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Blockchain and Artificial Intelligence: A Way Ahead

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ABSTRACT

Blockchain Technology and Artificial Intelligence which are predicted as the future game-changer are in its budding state like exactly how the present-day internet was in the early nineties. This extremely dynamic technology is potent enough to erase all the present irregularities which the internet was incapable to solve to date. If implemented in the right way assisted with proper framework, Blockchain, and Artificial Intelligence technology are proficient to eliminate the two major nightmares of present-day internet users, i.e. Trust and Intermediaries. By avoiding the intermediaries, people find an easy way out from the massive commission and service charges which otherwise went to the pockets of the intermediaries.

Countries like Mauritius, China, Japan, Canada, and UAE have understood the potential scope of the blockchain and artificial intelligence technology, and they are progressing over it with several advances to enable and transform their economy as a blockchain-powered economy. Thereby transforming the internet powered economy to a blockchain-powered economy which is more secured to use with much ease than the former and enabling, 'peer to peer' transaction instead of the previous 'peer to intermediary to peer transactions' with zero losses of money. Due to lack of understanding, the general presumption is the scope of blockchain is limited to Bitcoin and Cash transactions, but in fact, it has a wider and broader application that is still underutilized.

Our paper critically analyses and suggests a remedy for several complicated issues prevailing in India related to data collection and also analyses how the artificial intelligence where used utilized to tackle many issues during the pandemic deploying blockchain as a solution by exploring certain unaccustomed applications of the same. The technology innovation in a situation like a pandemic had made people realize its benefits and the future ahead.

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I. INTRODUCTION

The Blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value. A block chain is a distributed ledger which consists of blocks. Each block contains multiple verified transactions. Blocks contain a secured hash, which is generated taking into account the index, timestamp, data inside the block, and the hash of the previous block. This design is what makes a blockchain auditable.[3] Any modification to the blocks, after a verified block has been added to the blockchain, would generate a new hash which will be inconsistent with the hashes that precede. Currently, most people use a trusted middleman such as a bank to make a transaction. But blockchain allows consumers and suppliers to connect directly, removing the need for a third party.

In simple words, the unexplored applications of blockchain include its capacity to erase intermediaries from the present transactions so as to make it a direct peer to peer transaction and thereby saving the unwanted expense incurred before the third party. The revolutionary application of the technology comes in almost every type of transaction involving value, including money, goods and property. It has limitless application from collecting taxes to enabling migrants to send money back to family in countries where banking is difficult. Blockchain could also help to reduce fraud because every transaction would be recorded and distributed on a public ledger for anyone to see.

According to a survey by the World Economic Forum's Global Agenda Council, only a very small proportion of global GDP (around 0.025%) is held in the blockchain currently which is otherwise just or $20 billion. But the research by the world economic forum also suggests that this will increase significantly in the next decade, as banks, insurers and tech firms see the technology as a way to speed up settlements and cut costs. Those are the unexplored applications of the Blockchain technology which we are discussing in our futuristic study. A report from financial technology consultant Aite estimated that banks spent $75 million last year on blockchain. And Silicon Valley venture capitalists are also queuing up to back it. It's not just over with that; the companies competing to master blockchain include UBS, Microsoft, IBM and PwC. The Bank of Canada is also experimenting with the blockchain technology.

Computer science defines AI research as the study of "intelligent agents": any device that perceives its environment and takes actions that maximize its chance of successfully achieving its goals. A more elaborate definition characterizes AI as "a system's ability to correctly

[3] Don & Alex Tapscott, Blockchain Revolution (2016).

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interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation." AI often revolves around the use of algorithms. An algorithm is a set of unambiguous instructions that a mechanical computer can execute. A complex algorithm is often built on top of other, simpler, algorithms.

A typical AI analyzes its environment and takes actions that maximize its chance of success. Many AI algorithms are capable of learning from data; they can enhance themselves by learning new heuristics (strategies, or "rules of thumb", that have worked well in the past), or can themselves write other algorithms. Some of the "learners" described below, including Bayesian networks, decision trees, and nearest-neighbor, could theoretically, (given infinite data, time, and memory) learn to approximate any function, including which combination of mathematical functions would best describe the world.[4]

