human intelligence.
- The AI-controlled tool is designed to process only information and make it available to judges for decision. It does not participate in the decision-making process.
- Judges dealing with criminal matters would use it on an experimental basis.

SUVAS

- The ‘Supreme Court Vidhik Anuvaad Software’ is a machine-assisted translation tool trained by Artificial Intelligence.
- SUVAS has the capacity and capability of translating English Judicial documents, Orders, or Judgments into nine vernacular language scripts and vice versa.
- This is the first step towards the introduction of Artificial Intelligence in the Judicial Domain.”

The five principles of the Ethical Charter on the Use of Artificial Intelligence in Judicial Systems and their environment

- Principle of respect for fundamental rights
- Principle of non-discrimination
- Principle of quality and security
- Principle of transparency, impartiality and fairness
- Principle “under user control”

The potential benefits of AI Adjudication

- First, AI adjudication could mitigate, or even eliminate, the arbitrariness that results from drawing a “good” or sympathetic judge.
- Second, standardization of the adjudication process itself could make good on codified justice’s promise to eliminate human bias from judicial decision-making.

Applications of AI

- Lawyers are required to manually review, edit a large number of documents
- Companies have developed AI systems that can automatically ingest proposed contracts, analyze them in full using natural language processing (NLP) technology, and determine which portions of the contract are acceptable and which are problematic.
- Software enables users to assemble, automate, approve, digitally sign, and manage all of their contracts – all from one place.
- Litigation prediction, legal research, precedent analysis, Litigation Analytics (How Judge decided earlier in similar cases), and e-Discovery.

- In international arbitration, the use of AI has been predicted for a variety of tasks, including appointment of arbitrators, legal research, drafting and proof-reading of written submissions, translation of documents, case management and document organization, cost estimations, hearing arrangements (such as transcripts or simultaneous foreign language interpretation), and drafting of standard sections of awards.

Blockchain

Blockchain is a shared, distributed ledger that facilitates the process of recording transactions and tracking assets in a network.

- An asset can be
 - tangible — a house, a car, cash, land; or
 - intangible like intellectual property, such as patents, copyrights, or branding. Virtually anything of value can be tracked and transacted on a blockchain network, reducing risk and cutting costs for all involved.

The blockchain can be imagined as a decentralized database in which entries are unchangeably grouped in chronologically sorted, linked blocks.

Features of Blockchain

- **Consensus:** For a transaction to be valid, all participants must agree on its validity.
- **Provenance:** Participants know where the asset came from and how its ownership has changed over time.
- **Immutability:** No participant can tamper with a transaction after it's been recorded to the ledger. If a transaction is in error, a new transaction must be used to reverse the error, and both transactions are then visible.
- **Finality:** A single, shared ledger provides one place to go to determine the ownership of an asset or the completion of a transaction.

