



Nasional Techno

Mahasiswa UI Rancang AI untuk Dukung Sinergi antar Undang-Undang

Agustus 29, 2023 rudy ade Comment(0)

24 Mahasiswa UI Ciptakan AI untuk Uji Keselarasan

gan Secara Otomatis, Satria Data 2023

Mahasiswa UI
Bukti Artificial Intelligence Tak Terbantahkan, Mahasiswa Fasilkom UI Rajai Kompetisi Satria Data

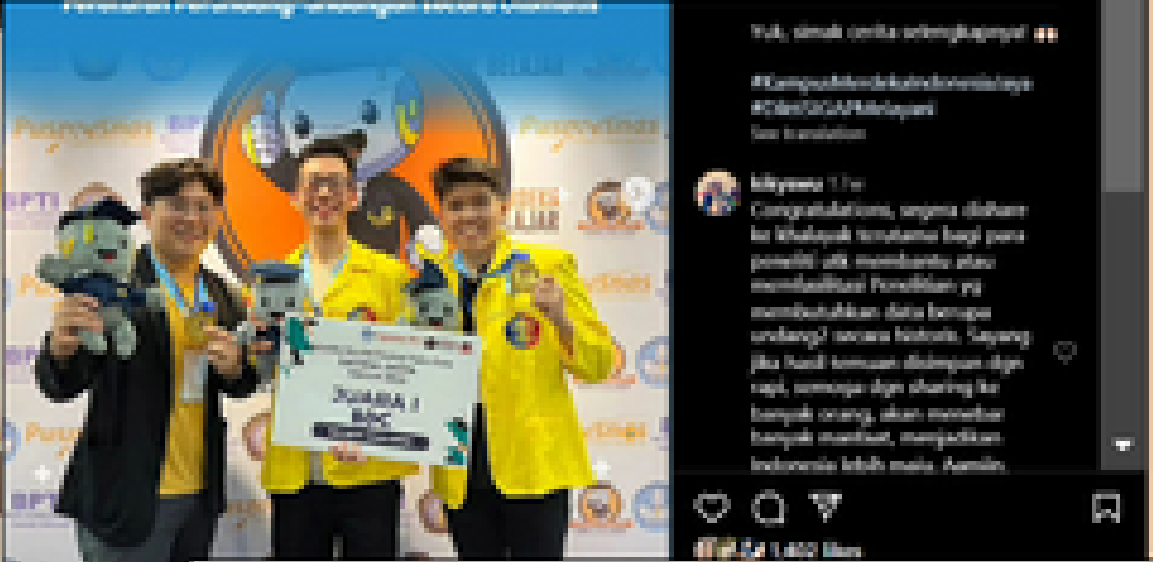
Senin, 28 Agustus 2023 16:56 WIB

Indozonetech



#KAMUHARUSTAU

Mahasiswa UI Buat AI yang Bisa Uji Keselarasan Antar Undang-undang



Calon Legaltech Penguji Keharmonisan Regulasi Berhasil Diciptakan Mahasiswa UI

Memfaatkan metode Legal Textual Entailment yang mampu mendeteksi ketidakselarasan secara semantik tanpa memerlukan konteks yang mendalam. Karya ini menjadi juara pertama dalam kompetisi yang digelar Pusat Prestasi Nasional, Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi.

Dan Normand Edwin Erizar

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LegiMate ID

YOUR AI-POWERED PARTNER FOR LEGISLATIVE
DOCUMENT ALIGNMENT TEST



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LegiMate ID

**Your AI-Powered
Partner for Legislative
Document Alignment
Test**

SITUATION



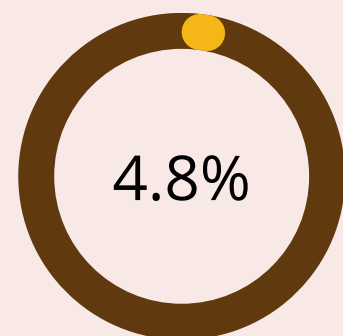
Legal Regulations

Legal regulation plays a role in providing a clear legal foundation for its citizens

57.6 K
regulations

Total Regulations

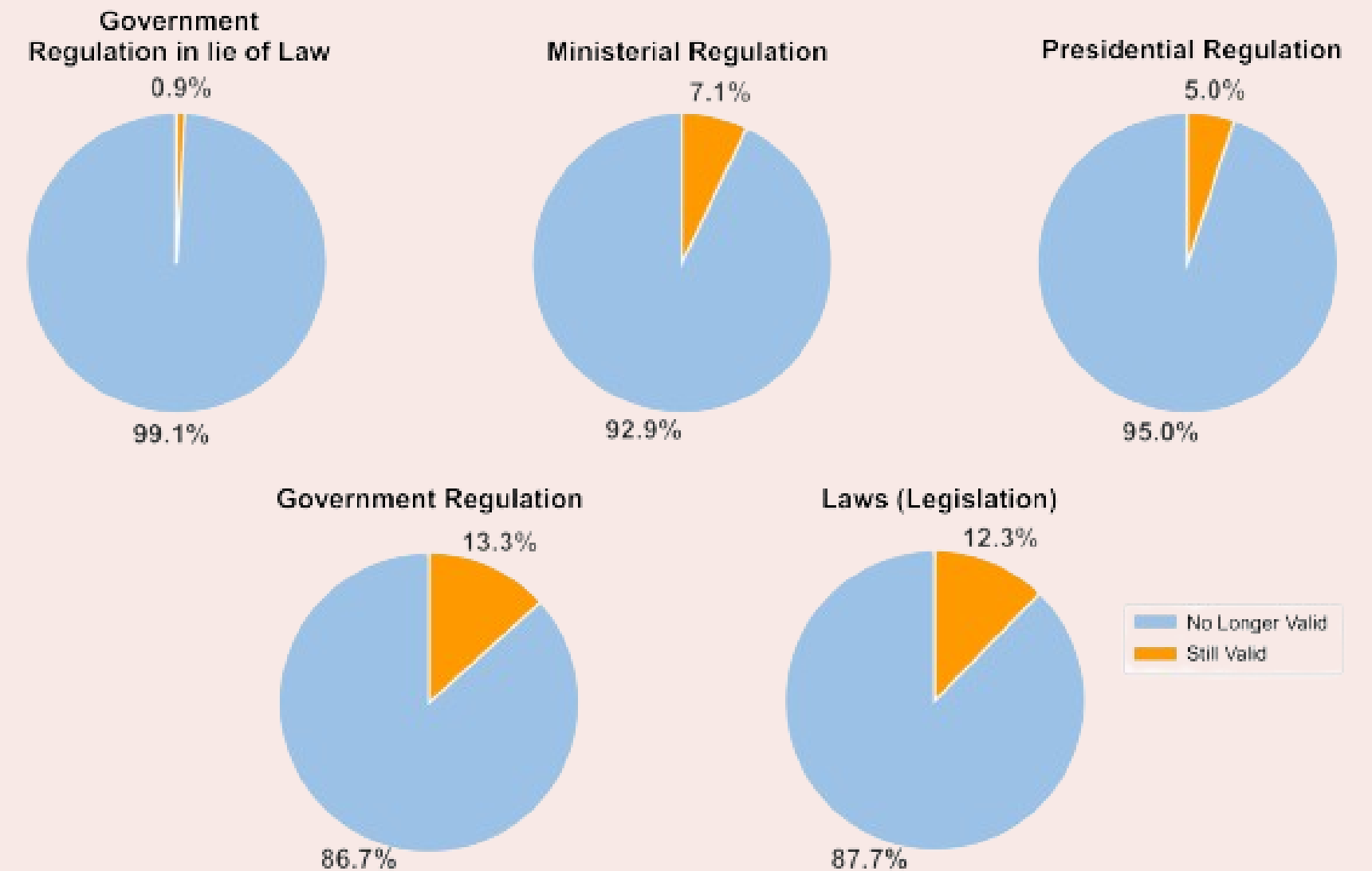
The **total** number of legislative regulations in **2023** reaches **57.6 thousand** regulations.



