Decentralized Patent Management System

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Abstract- *The centralized distribution of patents poses multiple risks to innovators. It becomes difficult for them to maintain control of such property and track its usage; ownership can be difficult to prove, and the innovating party may not be able to curb or prevent infringements. By using blockchain as a patent registry, we can store a patent as an encrypted document in arweave and represent it by a digital authenticity certificate, which guarantees tamper-proof evidence of ownership with timestamped transactions, thereby fostering transparency and decentralization. Through this project, we can create an application that a patent can be applied and verified using plagiarism detection techniques and approved by the smart contract and the patent's ownership can be even transferred to another person. By using arweave we can provide the user data permanence. In this way Patent management can be modernized and will be secured and tamper-proof.*

Keywords*- Blockchain, Arweave, Patent management, Licensing, Intellectual property rights.*

I. INTRODUCTION

In the current era, an idea is the most powerful and expensive entity. However, since the digital world is expanding, there are new threats to the ideas (or creative people in general) that need to be addressed adamantly. Please be advised that whether we talk about the digital world or otherwise, the only recognized way of protecting an IP (intellectual property) is by getting a patent and trademark.

Intellectual property (IP) – IP refers to creations of the mind, such as inventions; literary and artistic works, designs; and symbols, names and images used in commerce.

Patents - According to the Office of the Controller General of Patents, Designs and Trademarks (OCGPDT), "A Patent is a statutory right for an invention granted for a limited period of time to the patentee by the Government, in exchange of full disclosure of his invention for excluding others, from making, using, selling, importing the patented product or process for producing that product for those purposes without his consent." In India, the Indian Patent Office grants patents to applicants for a duration of 20 years from the date of filing.

On average, it takes 4 to 6 years for a patent to be approved and deployed.

Trademark – WIPO's definition says "A trademark is a distinctive sign which identifies certain goods or services produced or provided by an individual or a company. The system helps consumers to identify and purchase a product or service based on whether its specific characteristics and quality – as indicated by its unique trademark – meet their needs." The average time taken to procure a trademark is between 6 to 18 months. Trademarks are valid indefinitely till their significance ceases to exist.

However, the following problems are associated with them:

1) A significant amount of time is wasted in filing and getting a patent. It does not only thwart the morale but also gives enough time to someone else for copying the idea and implementing it before you could even get the patent approved.

2) Generally, the patent documents are in a rather centralized environment which means that the documents are not "that" protected as one may assume.

3) Moreover, if a patent or invention is not properly recorded, it can raise quite expensive and time-consuming disputes in the future. For instance, the disagreement as to who proposed the invention, who are the partners, authenticity of the patent, jurisdiction to which it belongs, and many other aspects as well.

Therefore, it is important to have robust blockchain-based solutions that allow the sheer protection of Intellectual Property and the rights associated with them.

In this paper, we deal with a decentralized approach for patent management using blockchain. By using arweave we can provide the user data permanence. In this way Patent management can be modernized and will be secured and tamper-proof.

II. EXISTING SYSTEM

The existing system for Patent Management System is a centralized system. The process of Patent registration includes:

1) After assembling the concepts and ideas we should provide the drawings and designs of the invention if it is a working model, which will provide a clear picture for a better understanding of the invention.
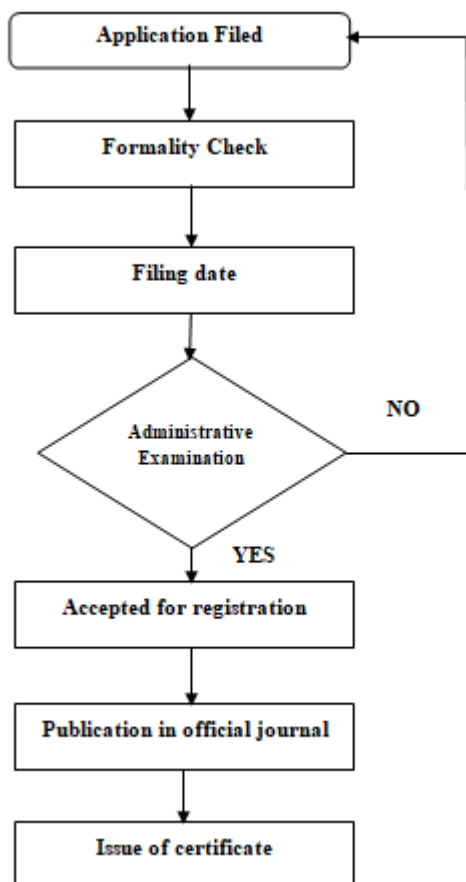

Fig 1. Existing System

2) To check if the invention falls under the patentable category. Not all inventions can be patented. As per the Indian Patent Act, there are several categories under which the inventions cannot be patented.

