# Demo 2: Enhanced Implementation Features

## Table of Implemented Features

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| --- | --- | --- | --- |
| Category | Feature | Implementation Details | Technologies Used |
| Authentication | Role-based access | User roles & permissions | JWT, RBAC |
| PDF Processing | Chapter detection | Layout analysis | pdfminer.six, pdfplumber |
| Question Generation | Domain-specific | Pattern-based generation | NLTK, spaCy |
| Analytics | Basic dashboard | User statistics | Chart.js, |
| Caching | Redis integration | Session & data caching | Redis |
| Security | Rate limiting | API protection | FastAPI-limiter |

## Detailed Feature Implementation

### 1. Enhanced Authentication

* Role-based access control
* User profile management
* Advanced session handling

### 2. Advanced PDF Processing

* Chapter detection
* Layout analysis
* Enhanced text extraction

### 3. Domain-Specific Question Generation

* Pattern-based generation
* Difficulty level adjustment
* Domain detection

### 4. Analytics Implementation

* Basic analytics dashboard
* User statistics tracking
* Performance metrics

### 5. Caching System

* Redis integration
* Session caching
* Data caching

### 6. Security Features

* Rate limiting
* API protection
* Advanced error handling

## Technical Specifications

### System Architecture

* Frontend: React 18.2.0 with Redux
* Backend: FastAPI 0.104.0 with Redis
* Database: PostgreSQL 15.0 with advanced indexing
* Cache: Redis 7.0

### Development Tools

* Version Control: Git with branching strategy
* Package Management: npm, pip with requirements.txt
* Development Environment: VS Code with extensions

## Screenshots

* A screenshot of a login form

  AI-generated content may be incorrect.
* A screenshot of a computer

  AI-generated content may be incorrect.

A screenshot of a computer

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