Invalidated Regulations

The total number of legislative regulations that have **become invalid** until **2023** is **4.77%**.

PERCENTAGE OF ENFORCEMENT STATUS OF LEGISLATIVE REGULATIONS



One government figure stated that :
“ **in every court session, an average of 100 to 200 local regulations are often**

INVALIDATED ”

LAW SOURCES



Statute Law



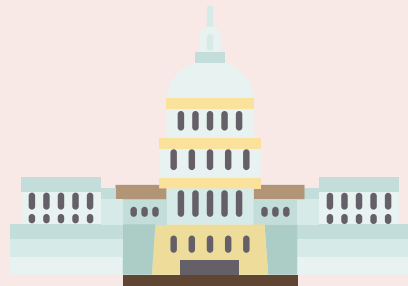
Common Law



Statute law is **based on statutes**



New decisions are **made by judges in the court**



Federal statutes enacted by **Congress set federal law**



New decisions are based on **Judges' opinions made over hundred of years**



New laws are issued after elected **lawmakers introduce bills** that go all the way **through the process.**



Common law is judge-made law. However, judges **aren't permitted to make up** the laws.



If **voted and passed**, bills become **law**, otherwise, it's **invalidated.**



They are **bound** by the decisions in **prior case.**

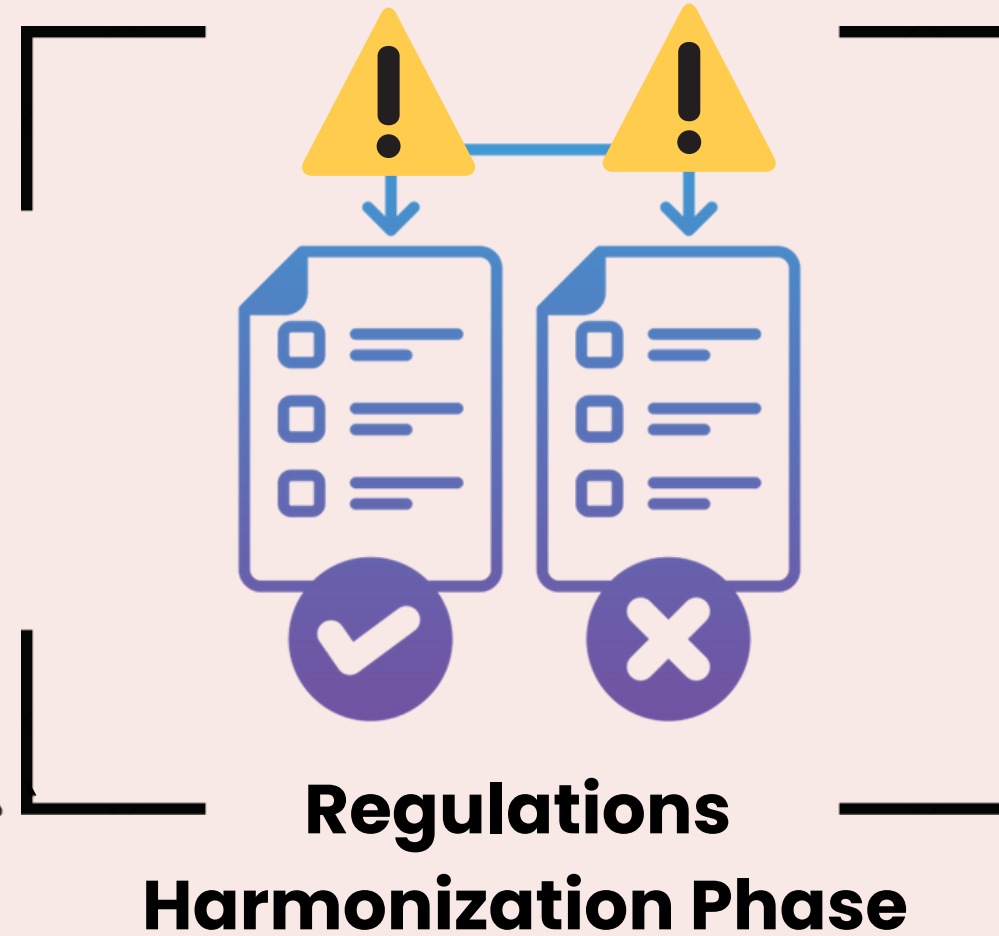
LEGAL DOCUMENT CREATION PROCESS



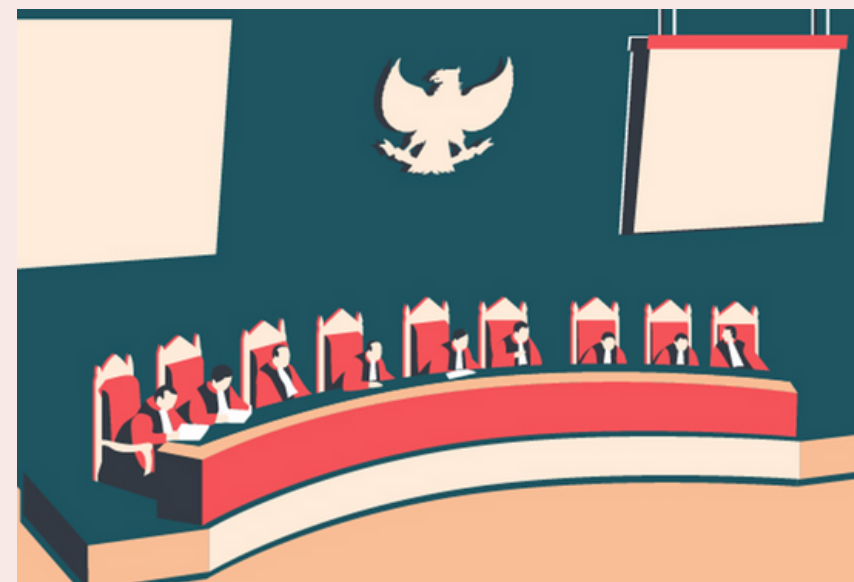
Planning stage



Promulgation stage



