



Contract Analysis & Risk Assessment Bot - Project Description

Overview

A comprehensive, AI-powered contract analysis platform designed specifically for Small and Medium Enterprises (SMEs) in India. The bot leverages Google's Gemini API to intelligently analyze contracts, identify risks, ensure compliance with Indian laws, and provide actionable legal insights in both English and Hindi.

Problem Statement

SMEs often lack access to affordable legal expertise for contract review. They struggle with:

- Identifying high-risk clauses in legal documents
- Ensuring compliance with Indian regulations (GST, Labour Law, Arbitration Act, etc.)
- Understanding complex legal terminology
- Managing multiple contracts efficiently
- Documenting contract analysis for audit purposes

Solution

An intelligent contract analysis bot that combines:

- AI-Powered Analysis: Gemini API for intelligent clause explanations
- Risk Detection: Automated identification of problematic clauses
- Compliance Checking: Indian law compliance verification
- Bilingual Support: English & Hindi UI for wider accessibility
- Batch Processing: Analyze 50+ contracts simultaneously
- Professional Reports: Export in JSON, Markdown, HTML, and PDF formats



Key Features

1. Smart Contract Upload & Parsing

- Supports PDF, DOCX, and TXT file formats
- Automatic text extraction and normalization
- Hindi/English language detection

2. Contract Overview

Contract type classification (NDA, Service Agreement, Employment Contract, etc.)

Entity extraction (6 types):

Parties/Stakeholders

Key Dates (effective date, expiry, renewal)

Financial Amounts (INR/USD conversion)

Jurisdiction & Venue

Payment Terms

Obligations & Rights

3. Risk Assessment Engine

Clause-by-clause risk scoring (High/Medium/Low)

Detailed issue identification with recommendations

Ambiguity detection in contract language

Risk aggregation for overall contract assessment

4. Compliance Checker

Generic compliance checks (5 standard clauses)

India-Specific Compliance (8 specialized checks):

GST Compliance Clause

Labour Law Compliance

Applicable Law Reference

Arbitration Clause (Arbitration & Conciliation Act 1996)

Notice Period for Employment

Data Protection/DISHA Compliance

Force Majeure

Severability & Amendment Clauses

Missing clause identification

5. Automatic Clause Classification

Categorizes clauses into 15 semantic types:

Payment Terms

Liability & Indemnity

Intellectual Property

Confidentiality

Termination

Dispute Resolution

Warranties

Obligations

Rights

- Penalties
- Auto-Renewal
- Force Majeure
- Limitation of Liability
- Severability
- Amendment

6. Knowledge Base

- 10 common contract issues faced by Indian SMEs
- Frequency analysis (prevalence in Indian contracts)
- Risk assessment per issue
- Solutions and sample fixes for each issue
- SME-focused context and guidance

7. Smart Templates

- 5+ pre-built contract templates
- AI-generated custom templates
- Clause suggestions and alternatives
- Risk-aware recommendations

8. Batch Processing

- Analyze multiple contracts simultaneously (50+)
- Comparative risk analysis
- Contract type distribution
- Bulk compliance reports
- JSON export for integration

9. Multi-Format Export

- JSON: Machine-readable structured data
- Markdown: Human-readable documentation
- HTML: Website-ready formatted reports
- PDF: Professional printed reports with charts and tables

10. Audit & Compliance Logging

- Complete audit trail of all analyses
- Session IDs and Event IDs for tracking
- User activity logging
- Compliance summary metrics
- Downloadable audit reports

11. Bilingual UI

Full English & Hindi support
Real-time language switching
All UI elements translated (150+ strings)
Maintains data integrity across languages

12. AI-Powered Insights (Gemini API)

Clause explanations in plain language
Alternative clause suggestions
Risk reasoning and explanations
Fallback mechanisms for offline mode



Technical Stack

Backend

Language: Python 3.8+
Framework: Streamlit 1.28+ (Web UI)
LLM Integration: Google Generative AI (Gemini)
NLP: spaCy 3.7+, NLTK 3.8+

File Processing

PDF: pdfplumber
DOCX: python-docx
Text: Native Python

Report Generation

PDF: ReportLab 4.0.0
Data Processing: Pandas 2.0+, NumPy 1.24+

Environment & Configuration

Env Variables: python-dotenv
Session Management: Streamlit session_state
Logging: JSON-based audit logging