Tracking vehicle Ownership- Conventionally

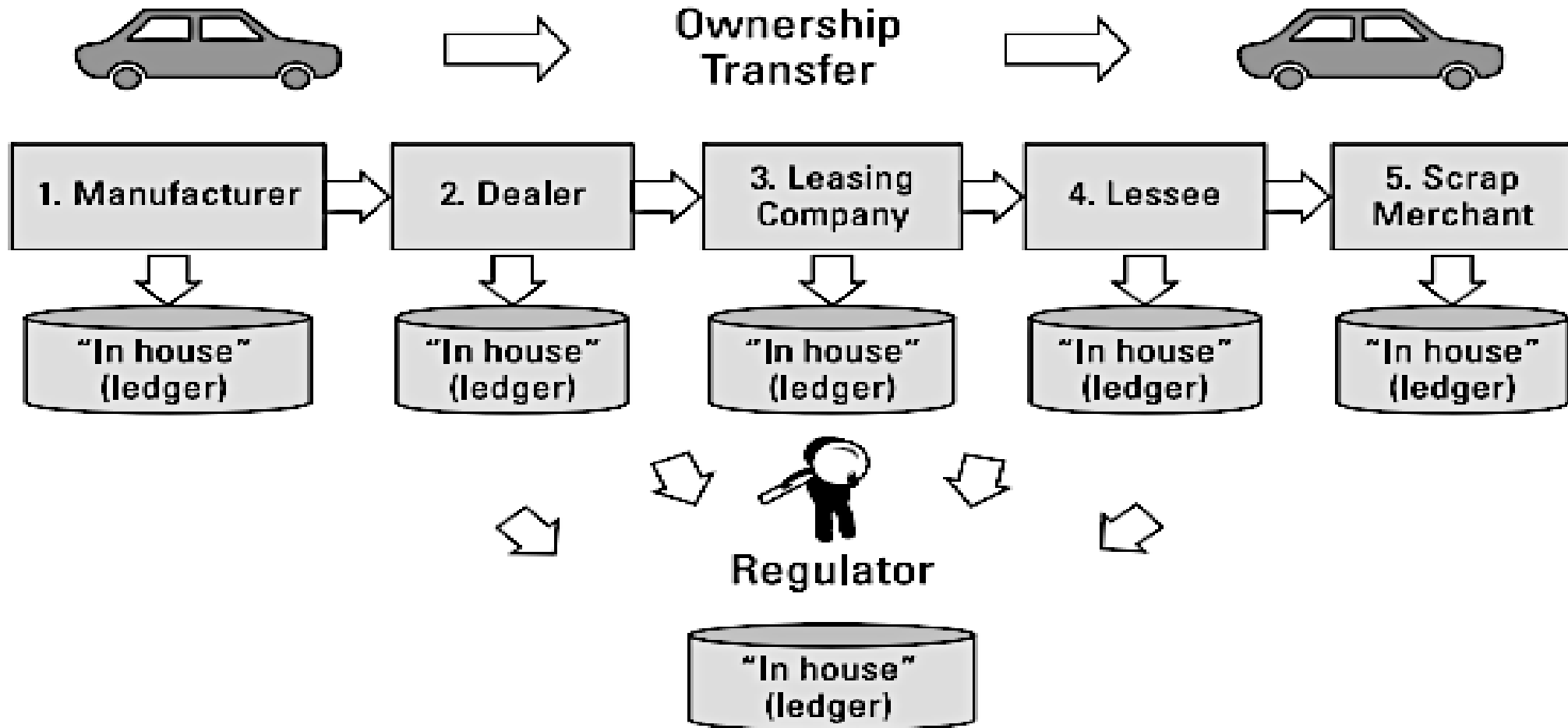


FIGURE 1-2: Tracking vehicle ownership without blockchain.

