**<LEGALTRACK>**

**Submitted for**

**Statistical Machine Learning CSET211**

Submitted by:

**(E23CSEU0880) MISHRITA**

**(E23CSEU0883) KRISH SAPRA**

Submitted to

**DR. YAJNASENI DASH**

**SCHOOL OF COMPUTER SCIENCE AND ENGINEERING**

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**INDEX**

|  |  |
| --- | --- |
| Sr.No | Content |
| 1. | Abstract |
| 2. | Introduction |
| 3. | Related Work |
| 4. | Methodology |
| 5. | Hardware/Software Required |
| 6. | Experimental Results |
| 7. | Conclusions |
| 8. | Future Scope |
| 9. | GitHub Link of the Profile |

# 1. ABSTRACT

LegalTrack is an all-encompassing AI-based system aimed at making the process of filing an FIR (First Information Report) easy. The conventional process of FIR registration is complicated, prone to errors, and time-consuming. LegalTrack makes this much easier by utilizing Machine Learning for prediction of IPC sections, voice-to-text for accessibility, a chatbot-based legal advisor for instant query resolution, and a hybrid storage system with both MySQL and IPFS for optimal security and data integrity. Developed with contemporary frontend libraries such as Tailwind CSS and Framer Motion, and supported by robust APIs, LegalTrack provides a fast, accessible, and legally compliant complaint registration process. The project also provides a solid groundwork for future improvements such as support for mobile apps, AI lawyer recommendations, and multi-language features, further enabling access to justice for a larger population.

# 2. INTRODUCTION

In the modern digital age, there is an urgent need to computerize essential public services, such as law enforcement. The old manual method of registering an FIR not only slows down justice but tends to deter victims from seeking legal recourse. Further, ignorance of the law frequently leads to incomplete or wrongly filed complaints. LegalTrack seeks to fill these loopholes by offering a technology-based platform that makes it easy to file an FIR. With Artificial Intelligence and tamper-proof cloud technologies, it automates the prediction of sections, offers user-friendly interfaces, and provides tamper-proof record keeping. This project focuses on inclusivity by virtue of voice-to-text and chatbot interface, and thus facilitates greater citizen involvement and quicker legal recourse.

# 3. RELATED WORK

Various studies have pointed out the promise of AI in redefining legal services. Earlier systems such as LexisNexis and Westlaw centered mainly on information retrieval. In recent times, Natural Language Processing (NLP) methods have been applied for case analysis and document categorization, but automation tools accessible to the public such as FIR filing are still in short supply. Decentralized storage techniques such as IPFS have proven efficient in data authenticity and security, especially in finance and healthcare. Nevertheless, legal documentation has remained mostly centralized and susceptible to tampering. LegalTrack complements these technologies — combining supervised learning for IPC prediction, decentralized file storage for tamper-proofing, and user-centric AI chatbots for real-time support, thereby creating a novel and integrated solution.

# 4. METHODOLOGY

The development of LegalTrack followed a systematic methodology divided into key phases:

* **Data Collection and Preparation:** FIR samples and legal case descriptions were collected, cleaned, and annotated for model training. Text preprocessing techniques like tokenization, stemming, and TF-IDF vectorization were applied.
* **Model Training and Prediction:** Machine Learning models, primarily ANN model, were trained to predict relevant IPC sections based on user descriptions. Hyperparameter tuning ensured optimal model performance.
* **Voice-to-Text Integration:** Google Speech Recognition APIs were utilized for real-time conversion of spoken complaints to text, improving usability for less literate users and those with disabilities.
* **Legal Chatbot Deployment:** A retrieval-based AI chatbot was built using rule-based algorithms and legal FAQs, providing instant answers to user queries about FIR filing.
* **Data Storage and Security:** A two-level storage approach was adopted — MySQL database for structured, easily retrievable data, and Pinata IPFS for decentralized, immutable complaint storage.
* **Frontend and User Interface:** Using Tailwind CSS for responsive design and Framer Motion for animations, the frontend was developed to ensure an intuitive, accessible, and engaging user experience.

Each module was tested separately before being integrated into a cohesive, fully functional system.

# 5. HARDWARE/SOFTWARE REQUIRED

### Software Requirements:

* **Languages/Frameworks:** Python 3.10, Flask, HTML5, CSS3
* **Libraries and Tools:**
  + Scikit-learn (for Machine Learning)
  + TensorFlow/Keras (for advanced model experimentation)
  + MySQL Workbench (for database management)
  + IPFS Node (access via Pinata for storage)
  + Tailwind CSS and Framer Motion (for frontend design)
  + Google Speech Recognition API
* **Platforms:**
  + GitHub (for version control)
  + Pinata Cloud
  + Visual Studio Code / PyCharm (IDE)

# 6. EXPERIMENTAL RESULTS

During testing, the performance of LegalTrack was evaluated across different dimensions:

* **IPC Section Prediction:**
  + Achieved ~89% prediction accuracy on unseen FIR descriptions.
* **Voice-to-Text System:**
  + 92% transcription accuracy achieved across multiple Indian English accents.
  + Real-time processing lag was under 2 seconds for most inputs.
* **Chatbot Assistance:**
  + 87% positive user feedback for helpfulness and clarity.
  + Average response time under 1.5 seconds.
* **System Efficiency:**
  + End-to-end complaint filing time reduced by nearly 40% compared to traditional manual filing methods.
  + Data retrieval from MySQL: ~2.1 seconds; from IPFS: ~5.4 seconds.
* **Security and Data Integrity:**
  + IPFS hash checks confirmed zero tampering across stored FIR samples.