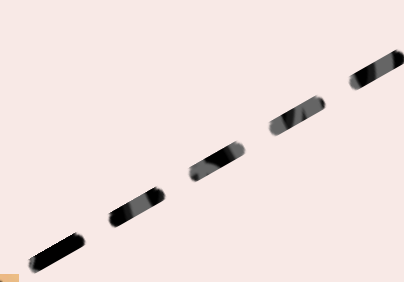
Drafting stage



Deliberation stage



Approval stage



PROBLEM: LEGAL TEXTUAL ENTAILMENT

In the harmonization phase, the goal is to **ensure no contradictions** exist among **clauses**, both semantically and contextually

However, there are several problems occurred

| Content of a clause in document A | Content of a clause in document B |
|--|---|
| Every taxpayer has the right to tax amnesty. | Only some taxpayers have the right to tax amnesty. |
| Every child has the right to receive a quality education | Students who can't afford tuition fees will not be admitted to public schools |

* Yellow indicates contradicted clause **semantically**
 * Red indicates contradicted clause **contextually**

Process of producing legislation is **complex** and **prone to errors**



The process of **manually** harmonizing regulations **takes a long time.**



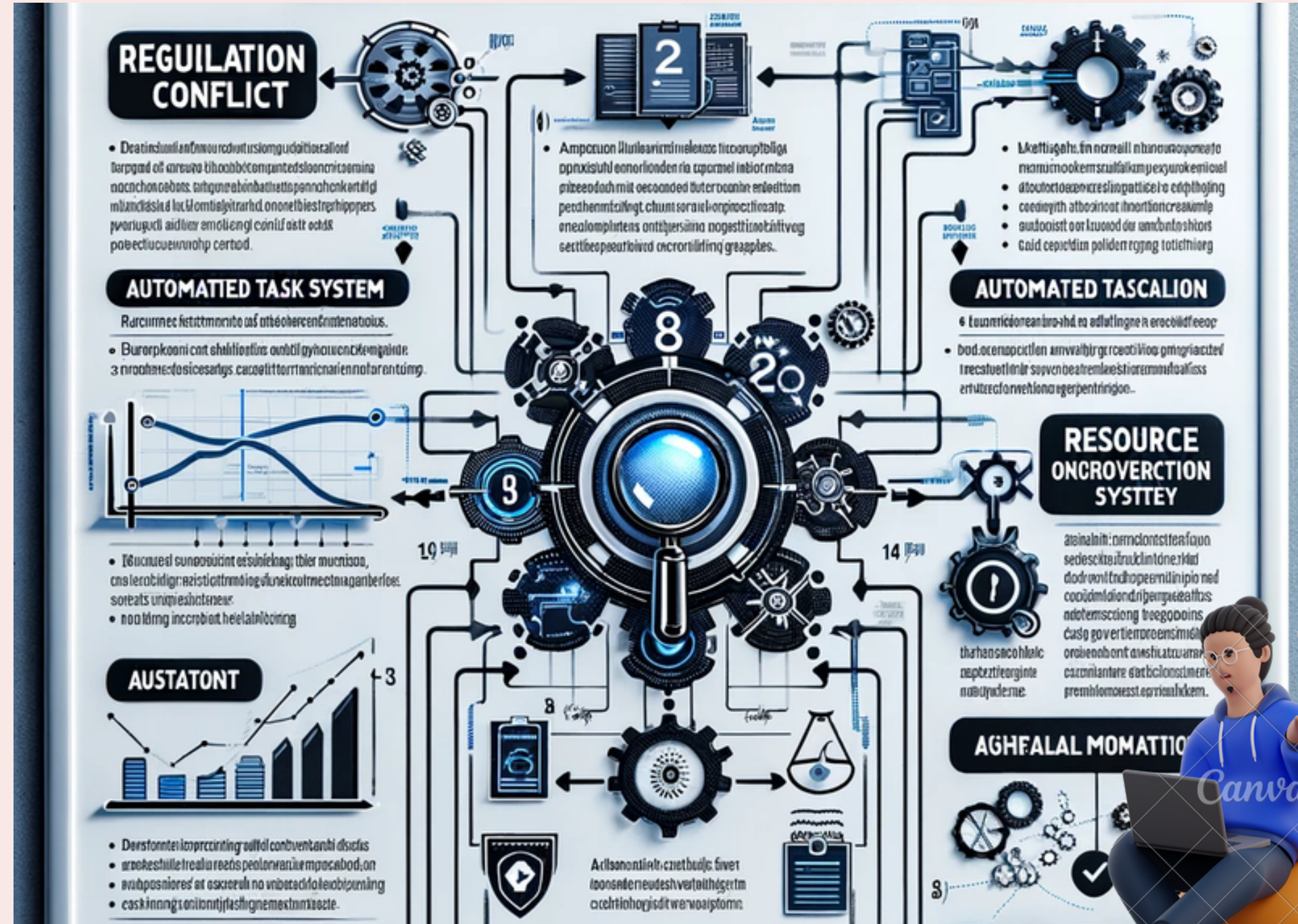
Policymakers will **waste time** and **costs** due to **invalidated regulations**



QUESTION

TO
what **EXTENT**
CONTRADICTIONS

on clauses
can be **AUTOMATICALLY**
predicted ?