Tracking vehicle Ownership with Blockchain

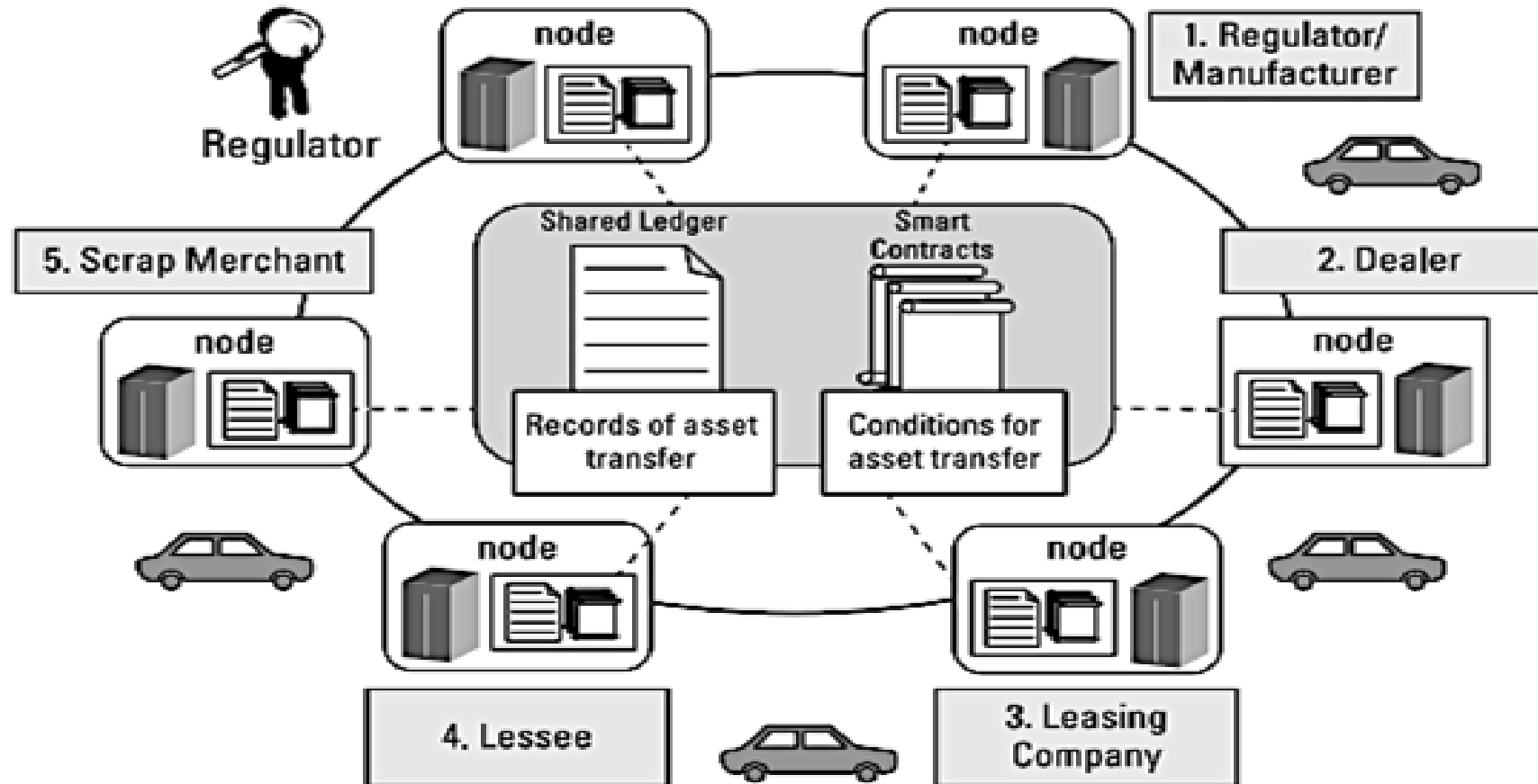


FIGURE 1-3: Tracking vehicle ownership with blockchain.

Smart Contracts

- Smart contracts are digital contracts stored on a blockchain that are automatically executed when predetermined terms and conditions are met.
- Used to automate the execution of an agreement so that all participants can be immediately certain of the outcome, without any intermediary's involvement or time loss.

Case Scenario-1- Insurance

The insurance industry can also use blockchain.

Insurance providers need an efficient way to process claims, verify that an insurable event (such as an accident) actually occurred, and provide customers with fair and timely payouts. With automated insurance claim processing, policy conditions are written into a smart contract stored on the blockchain and connected to publicly available data via the Internet. Whenever an insurable event occurs and is reported by a trusted source, the insurance policy is automatically triggered, the claim is processed according to the terms of the policy specified in the smart contract, and the customer is paid.

The benefits for insurance are as follows:

- » Eliminates the cost of processing insurance claims
- » Reduces the opportunity for insurance fraud
- » Great relief for citizens

Key benefits of Blockchain

- Time Savings Transaction time is slashed to minutes from days
- Cost Savings Less Oversight, intermediaries reduced and costs saved.
- Tighter Security Features protect against tampering, fraud and cybercrime
- Enhanced privacy Viewership of transaction can be restricted
- Improved auditability Shared ledger means a single source of truth
- Increased efficiency Streamlines transfer of ownership with speed and efficiency

Challenges

- Not all AI-based applications allow such simple forms of control as those discussed above. Predictive systems are the quintessential example of a more complex state of affairs.
- The use of AI science and technology in criminal matters poses specific challenges as its application may reflect some current public debates about the alleged predictability of offending behaviour.
- VICTOR, the Brazilian Supreme Court's Artificial Intelligence, according to its developers, does not exercise automated decision-making. It is used to ascertain the general repercussion in matters pending before the Supreme Court in an efficient manner.

- However, Victor can generate incorrect, unjustified, or unfair results regarding the deleterious consequences from machine learning from biased data sets, to the opacity of these algorithms, and to the discrimination potentially generated by them.
- Human decisions can be based on values and considerations that a machine lacks. For example, a judge could decide to order the bail of a female offender who has a risk of recidivism, on the basis of a hierarchy of values, for example by setting greater store by her role as a mother and protector of her children, whereas the algorithm would be able to determine the risk of reoffending more accurately but would not be able to operate such a hierarchy of priorities. Eg COMPAS

With advanced technology, have traditional professional positions such as lawyers, judges, auditors would become obsolete?

Contrary to the fears of many professionals, technology won't lead to a decrease in the number of professional jobs. If that were the case, machines would be harmful to our jobs and well-being. The opposite is true, however.

This causes a fear in the minds of the professionals, but they are actually misunderstanding their role. Their reason for being shouldn't be to maintain their privileged status, but to help solve society's problems by providing even more access to their expert knowledge.

- Judges need to understand how AI works, in order to make adequate use of it. Courts, in turn, need to digitize their information and provide it with legal interpretation, in order to make it more usable for artificial intelligence systems.
- Professionals need to be flexible, adapting to the new technology and need to be prepared to go with the flow to ensure they stay relevant in our modern world. Technology is a tool to make knowledge more accessible; it helps us all.

Conclusion

What good can AI do for justice, and what does it take?

Legal information needs to be more structured and endowed with meaning.

As the library of legal information is enriched, Artificial intelligence can also help with advice and suggestions.

Courts must constantly monitor their system for effectiveness and adjust it if necessary. For courts and court systems, largely set up and run as production organisations, this kind of development work is a huge new task.