II. BIG DATA COLLECTION

Implementation of Adhaar by UIDAI had several shortfalls as well as some insecurities; the most prominent one being the breach of privacy, making it in contravention with the most recent judgement of Justice K.S.Puttaswamy(Retd) vs Union Of India[5] which made the Right to Privacy a fundamental right. The platform of adhaar has no safety and it is an accepted fact that it miserably fails at data protection and other privacy stipulations. “Adhaar master software was offered to me at Rs.2500” says Rachna Kaira, the journalist who exposed the dangerous loophole of adhaar. Adhaar can be considered as one of the largest and centralised data base of the personal details of the residents of a particular country, considering the fact that India is the second most populous country in the world and it holds records of 1.19 billion Indian residents. Aadhaar collects name, date of birth, gender, address, mobile/email (optional) of residents of India and stores them against the corresponding biometric data which is in other words an open source information to anybody who have Rs2500 in their hand and sometime worth spending so as to obtain it. This Aadhaar number does not hold any meaningful information itself but a service provider (your bank or telecom service provider) can use this Aadhaar number and authenticate against information provided by you to verify your identity which itself becomes another bigger threat. There is another possibility that an AUA with a mischievous intent may keep an undisclosed record of your demographic and biometric details along with the associated Aadhaar number and commit fraudulent activities. Addressing these concerns, the only advanced practical solution to this situation is the implementation of a blockchain-based

[4] Poole, David; Mackworth, Alan; Goebel, Randy, Computational Intelligence: A Logical Approach, 1989 New York: Oxford University Press. ISBN 978-0-19-510270-3.
[5] K.S.Puttaswamy(Retd) vs Union Of India, (2012) Writ Petition (Civil) No 494

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Aadhaar which would help UIDAI to comply with the data protection and privacy stipulations outlined in the Right to Privacy judgment.

Data protection and privacy stipulations outlined in the Right to Privacy judgment can be adhered by bringing the proposed blockchain based adhaar into a reality. This would allow information to be collected, held and utilized transparently with the consent of the individual who is the real owner of the information.

When adhaar becomes blockchain powered, there will be multiple UIDAI trusted nodes (i.e. state governments can opt to become one of the UIDAI trusted nodes). Trusted nodes will be able to validate a transaction and append blocks in the blockchain. Only the trusted nodes will be able to decrypt the data stored in the blocks. Since there will be multiple nodes involved in the peer-to-peer network and every node will have a full copy of the blockchain, one or a few nodes getting compromised will not pose a threat to the blockchain. To endorse a malicious transaction, (i.e. add a new block, or decrypt a data) a hacker must take control of at least 51% of the total existing nodes. Additionally, nodes other than the UIDAI trusted nodes (i.e. NGOs, activists, anybody who wants to) will be able to download the entire blockchain and verify the hashes. By this way, anyone will be able to check the integrity of the blockchain without actually looking into the data. However, given the immensity of the data and required bandwidth, it might become difficult to implement such a system. We can overcome this problem by storing the actual data in a central server like it is now, and the blocks will hold a pointer to the actual data in the centralized database. The pointer stored will be encrypted and to be able to see the data a node will have to decrypt it. This way, the bandwidth required for the implementation will be much less and the existing infrastructure that stores all the data will be utilized. In order to ensure privacy in the Aadhaar authentication process carried out by Authorised user agreements or AUAs [various organisations], we can also adopt a smart contract. A smart contract is a protocol intended to facilitate, verify, or enforce the negotiation or performance of a contract allowing the performance of credible transactions without third parties. Smart contract transactions are trackable and irreversible.

- 1. Also, in order to ensure that Aadhaar holders share their data only with the UIDAI and not the AUA, here's a suggested smart contract which can be followed: 1. The AUA initiates an authentication request to the blockchain specifying the user it wants to authenticate

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- 2. The user, upon approving the request, adds their personal data to the blockchain (happens through a government portal). The data, as mentioned earlier, is encrypted and only the UIDAI trusted nodes can decrypt it
- 3. UIDAI authenticates the user and marks the request as approved/rejected
- 4. The AUA initiates another query to check the status of the initial request.[6]

III. RTI AND BLOCKCHAIN

Right to Information Act RTI was implemented in India to empower the citizens, promote transparency and accountability in the working of the Government, providing a platform for the public to raise question against corruption and make our democracy work for the people in real sense. It goes without saying that an informed citizen is better equipped to keep necessary vigil on the instruments of governance and make the government more accountable to the governed. The Act is a big step towards making the citizens informed about the activities of the Government. Blockchain being the most secure, accessible and fusible technology known till date, implementation of RTI in correspondence with blockchain technology can improve the efficiency and speed of delivery of each RTI application. And the storage of the existing public records to block would make RTI faster easier and reliable.

