AI JUDGE: AN INTELLIGENT JUSTICE SYSTEM

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Abstract:

INDIA – The 2nd most populated country in the world has one of the worst Judicial infrastructures. We live in a time when the Ex. Chief Justice of India accepted on National television the problems with our judicial system. Our courts are crowded, overworked and ultimately there are dates without outcomes. The Indian citizens lose faith in our justice system when they must wait years usually until death till their names are cleared of the stain that has been brought upon it. Our system can be used to unclog our justice system because it is a machine that can work day and night, reduce the associated delays, red-tapism and corruption by just taking the lower court judgement as input. This system then affirms or reverses the cases using ML and NLP techniques, thus reducing the unnecessary pressures on our judicial system and helping the people in their fight for justice. A famous proverb says that: "Justice delayed is justice denied"

Keywords: Natural Language Processing, Machine Learning, Convolutional Neural Network, Justice, Affirmed, Reversed, Indian Judicial Sytsem.

I. PROBLEM DEFINITION

As we all know that the Indian Constitution is made up of three pillars, the Legislative, the Executive, and the Judiciary. Among these three, Indian Judiciary is considered one of the most powerful pillars as it is an autonomous body. This is because even the highest official of the country can be tried by the Indian Judicial system. But the problem is despite its overwhelming power, there are certain integral problems that the Indian Judiciary faces.

The **judge-population ratio in India is 12 judges per million**, while the ratio is 75.2 in Canada and 107 in the United States. Not enough judges are a major reason for such a backlog. India has only 22,677 judges, and to clear all the pending cases itself would take us almost 10 years. The former Chief Justice of India (CJI) Mr. TS Thakur has stated that we will require more than 70,000 judges to clear all the pending cases.

The Indian Judiciary system follows a hierarchy of courts method i.e. one first must approach the subordinate courts and then can approach the high court and the supreme court. Even after implementing such methods our high court has almost 45 lakh cases pending, and our supreme court has about 65 thousand cases pending.

We deeply feel the plight of the people who have not got justice because of the tardiness of our judicial system. There have been people who have been wrongly caught and are waiting for justice but are stuck until our courts let them free. Till then they themselves, their families, their relatives all are accused by the society of doing wrongful acts. This affects the mental health of people and this kind of pressure should be dealt with immediately.

Budget allocation for the judiciary is just 0.2 percent of the GDP. Corruption in India only adds to this and makes it worse. As per the constitutional provision, there is no provision yet for registering a FIR against a judge who has taken bribe without taking the permission of the Chief Justice of India. Obviously, visiting the CJI, seeking his permission, and then registering a FIR is not what a poor man will prefer to do.

Our solution will not only reduce the delay caused by manual intervention but also try to reduce corruption, if any, in the Indian justice system. This system will help the Indian judiciary as well as the people of India, since they are the major victims who have been suffering because of the sluggishness of our justice system. Our system will increase the speed at which our cases are currently being solved. This in turn will reduce the 3 crore cases pending and reduce the immense pressure on our judges.

II. MODULAR DESCRIPTION AND ARCHITETCURE

A. Dataset Collection and Preparation:

Indian court case decisions are taken from different websites like: bombayhighcourt, casemine, legalcrystal, etc. The dataset will then be divided into different

articles, with each article pointing to a different aspect of human rights.

First, we classify the case decisions as either civil or criminal. In our project we are only working on civil cases since the number of cases are quite a lot.

Secondly, we created a vocab file containing the case articles/ different laws and sections regarding the civil cases according to the Indian Judiciary.

Thirdly, class will be imbalance since the number of affirmed cases is much greater than the number of reversed cases. To combat this, we will make a separate dataset where we will decrease the count of affirmed cases to equal that of the reversed cases.