COMPLICATION

“The lack of AI technology”

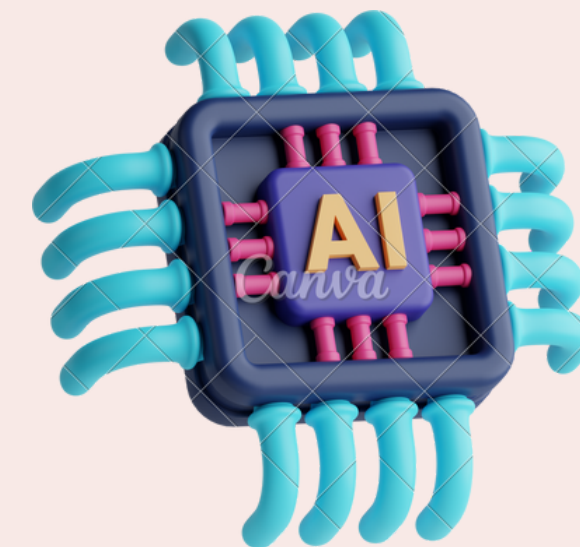
AI technology could be involved in **assisting policymakers** or **constitutional courts** as a first step in addressing those issues.



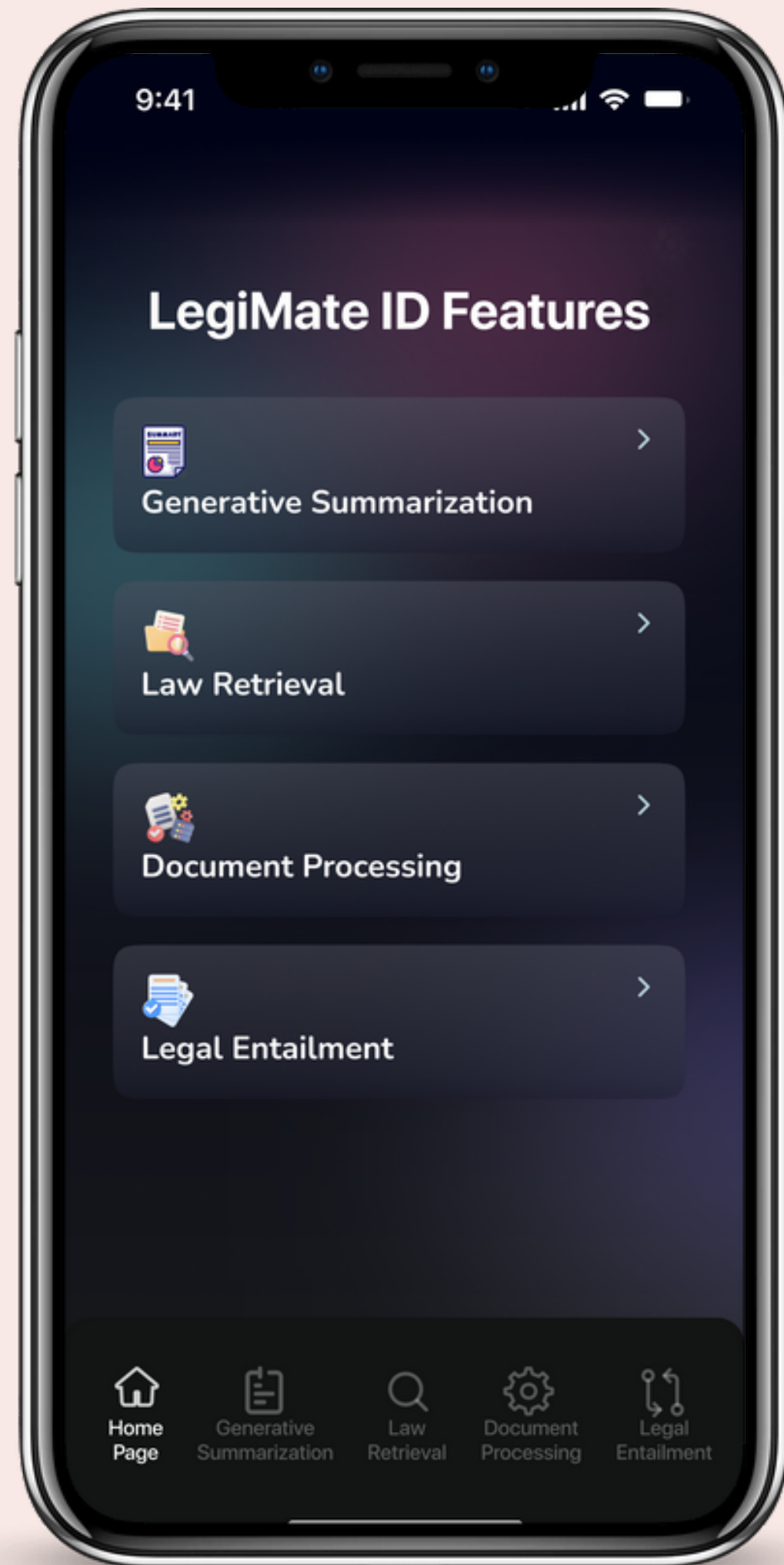
**Manual Checking
Spends Time**



**Reduce the Risk of
Conflicting Regulations**



**The Utilization of AI
technology**



SOLUTION



LegiMate ID



Saving time compared to **manual** alignment testing



Identifying potential clause **inconsistencies**



Streamlining regulation creation **process**

Harnessing **AI-driven Legal Textual Entailment** techniques to **evaluate** the **consistency** among clauses within legal regulations.

TARGET MARKET

Constitutional Courts

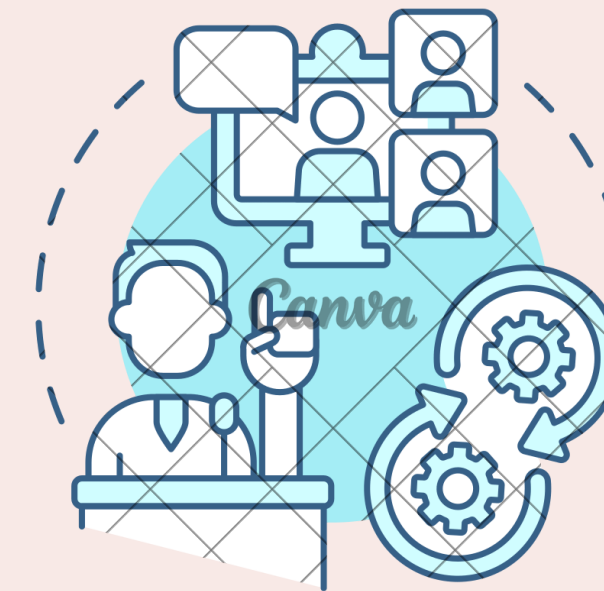
Responsible for ensuring the harmony of laws



Legimate ID can assist in reducing the process of manually harmonizing regulations

Policymakers

Responsible for making legislative regulations and preventing contradictions



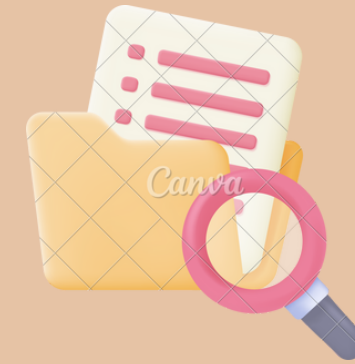
Legimate ID helps avoid conflicting regulations, as conflicting laws could be invalidated.

