



# 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.