B. Pre-Processing:

Cleaning and stop words removal:

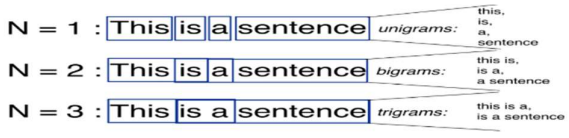
Before starting with training, we must pre-process the messages. First, we shall make all the character lowercase. This is because 'free' and 'FREE' mean the same. Then we tokenize each message in the dataset. Tokenization is the task of splitting up a message into pieces and throwing away the punctuation characters. We then move on to remove the stop words. Stop words are those words which occur extremely frequently in text. For example, words like 'the', 'a', 'an', 'is', etc. These words do not give us any information about the content of the text. Thus, it should not matter if we remove these words for the text.

Lemmatization:

Lemmatization refers to doing things properly with the use of a vocabulary and morphological analysis of words, normally aiming to remove inflectional endings only and to return the base or dictionary form of a word, which is known as the lemma.

C. N Gram Model:

We use n-grams to improve the accuracy. As of now, we only dealt with 1 word. But when two words are together the meaning totally changes. Sometimes accuracy is improved when we split the text into tokens of two (or more) words than only word.



D. Bag of Words / TF-IDF Model:

In Bag of words model we find the 'term frequency', i.e. number of occurrences of each word in the dataset. Thus, for word w,

$$P(w|case) = \frac{\text{Total no. of occurrences of w in case}}{\text{Total no. of words in case}}$$

E. Classification:

The matrix generated from the BOW model, is fed into the classification models.

We have tested on 3 classification models i.e. SVM, KNN and RF which provides an accuracy range during the initial stages of around 70% which is greater than the other models.

F. Neural Networks (CNN):

Word Embeddings:

Classical methods like bag-of-words, where relationships between words or tokens are ignored, or forced in n-gram approaches don't have an expressive representation of text. To overcome this, we use Word Embeddings where each word in the vocabulary is represented by a real valued vector in a high-dimensional space. The vectors are learned in such a way that words that have similar meanings will have similar representation in the vector space.

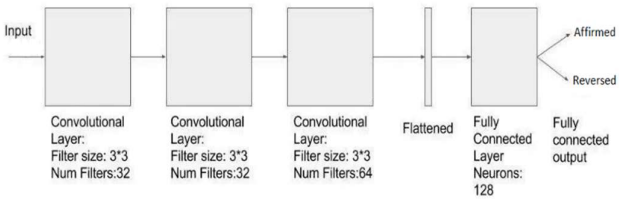
Word2Vec:

It is an approach to learning a word embedding from a text corpus in a standalone way. The benefit of the method is that it can produce high-quality word embeddings very efficiently, in terms of space and time complexity.

CNN:

We use a Convolutional Neural Network (CNN) as they have proven to be successful at document classification problems. A conservative CNN configuration is used with 32 filters (parallel fields for processing words) and a kernel size of 8 with a rectified linear ('relu') activation function. This is followed by a pooling layer that reduces the output of the convolutional layer by half.

Next, the 2D output from the CNN part of the model is flattened to one long 2D vector to represent the 'features' extracted by the CNN. The back-end of the model is a standard Multilayer Perceptron layers to interpret the CNN features. The output layer uses a sigmoid activation function to output a value between 0 and 1 for the negative and positive sentiment in the review.