OUR **MAIN** FEATURES



Generative Summarization

Condense legal documents into concise summaries



Statute Law Retrieval

Employs a search engine to identify relevant documents



Document Processing

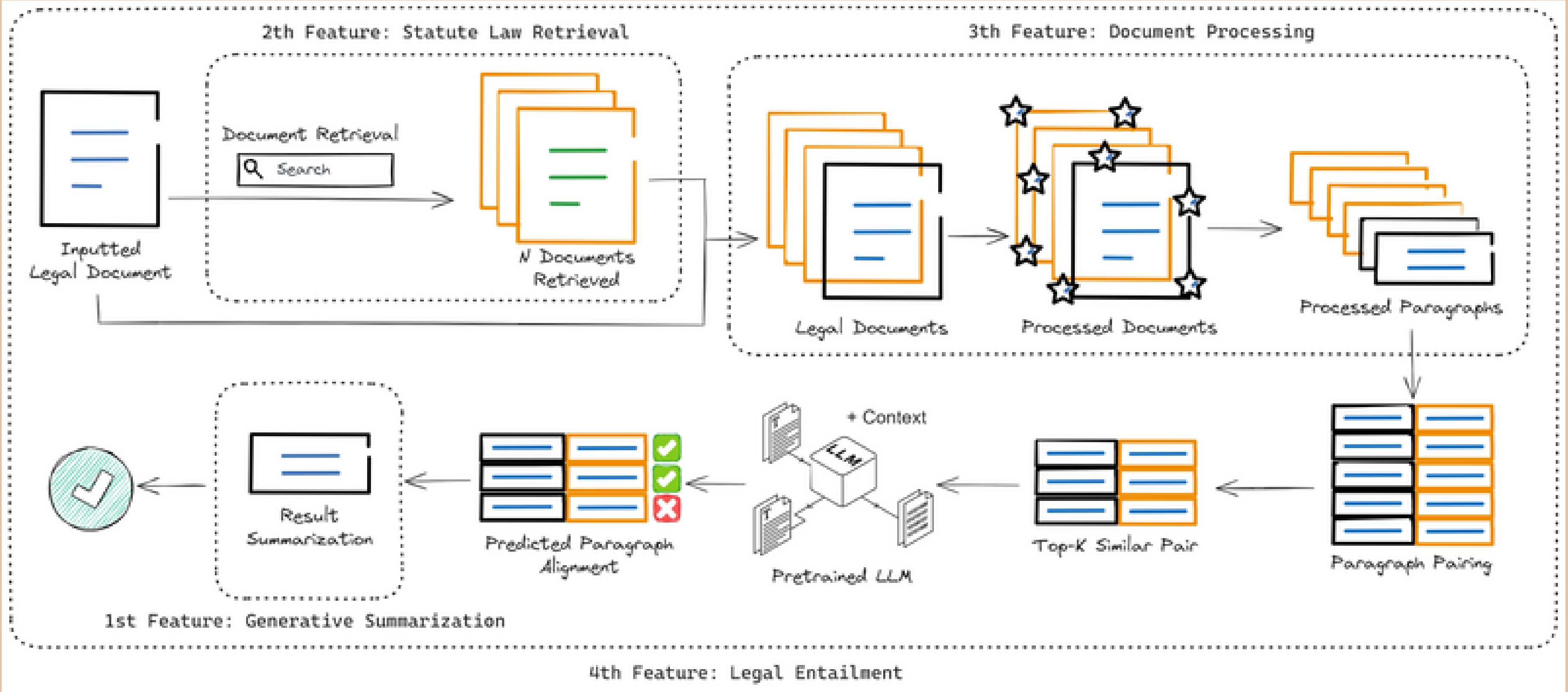
Transform docs into structured formats for subsequent analysis.