Deployment Ready

requirements.txt with all dependencies
.gitignore for sensitive files

.env file support for API keys
Modular architecture for easy extension

Project Structure

```
contractanalysisriskassbot/  
└── app.py  
└── requirements.txt  
└── config.json  
└── .env  
└── .gitignore  
└── README.md  
└── contract_parser/  
    ├── utils/  
    ├── tests/  
    ├── templates/  
    └── data/  
        └── audit_logs.json
```

How It Works

User Workflow

Upload Contract → Select PDF/DOCX/TXT file
Automated Analysis → System extracts text and normalizes content
Overview → See contract type, parties, dates, amounts
Risk Assessment → Identify high/medium/low risk clauses
Compliance Check → Verify Indian law compliance
Clause Review → Filter and analyze specific clauses
Classification → Auto-categorize clauses by type
Get Templates → Generate or browse contract templates
Export Report → Download analysis in multiple formats
Audit Trail → Access complete history of analyses

Advanced Capabilities

AI-Powered Features

Gemini Integration: Natural language understanding of contract language
Risk Reasoning: LLM explains why specific clauses are risky

Clause Alternatives: AI suggests better wording for problematic clauses

Ambiguity Detection: Identifies unclear or conflicting language

India-Specific Optimizations

8 India-specific compliance rules

Knowledge base focused on Indian SME contracts

References to Indian laws:

Indian Contract Act 1872

Sale of Goods Act 1930

Labour Law provisions

GST Act 2017

Arbitration & Conciliation Act 1996

Data Protection (DISHA)

Companies Act 2013

Enterprise Grade

Complete audit logging

Session tracking

Event-level granularity

Compliance reporting

Batch analysis capabilities

Multi-format export



Use Cases

For SME Entrepreneurs

Review vendor contracts before signing

Create standard templates for their business

Ensure employment contracts comply with labour law

Quick risk assessment of service agreements

For Legal Teams

Streamline contract review process

Batch analyze multiple contracts

Generate compliance reports

Maintain audit trail for regulatory requirements

For Startup Founders

Understand legal risks quickly
Get AI-powered clause explanations
Compare contract alternatives
Document decision-making process

For Compliance Officers

Verify regulatory compliance
Generate compliance reports
Track contract analysis history
Ensure consistent standards

🔒 Security & Privacy

- ✓ No data stored permanently (except audit logs)
- ✓ API keys protected in .env file
- ✓ SQLite-free architecture (JSON logs only)
- ✓ Session-based processing
- ✓ .gitignore prevents credential leakage
- ✓ Audit trail for transparency

📊 Project Statistics

Total Lines of Code: 1600+
Modules: 19 core modules
Contract Types Supported: 6+
Clause Categories: 15
India-Specific Rules: 8
Knowledge Base Issues: 10
UI Translations: 150+ strings
Supported Languages: English, Hindi
Export Formats: 4 (JSON, Markdown, HTML, PDF)
Batch Capacity: 50+ contracts simultaneously

💻 Technologies Demonstrated

- ✓ Web Application Development (Streamlit)
- ✓ Natural Language Processing (spaCy, NLTK)
- ✓ Machine Learning Integration (Gemini API)
- ✓ File Processing (PDF, DOCX, TXT)
- ✓ Data Analysis (Pandas, NumPy)
- ✓ Report Generation (ReportLab)

- Cloud API Integration
- Localization/Internationalization
- Logging & Audit Systems
- Git & GitHub
- Python Best Practices
- Law & Compliance Knowledge

Conclusion

The **Contract Analysis & Risk Assessment Bot** delivers a powerful, scalable, and SME-focused solution to one of the most critical challenges faced by Indian businesses—understanding and managing legal contracts efficiently. By combining advanced NLP techniques, AI-driven reasoning through the Gemini API, and deep alignment with Indian legal frameworks, the platform empowers non-legal users to make informed, compliant, and risk-aware decisions. Its bilingual support, batch processing capabilities, comprehensive audit logging, and professional reporting make it suitable not only for SMEs but also for startups, legal teams, and compliance officers seeking automation without compromising accuracy or transparency.