3) Check whether the invention meets all the mentioned patent conditions. Novelty, non-obviousness, and industrial applicability are among them. During the patent search process, one must also undertake research and prepare a patentability report. Following that, one can determine whether to proceed with the patent registration process.

4) Make a patent application. If your invention is complete, you can apply for a full patent, but if it is a work in progress that can be completed in 12 months, you should apply for a provisional patent.

5) After completing the patent filing process, the application is eventually published 18 months later. If someone wants the application to be published sooner, they can do so by submitting special requests.

6) The patent application is approved once it has been received by the controller. This is one of the final and most crucial procedures in the patent application process. Examiners assess several factors and thoroughly review the application.

7) Objections will be raised and clarified in response to patentability reports and examinations. This allows the inventor to clarify the invention and successfully complete the patent process.

8) The last and most important step is the granting of a patent. If all the requirements of the patent are met, the application will be approved, and the patent will be granted. The grant of the patent will then be published in the Patent Gazette.

III. RELATED WORK:

Blockchain Technology is the newest tracking tool in the digital world. This tool was first used in digital currencies to record the exchange of money between individuals in a distributed ledger without a trusted third party. This explores the usage of Blockchain Technology as a system to track the Intellectual Property Rights of various entities involved in the patenting process. The following are the three key areas in which blockchain technology can help the Intellectual Property Rights industry to achieve better efficiency, transparency, and security.

The electronic distribution of Intellectual Property (IP) poses multiple risks to innovators. It becomes difficult for them to maintain control of such property and track its usage; ownership can be difficult to prove, and the innovating party may not be able to curb or prevent infringements. By using blockchain as an IP registry, we can store IP as an encrypted document and represent it by a digital authenticity certificate, which guarantees tamper-proof evidence of ownership with timestamped transactions, thereby fostering transparency and decentralization.

Blockchain Technology and Intellectual Property Rights focuses on interplay of blockchain technology and intellectual property rights (IPRs). It explores the avenues

where blockchain technology can be useful in processing of IP applications, maintaining IP records, licensing and smart contracts, enforcement, and management of IP rights.

A. SUMMARY:

From the above literature survey, the Intellectual properties are stored in the blockchain itself which will reduce the efficiency of the chain and increases transaction fees. Even using IPFS (InterPlanetary File System) for storing files has a disadvantage of data permanence so we are using Arweave for overcoming this flaw.

IV. RESOURCES USED

The resources used in Decentralized Patent Management System includes the following:

1. Angular:

AngularJS is a JavaScript framework. It can be added to an HTML page with a <script> tag. AngularJS extends HTML attributes with directives and binds data to HTML with expression.

In this project we use angular for frontend framework because angular is the platform that makes it easy to develop robust web applications. Angular helps build interactive and dynamic single page applications through its compelling features that include templating, two-way binding, modularization, RESTful API handling, dependency injection, and AJAX handling.

2. Solidity:

Solidity is an object-oriented programming language created specifically by the Ethereum Network team for constructing and designing smart contracts on Blockchain platforms. It helps to keep things organized and allows you to create style sheets faster.

Using Solidity, developers can write applications that require self-enforcing business logic added in smart contracts. Since solidity is designed around the JavaScript syntax, it is easier for web developers to understand and implement it. Solidity smart contacts can be created and deployed to make the voting process transparent and streamlined.

3. Syntactically Awesome Style Sheet (SASS):

SASS is a preprocessor scripting language that is interpreted or compiled into CSS. SASS is the superset of CSS. SCSS is the more advanced version of CSS. SASS is completely compatible with all versions of CSS and reduces repetition of CSS and therefore saves time. It is free to download and use.

SASS lets you use features that do not exist in CSS, like variables, nested rules, imports, inheritance, built-in functions, and other stuff.