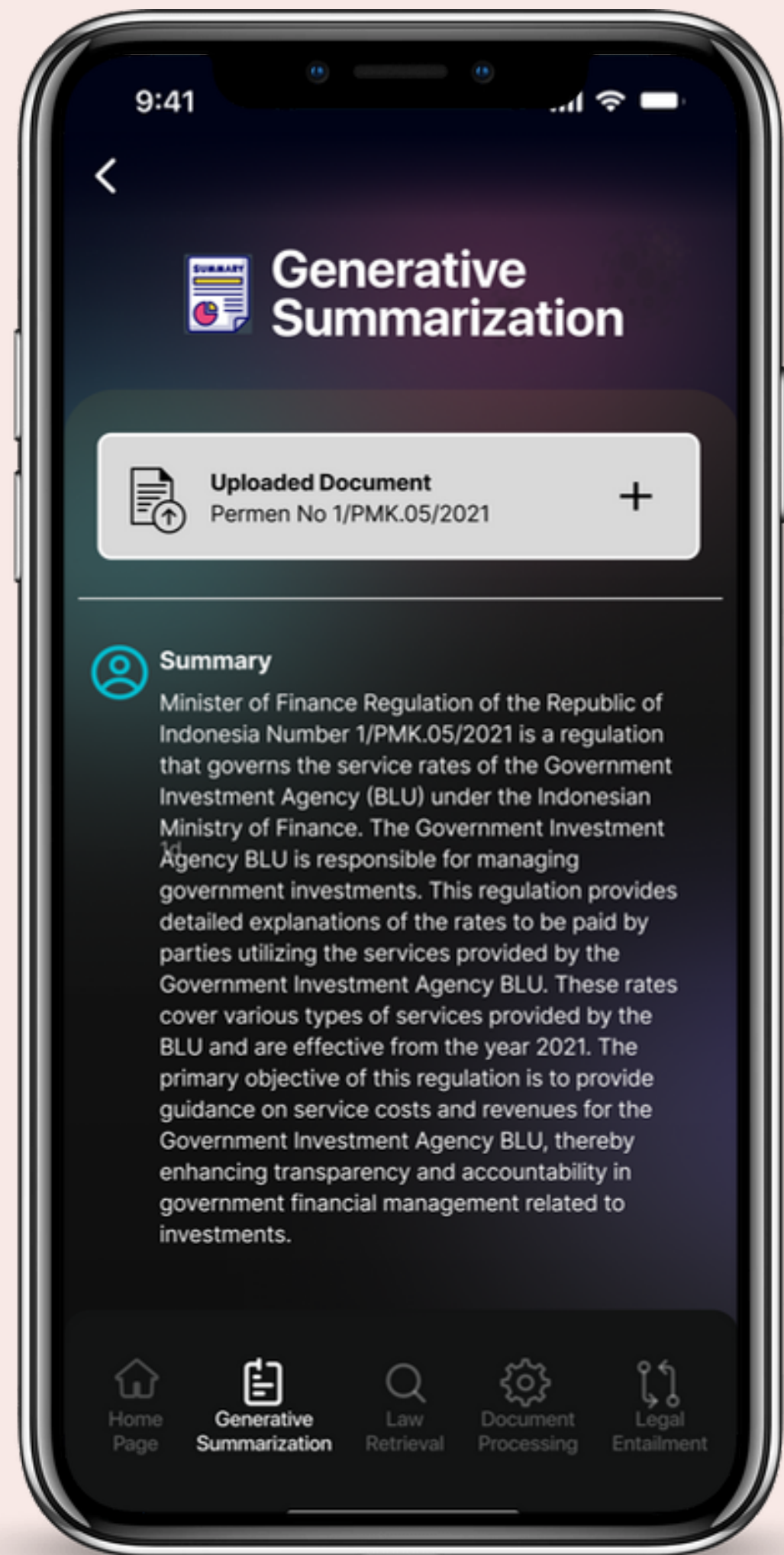


Legal Entailment

Evaluates consistency among clauses in legal regulations

PROCESS FLOWCHART





GENERATIVE SUMMARIZATION

Automatically **generate concise summaries** of lengthy text passages or documents powered by **Artificial Intelligence**

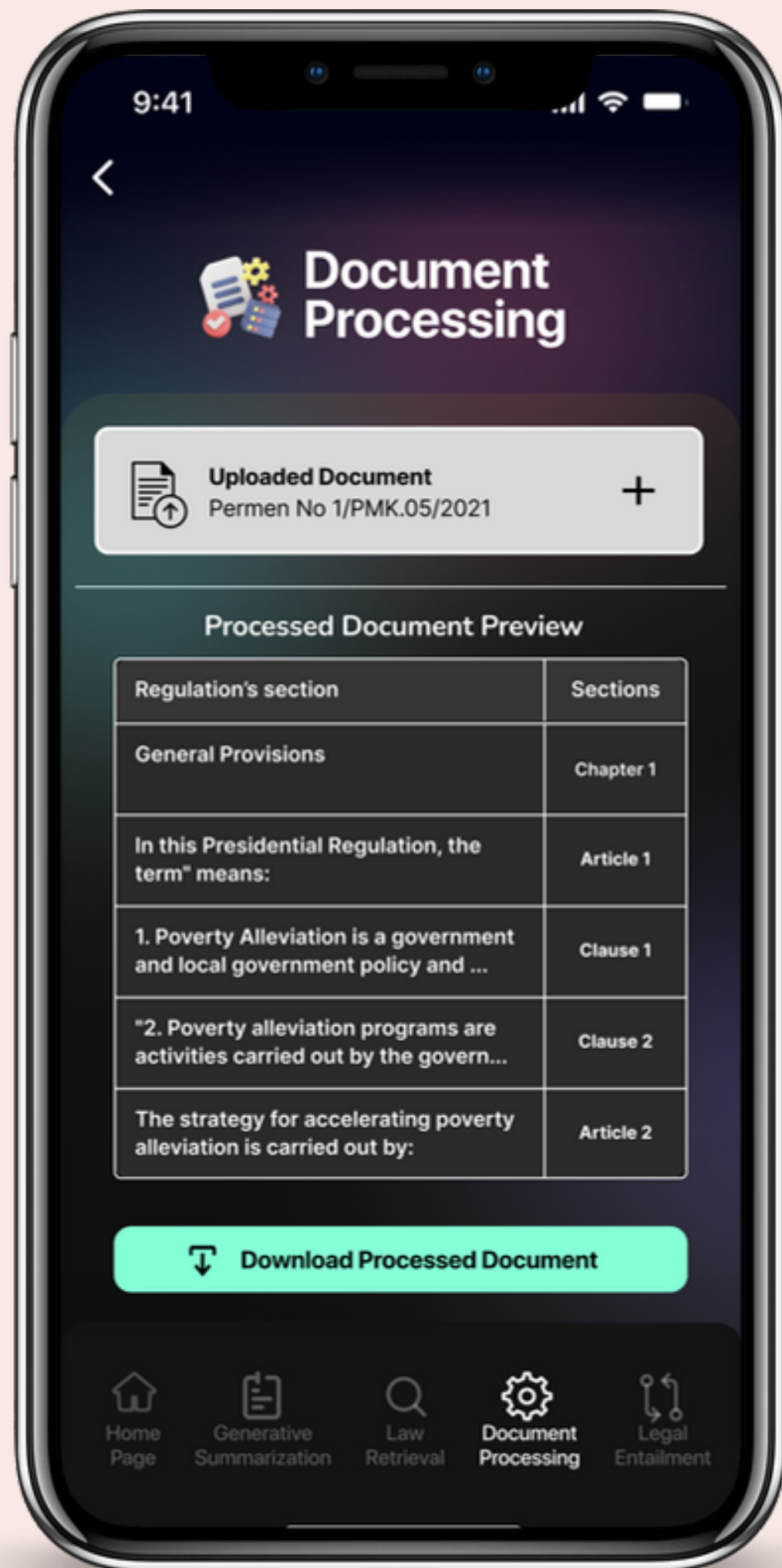
Large Language Models (LLMs) are used to summarize passages by utilizing deep learning techniques, such as GPT (**Generative Pre-trained Transformer**)

STATUTE LAW RETRIEVAL

Utilizes a **search engine** to retrieve relevant legal **documents** based on their content or file name, according to the **query**.

It employs a **two-tower model**, where the base retrieval is **text-matching-based**, such as **BM25**, and the **re-ranking** can be done multiple times using **neural text encoders**.





DOCUMENT PROCESSING

It converts **unstructured documents** into **structured forms**, such as tables, to facilitate future processing and analysis.