IV. BLOCKCHAIN IN INTELLECTUAL PROPERTY RIGHTS

As with real estate, blockchain can provide indisputable records for intellectual property rights on patents, trademarks, and copyrights. Blockchain is irreversible, secure, and time-stamped, offering a reliable way to track first use. A blockchain approach to IP management could also be used with any kind of digital assets, such as images, video files, audio recordings, and other digital content. For example, professional photographers or musicians could use it to manage licensing rights to their creations and to enable royalty payments.

LAND REGISTRY AND PROPERTY DEEDS

A public blockchain ledger can keep reliable records of property titles, deeds and ownership changes as they occur. Property owners, banks, insurance companies, title companies and municipalities would all have access to clean records of ownership and title transfers, reducing future title search time and increasing transparency.

PUBLIC SERVICE RECORDS

[6] *How can blockchain help Aadhaar ensure privacy and transparency?* The Economic Times (Feb. 22, 2018, 04:23 PM) https://tech.economictimes.indiatimes.com/news/technology/how-can-blockchain-help-aadhaar-ensureprivacy-and-transparency/63028987.

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Blockchain can help agencies digitize existing records and manage them within a secure infrastructure, allowing them to make some of these records "smart," as described above in the example of Delaware corporate filings. Government agencies could create algorithms to allow blockchain data to be shared between parties once predefined conditions are met. Blockchain applications in this arena might secure and streamline the management of birth and death certificates, driver's license records, sporting licenses, professional licenses, passports, travel visas—the examples are plentiful.

V. CRIMINAL JUSTICE SYSTEM AND TECHNOLOGY INNOVATION

Blockchain could be used to improve the criminal justice system with a distributed ledger architecture. Criminal charges could be shared and tracked in a ledger that law enforcement, prosecution, courts, probation, defense attorneys, and corrections organizations could access. When charges are added or dropped by law enforcement, prosecution, or courts, that information would be posted to the ledger as well, with the expected result being faster, more efficient administration of justice. Alternative dispute resolution refers to a variety of processes that help parties resolve disputes without a trial. Typical ADR processes include mediation, arbitration, neutral evaluation and collaborative law.

SMART CONTRACTS AND BLOCKCHAIN

In blockchain terms, a smart contract is a coded program that contains the terms of agreement and triggers, allowing the provisions of a contract to be carried out upon notification. For example, the delivery of an asset, a shipment of goods or other promised completion of services can automatically trigger a payment or other exchange defined in the contract. Blockchain provides a decentralized ledger that stores and replicates documents and agreements, giving them a certain security and immutability.

VI. CORPORATE FILINGS AND BLOCKCHAIN

The Delaware Blockchain Initiative (DBI), introduced in May 2016 and in active implementation, will leverage blockchain technology in support of corporate filings and other documents that companies file with the Delaware Division of Corporations. The current process is still heavily paper-based and laborious. The new DBI plan includes a new "smart records" system that automates compliance with retention and destruction of archival documents and "smart UCC filings" that will automate the release or renewal of UCC filings, increase the speed of UCC record searches and reduce errors, fraud, and operational costs.

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DOCUMENT NOTARISATION

Several startup companies, including Stampery, Stampd, and Blocksign offer notary services online using blockchain technology. These services accept an uploaded document, hash it, and provide a time stamp—a digital fingerprint of the document—that validates its date and time of creation, ownership, and independent verifiability. Any third party can verify these immutable facts about the document. Though blockchain notary processes have not been challenged yet, some believe that a cryptographic signature alone is not sufficient to prove identity. Earlier this year, however, Microsoft announced the integration of Stampery authentication into Microsoft Office, signaling confidence in a blockchain solution for notarization.

USE OF TECHNOLOGY FOR DISPUTE RESOLUTION

Alternative dispute resolution refers to a variety of processes that help parties resolve disputes without a trial. Typical ADR processes include mediation, arbitration, neutral evaluation and collaborative law. For parties seeking ADR, a blockchain platform could provide a secure, immutable, and transparent platform for capturing negotiations, terms of a resolution, and the identities and agreements of each of the parties. Every fact and detail of the agreement would be available and traceable in case of further disputes. Availability and expertise of qualified third-party mediators could be recorded in a blockchain ledger as well.