4. Arweave:

Arweave is a new type of technology that uses a form of database to store data that cannot be deleted or changed and uses economics to incentive people to store the data for long periods of time for the first time ever.

This combination makes either public or private data permanent. Arweave would describe itself as a "novel data storage blockchain protocol" enabling a permanent internet and creating truly permanent data storage for the first time. It is a pay-once-forever storage model.

V. PROPOSED SYSTEM

A decentralized approach for patent management is implemented using blockchain. This can reduce the time taken for patent to register. In India, on an average it takes 3 to 6 years for a patent to be approved and deployed.

Using decentralized approach to provide efficiency, transparency, and security throughout the system. A permanent decentralized storage for storing the patents.

B. List of Modules:

*   Connect to wallet
*   View Patent model
*   Apply patent model
*   Transfer model

C. Modules Description:

Connect to wallet:

Connect to wallet is a feature that allows you to link your account to your wallet. Meta mask is used to put it into action. You'll need the meta mask browser extension for this phase. If you don't have meta mask installed, you'll get an error message that says "no meta mask found." If Meta mask is installed and the relevant account is linked, you will be connected and able to execute transactions as well as retrieve

information related to your account from the blockchain.In order to use the blockchain, you need to install a mobile distributed application (dApp) browser. One of the most popular dApp browsers is known as Meta mask.

View Patent model:

After successfully connected to the wallet, you will see the patent model dashboard. This page has the following options:

- Profile (Dashboard)
- Apply patent
- Shared history
- Transfer patent

In the dashboard, you can view the patent, apply for patent, and transfer the patent tabs. You can also see information about the patent's related to your account.In each patent you see a transfer button to transfer the patent to another account.

Apply patent model:

You can apply for a patent for your papers on this page. You must first give your patent a title and a description. After that, you must submit the document, which will be stored in the arweave storage after which you will be provided a url to your file, which will then be stored in the blockchain to create a patent. By using your metamask account you can execute transactions, to complete the transaction, you need pay a transaction fee and the patent will be granted aftre the completion of transaction.

The title, description, transaction id, wallet address, transaction hash, and url to your file from arweave are all stored in the chain after the patent is successfully created.

Shared History Model:

In the shared patent dashboard in which the patent which is shared with you is displayed with patent name and patent address**.**

Transfer patent model:

Transfer patent model allows you to transfer the ownership of the patent to someone else. To transfer the patent, you need the account address of the person you are transferring to. Once the patent is transferred to that person; the person will be the new owner of the patent but still the

royalty will be yours. After transferring you cannot claim that as your patent, and you cannot share or transfer it.
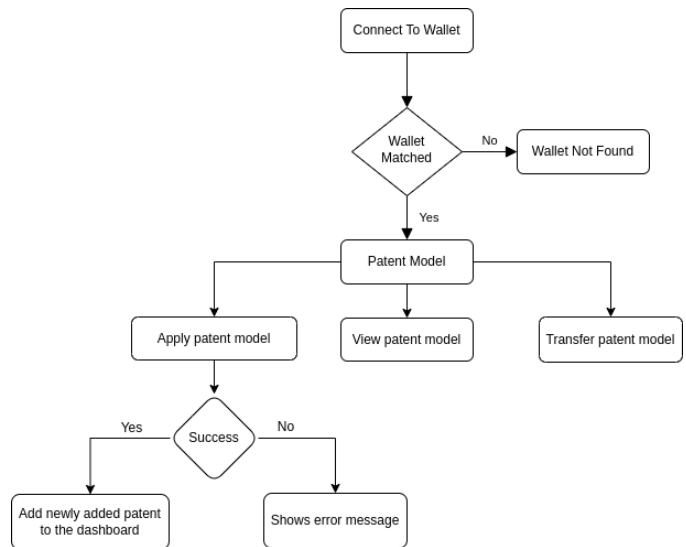

Fig 2. Proposed System

VI. RESULTS AND DISCUSSION

Why should someone else receive credit for a masterpiece you put your time and money into creating?