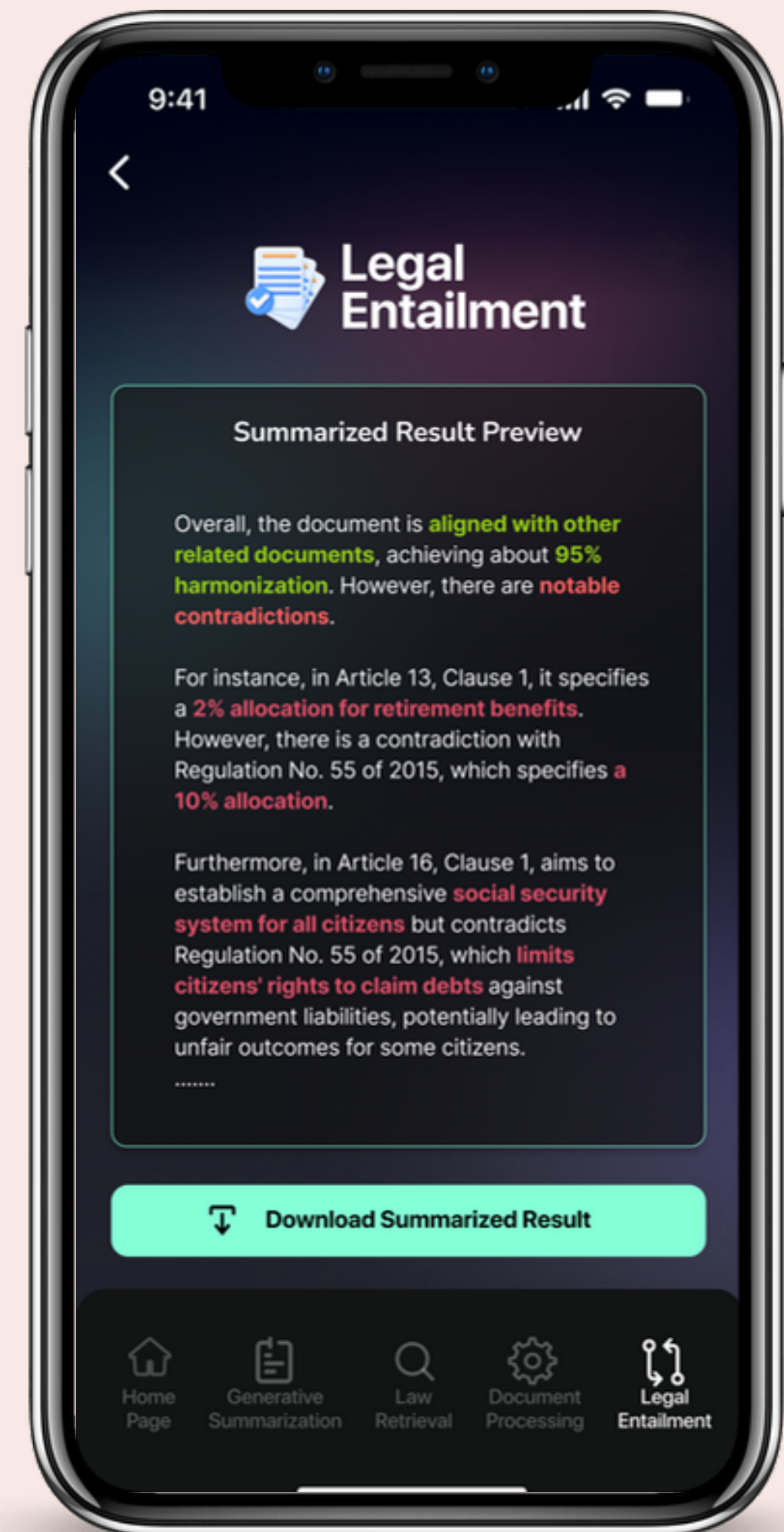
The system employs **Natural Language Processing (NLP)** algorithms, such as parsing and named entity recognition, along with regular expressions

LEGAL ENTAILMENT

Predict the **coherence** and **compatibility** between **clauses** within legal documents

“ It will label the clause to indicate whether it has contradictions or not ”

It utilizes **Legal Textual Entailment** (LTE) techniques by leveraging **transformer-based** models, such as BERT, or LLM



PREDICTION EXAMPLES



Based on the preliminary results from a simple **Natural Language Inference** model with **200 testing pairs** of clauses, comprising **185 entailed** clauses and **15 contradicted** clauses, here is the result :

Correctly predicted **entailed** clauses: **184/185**

Correctly predicted **contradicted** clauses: **11/15**

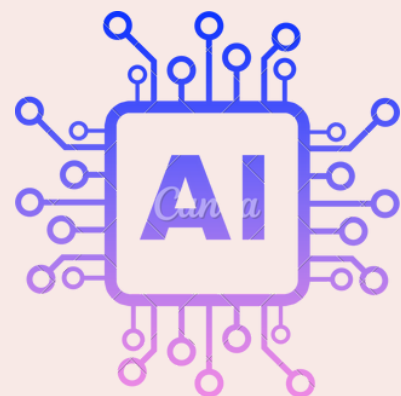
Disadvantages:

Unable to capture contextual relationship

| Clause 1 | Clause 2 | Prediction Label | Model Confidence |
|--|--|------------------|------------------|
| The country is developing a social security system for all citizens and empowering the community... | The right to claim debt on the state/local government's liabilities expires after 5 (five) years | Contradicted | 0.76 |
| ... no later than 2 (two) months before the relevant fiscal year commences | ... no later than 1 (one) month before the relevant fiscal year commences | Contradicted | 0.97 |
| Government investment ... to obtain economic, social, or other benefits | Government investment ... in the economy to advance public welfare | Aligned | 0.85 |

IMPROVEMENT STRATEGY

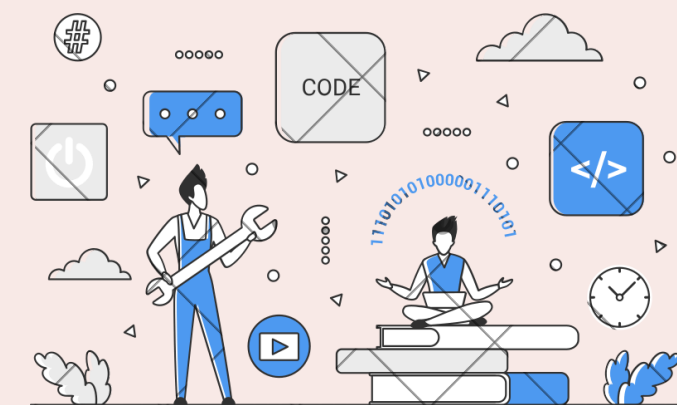
Implement the **latest** and **most robust AI model**, along with a **broader scope** of legal **information** from various regulations



Enrich **aligned** and **contradicted clauses** to enhance AI robustness



Deploy an **application** that is constantly **usable** by users



Include **additional legal contexts** from sources beyond regulations





DEMONSTRATION



LegiMate ID



Generative Summarization



Law Retrieval



Document Processing

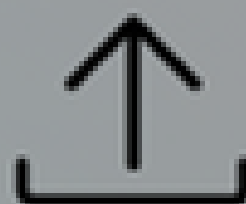


Legal Entailment





Legal Entailment



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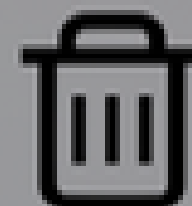


Legal Entailment



Uploaded Document

PP No. 99 of 2013





Legal Entailment

[Behind the scene process]

Law Retrieval

The document outlines regulations set by the Indonesian government for the ...