TECHONOLOGY INNOVATION FOR INDUSTRIAL ORGANISATIONS

Many industries have established blockchain ledgers specific to their industry or application, and the law is no exception. Bob Craig of law firm Baker Hostetler is leading a group of law firms and technology companies in the blockchain effort with the recent formation of the Global Legal Blockchain Consortium. The consortium will work to drive adoption and standardization of blockchain in the legal industry, with a goal of improving the security and interoperability of blockchain for legal applications. Another industry organization, the Enterprise Ethereum Alliance (EEA), is a collaborative blockchain consortium aiming to leverage open-source Ethereum technology. The EEA recently announced the launch of a new Legal Industry Working Group, to explore blockchain opportunities in legal and develop standards for smart contracts. A recently formed company, Integra Ledger is hoping to become the ledger used throughout the legal industry for blockchain digital identities.

VII. IMPACT OF TECHNOLOGY DURING PANDEMIC

(AI), has assisted virologists and scientists to understand the genetic characteristics of COVID-

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19 much earlier than any other virus in the past. China was able to recreate the genetic characteristics of the virus with the help of (AI), within a span of a month as compared to that of SARS in 2003. BenevolentAI a drug company based in London has developed an AI-powered algorithm, which has suggested a lot of recommendations in developing the drugs that could be a possible one to fight the virus derived from an AI-based knowledge graph. DeepMind AI team of Google have started deploying neural networks whose working is based on that of a human brain neuron, to comprehend the protein structure of the virus. These help to identify the dimension of the receptors which can disrupt crucial activities in the cell structure of the virus and can be very helpful to develop the drugs.

Google and Apple have come forward and formed a partnership to launch the COVID-19 tracing app to hell people and the government in containing the virus. (AI), has helped in comprehending a better geographical distribution of the data for identification and tracking the patients in many parts of the world. The humungous datasheets released by the government around the globe are being utilized for machine learning models to help in studying the correlation between the different strains and characteristics of the population contributing to the number of cases and fatalities of the specified geographical area.

Tree Algorithm was used in New York City to identify the reasons for the single-biggest factor contributing to the number of cases in the city. Tree Algorithm was used in New York City to identify the reasons for the single-biggest factor contributing to the number of cases in the city. (AI) powered diagnostic system with the help of deep learning machine models has been able to detect the virus in the chest X-rays in 20 seconds with a 96% accuracy rate.

As we witnessed an enormous amount of medical equipment's being exported and imported by different countries, a lot of donations being flown from different parts of the world, the need of logistical support need for this is very huge and due to short of workers as the lockdowns and other restriction a blockchain method can be implemented for a faster and accurate accountability of these activities. A tracking of these are also necessary as there were faulty masks being transferred and many unethical practices were being carried out at such movements. These was used by the Binance Charity Foundation is one such organization used its portal in UNCTAD World Investment Forum for their donations and charity purpose for a transparent and fair accountability of the transactions.

All though such innovation is a must for the future era, human workforce is also needed for the development as these technologies work with the data feed to them by the human beings. So, an mix of both human innovation in technology and the development of the technology both

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are have to go in hand for a smooth functioning of these technologies for a better future.

Biologists Stephen Gould's and Niles Eldredge's said that "equilibrium theory states that evolutionary change happens in short, stressful bursts of time. We can consider these 'brief moments' akin to a revolution that drives a much-needed transformation. The entities that can undertake such a transformation succeed in the new normal" the ongoing pandemic is considered to be such a brief movement as these technologies were introduced a decade long ago the implementation and its productivity hadn't been used to its maximum potential level.[7]

VIII. CONCLUSION

The examples above provide just a taste of what Blockchain and AI might mean for safeguarding privacy and the legal industry. While bitcoin and other crypto currencies take the headlines, the blockchain and AI technology underlying them has even greater potential for protecting important data and the legal industry. It's an immature market and a still widely misunderstood technology, but new opportunities, initiatives, and application ideas surface every day. As the growth of blockchain and AI unfolds, governments, law firms and attorneys focused on nearly any practice area will be impacted in some way and would do well to seek opportunities in blockchain.

Is Used with appropriate knowledge and care and the government and its agencies are not lethargic about the idea of building a blockchain powered data base and legal system we could achieve the goal of right to privacy and also get a modernized and efficient legal system. As said above this is the 'brief movement' and the by 2020-2030 will be seen as a transformation of these technological innovations to revolutionize the world with their maximum potential.

A situation like this has to take be taken as the movement to make progress in these sectors by implementing new strategies and setting regulatory standards for the transformation in these sectors. An efficient planning and administrative works by the government can make the better and maximum potential of these technology for an efficient and technological advance society.

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[7] *AI & Blockchain: Transforming the banking sector*, Moneycontrol, (Apr. 06, 2020, 08: 24 PM)

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