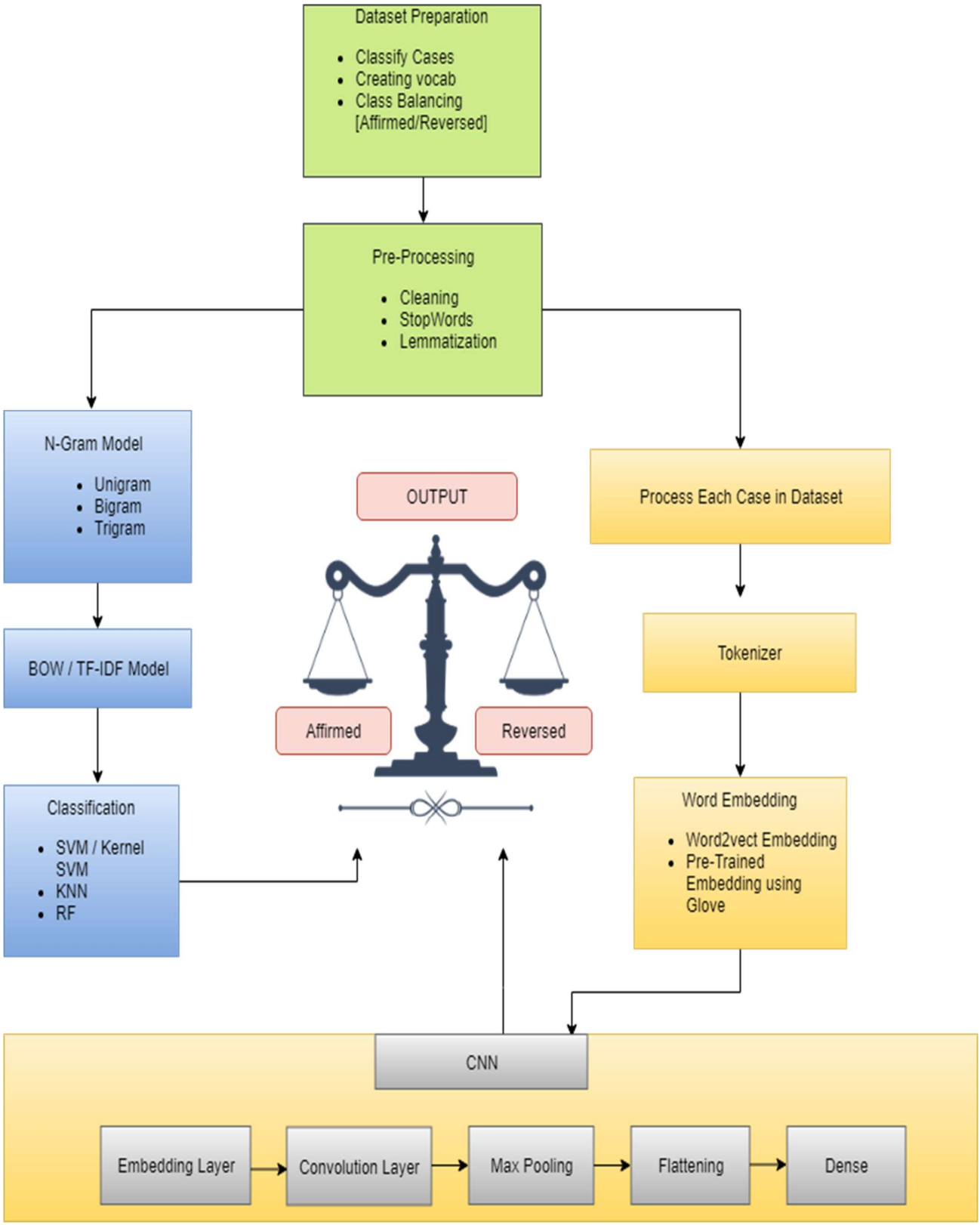


Fig: 2.1 System Architecture

III. OUTCOME

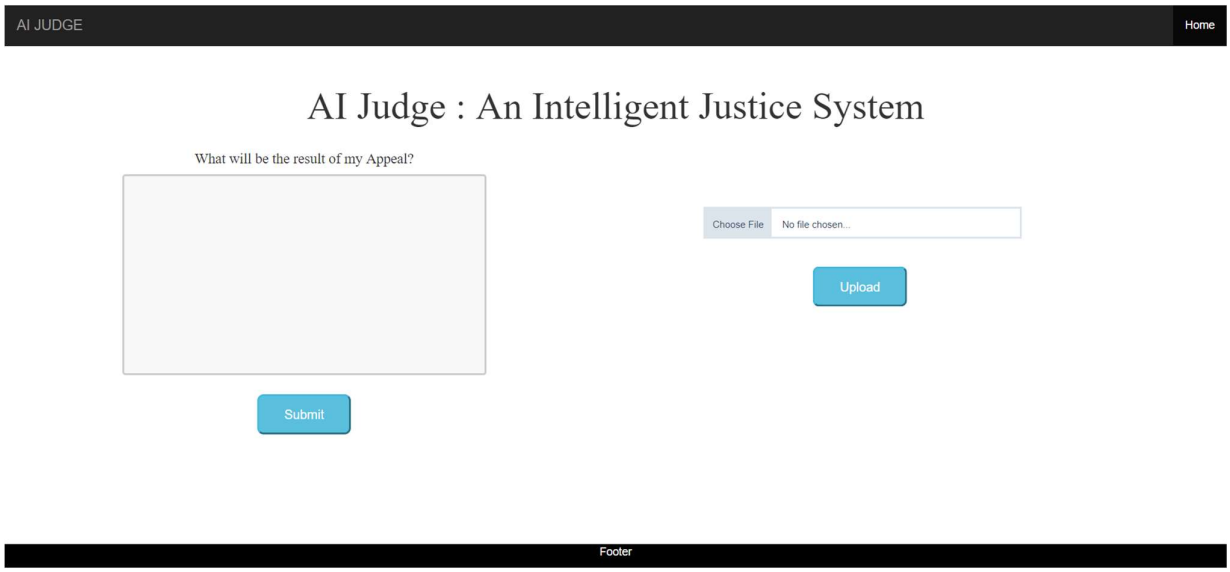


Fig:3.1: Screenshot

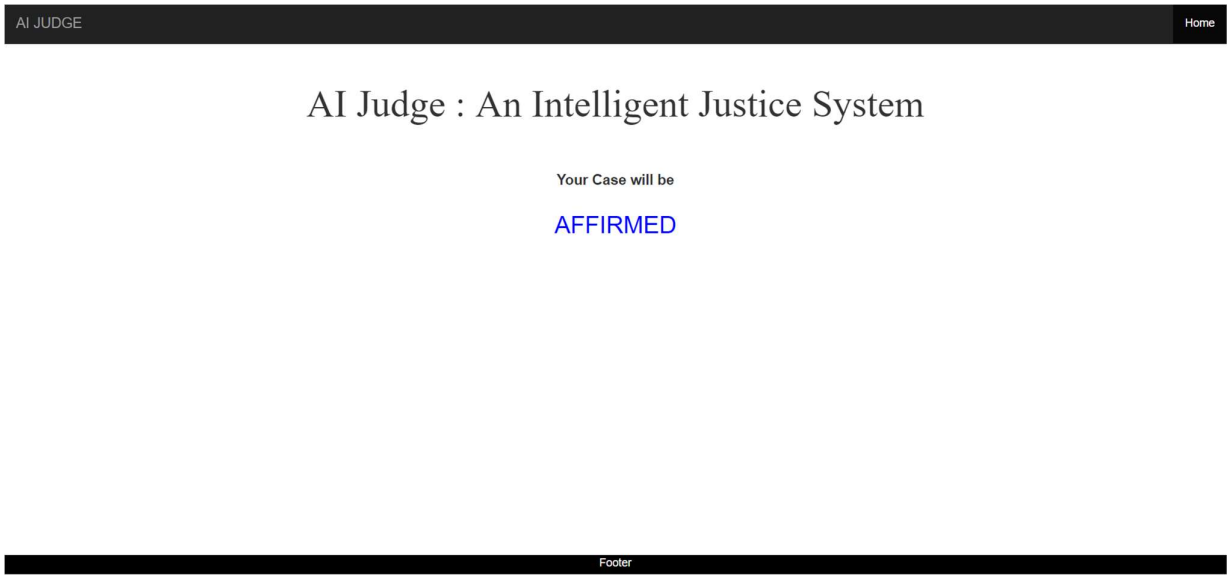


Fig:3.2: Screenshot 2

IV. CONCLUSION

Our project will affirm or reverse the cases and save on valuable time of the judiciary that can then work on updating the outdated laws. We aim to start building on this with greater accuracy and hope that it eases the pain of the judges, the delayed and the wronged. The faith of the common person in judiciary may be restored before it's completely lost. Always remember - **Truth prevails**.

V. REFERENCES

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