This is where Decentralized Patent Management System comes in, removing the trouble of having your creative work's patents timestamped so that the entire world can verify their legitimacy. It will not only provide you complete peace of mind, but it will also shield you from legal consequences. If an infringement occurs, you can readily contest it in court and prove your case.
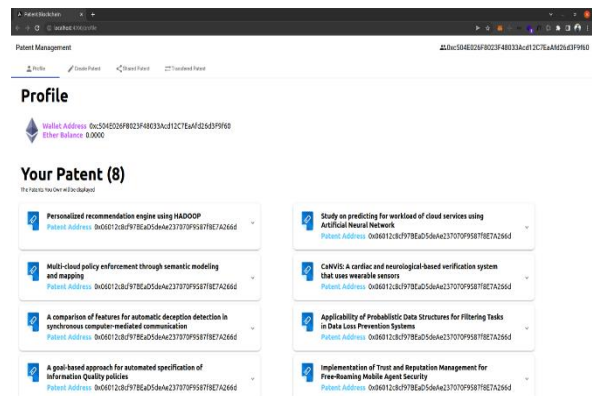

Fig 3. Profile page

After connecting to the wallet with meta mask account, your profile is displayed. Here your profile details are viewed in the top of the page followed by your patents.
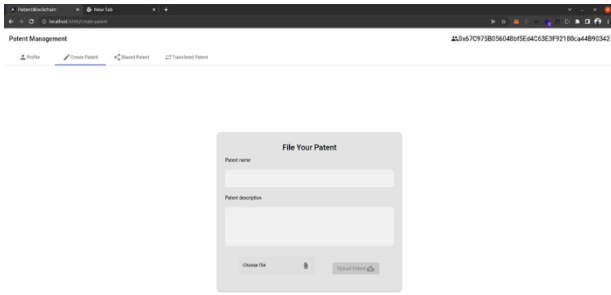
Fig 4. Applying for patent

Fig 4 is the create patent dashboard, you can apply for a patent. To do that, you need to upload the file. After the file is uploaded, you need to create it. If it is successfully created the patent will be added to the dashboard, which can be shared or transferred later. If the patent is not created successfully, then you will get an error message. While applying for a patent, the file is stored in Arweave.
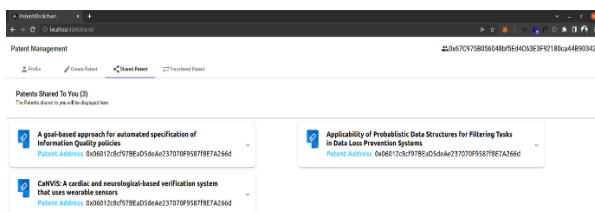

Fig 5. Shared patent page

Fig A3 displays the shared patent dashboard in which the patent which is shared with you is displayed with patent name and patent address.
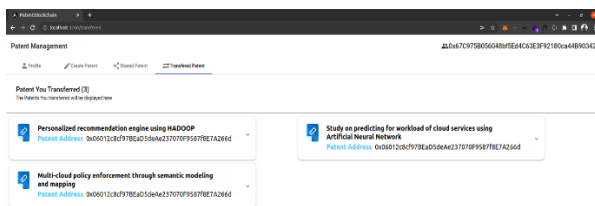

Fig 6. Transferred patent page

Fig 6 displays the transferred patent dashboard in which patent which is transferred by you is displayed with patent name and patent address. Since all this is done using decentralized approach, the processing speed is high.

Since all this is done using decentralized approach, the processing speed is high. If you believe your copyrights have been violated, you can file a claim in any court that accepts digital evidence. Because the courts are aware that these ledgers are immutable and decentralised.

VII. CONCLUSION

Blockchain technology clearly has enormous potential to meet the needs of IP offices all over the world. The sooner IP offices incorporate this technology into their daily operations, the better results they will achieve in terms of faster examination, trustworthy record management, smart licensing, and contractual agreements. The technique will be important not just in improving prosecution but also in enforcing IP rights and resolving IP infringement claims. Blockchain technology with Arweave provides wide range of advantages. Using arweave we have a database which cannot be deleted or changes (i.e.) permanent storage system. This concept will undoubtedly result in best patent management system, which will reduce time, money, etc. Therefore, a government organization can also run its virtual IP offices and continue issuing the blockchain patents, thus providing the complete provenance of an idea ora brand. As a result, the entire lifecycle could be traced and remove the wastage of time in determining the point of origination.

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