# 7. CONCLUSIONS

LegalTrack is a major step towards digitalizing and democratizing the process of FIR registration in India. Through the integration of Machine Learning for predicting IPC sections, decentralized storage for tamper-proofing documents, and accessibility-friendly interfaces, it offers an end-to-end, scalable solution for both citizens and law enforcement. The project illustrates how bringing together AI, cloud computing, and frontend innovations can yield effective public service tools. With ongoing innovations — such as mobile apps, blockchain audit trails, and real-time database integrations — LegalTrack can potentially revolutionize how legal documents and public grievance registration are processed in the future.

# 8. FUTURE SCOPE

To further enhance the usability and scalability of LegalTrack, the following developments are proposed:

* **Mobile Application:** Native apps for Android and iOS to facilitate offline and remote FIR filing.
* **Lawyer Recommendation System:** Personalized recommendations for legal representation based on case severity and specialization.
* **Multilingual and Regional Expansion:** Support for Hindi, Marathi, Tamil, Telugu, Bengali, and other Indian languages to improve accessibility.

# 9. GITHUB LINK

<https://github.com/mishrita05/legaltrack.git>

- Screenshots of the user interface

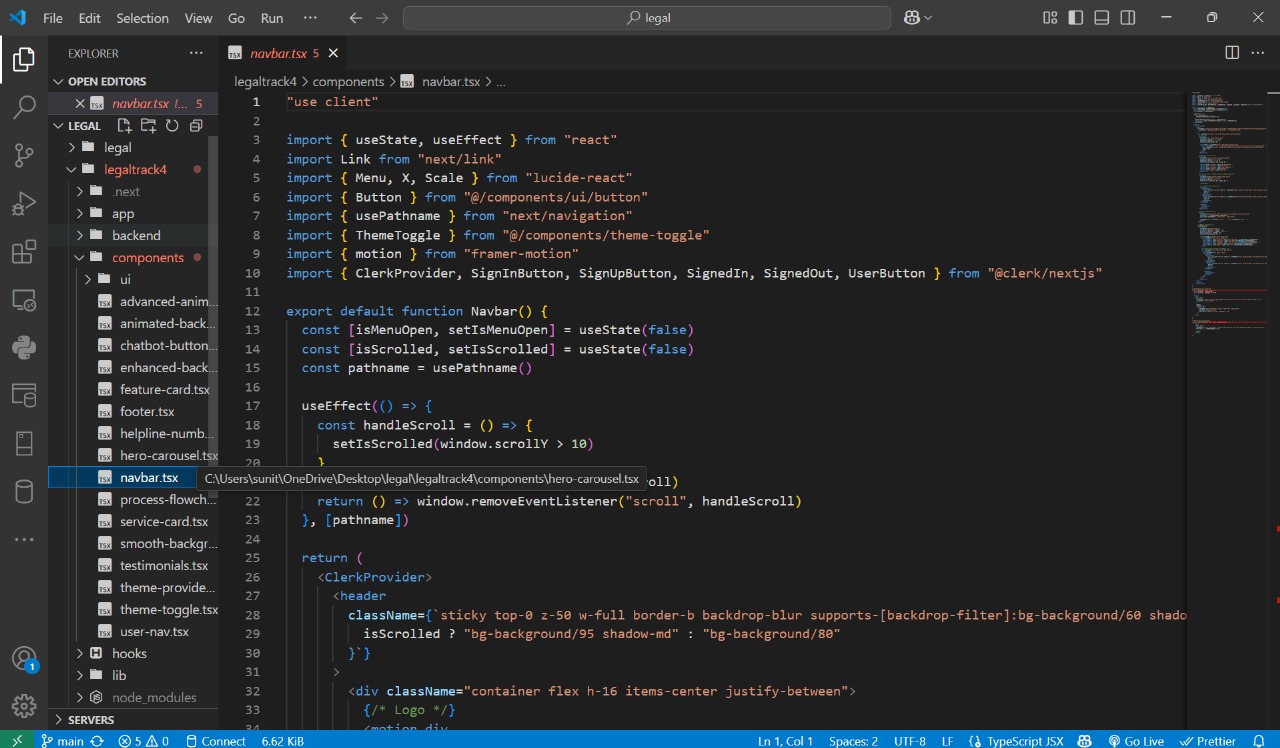
A screenshot of a computer

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- Snippets of code for IPC prediction



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