Legal Entailment

[Behind the scene process]

Law Retrieval

The document outlines regulations set by the Indonesian government for the ...



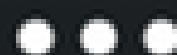
Perpres No 166 of 2014

Accelerated Social Security Alleviation Program



Perpres No 54 of 2005

Poverty Alleviation Coordination Team





Legal Entailment

[Behind the scene process]

Input Document

Paragraf 13

(1) Dana Operasional yang dapat diambil dari Dana Jaminan Sosial Kerenagakerjaan sebagaimana dimaksud dalam Pasal 12 ayat (5) ditetapkan paling tinggi:

- 10% (sepuluh persen) dari lunas jaminan kecelakaan kerja dan jaminan kematian; dan
- 2% dua persen dari akumulasi lunas dan dana hasil pengembalian jaminan hari tua.

(2) Besaran persentase Dana Operasional sebagaimana dimaksud pada ayat (1) ditetapkan setiap tahun oleh Menteri setelah berkoordinasi dengan menteri yang menyelenggarakan urusan pemerintahan di bidang kereagakerjaan dan DJSN.

Paragraf 14

(1) Dalam penentuan persentase Dana Operasional sebagaimana dimaksud dalam Pasal 13 ayat (2), BPJS Kerenagakerjaan mengajukan usulan besaran persentase Dana Operasional kepada Menteri paling lambat 3 (tiga) bulan sebelum tahun anggaran yang bersangkutan dengan melampirkan rencana kerja anggaran tahunan BPJS Kerenagakerjaan.

(2) Menteri menetapkan besaran persentase Dana Operasional sebagaimana dimaksud pada ayat (1) paling lambat 1 (satu) bulan sebelum tahun anggaran yang bersangkutan berjalan.

(3) Besaran persentase Dana Operasional sebagaimana dimaksud pada ayat (2) untuk tahun 2014 ditetapkan oleh Menteri paling lambat 31 Desember 2013.

Queried Documents

The queried documents are multiple instances of the input document, showing the text from the 'Input Document' section. The documents are arranged in a collage, with some overlapping others, representing the search results for the input document.



Legal Entailment

[Behind the scene process]

Processed Input Document

| No. article | No. clause | Content |
|-------------|------------|--|
| 19 | 1 | ... Social Security Fund as referred to in Articles 15 and 18 is separated for each Employment Social Security program. |
| 20 | 1 | ... letter a with calculation methods and assumptions in accordance with generally accepted actuarial practices. |
| 20 | 2 | The calculation and valuation of technical reserves as referred to in paragraph (1) shall be carried out by an actuary appointed by the Board of Directors. |
| 20 | 3 | ... the Supervisory Board, to review the calculations and valuations carried out by the actuary as referred to in paragraph (2). |
| 21 | 1 | The percentage amount of the Operational Fund as referred to in paragraph (2) for the year 2014 shall be determined by the Minister no later than December 31, 2013. |

Processed Queried Documents

| No. article | No. clause | Content |
|-------------|------------|---|
| 19 | 1 | ... a. 2% (two percent) of the accumulated premiums and the proceeds of the old age insurance development fund |
| 19 | 2 | ... determined annually by the Minister after consulting with the minister responsible for government affairs in the field of employment and labor. |
| 19 | 3 | ... the Operational Fund to the Minister no later than 3 (three) months before the relevant fiscal year by attaching the annual budget work plan of BPJS Employment. |
| 19 | 4 | The Minister determines the percentage of the Operational Fund as referred to in paragraph (1) no later than 1 (one) month before the relevant fiscal year commences. |
| 19 | 5 | The percentage amount of the Operational Fund as referred to in paragraph (2) for the year 2014 shall be determined by the Minister no later than December 31, 2013. |
| 19 | 1 | ... a. 2% (two percent) of the accumulated premiums and the proceeds of the old age insurance development fund |
| 19 | 2 | ... determined annually by the Minister after consulting with the minister responsible for government affairs in the field of employment and labor. |
| 19 | 3 | ... the Operational Fund to the Minister no later than 3 (three) months before the relevant fiscal year by attaching the annual budget work plan of BPJS Employment. |
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| 19 | 5 | The percentage amount of the Operational Fund as referred to in paragraph (2) for the year 2014 shall be determined by the Minister no later than December 31, 2013. |



Legal Entailment

[Behind the scene process]

Pairing Processed Input and Queried Documents

| Input document's content | Queried documents' content |
|---|--|
| The country is developing a social security system for all citizens and empowering the community... | The right to claim debt on the state/local government's liabilities expires after 5 (five) years |
| ... no later than 2 (two) months before the relevant fiscal year commences. | ... no later than 1 (one) months before the relevant fiscal year commences. |
| Government investment ... to obtain economic, social, and/or other benefits. | Government investment ... in the economy to advance public welfare |

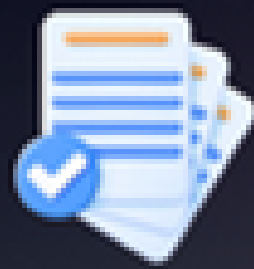


Legal Entailment

[Behind the scene process]

Prediction Result

| Input document's content | Queried documents' content | Prediction Model | Model Confidence |
|---|--|------------------|------------------|
| The country is developing a social security system for all citizens and empowering the community... | The right to claim debt on the state/local government's liabilities expires after 5 (five) years | Contradicted | 0.76 |
| ... no later than 2 (two) months before the relevant fiscal year commences. | ... no later than 1 (one) months before the relevant fiscal year commences. | Contradicted | 0.97 |
| Government investment ... to obtain economic, social, and/or other benefits. | Government investment ... in the economy to advance public welfare | Aligned | 0.85 |



Legal Entailment

Summarized Result

Overall, the document is **aligned with other related documents**, achieving about **95% harmonization**. However, there are **notable contradictions**.

For instance, in Article 13, Clause 1, it specifies a **2% allocation for retirement benefits**. However, there is a contradiction with Regulation No. 55 of 2015, which specifies **a 10% allocation**.

Furthermore, in Article 16, Clause 1, aims to establish a comprehensive **social security system for all citizens** but contradicts Regulation No. 55 of 2015, which **limits citizens' rights to claim debts** against government liabilities, potentially leading to unfair outcomes for some citizens.

.....



LegiMate ID

THANK YOU
