



AI Explainer and Code Generation Platform

Convert ideas into clean code — and code into clear understanding.

Quick Links

Category	Link
Demo Video	<i>Coming Soon</i>
Docker Support	Yes
Supported Languages	Python · JavaScript · SQL

Table of Contents

- About the Project
- Problem Statement & Motivation
- Key Features
- Architecture
- Tech Stack
- Models Used
- Project Structure
- Installation & Setup
- Usage Guide
- Admin Controls

- History & Analytics
 - Screenshots
 - Roadmap
 - Team
 - License
-

About the Project

CodeGenie is an AI-powered software development assistant designed to help beginners and engineers write efficient code and understand complex programming concepts.

- 💡 Developed as part of **Infosys Springboard Internship**
 - 💡 Ideal for: Students, developers, trainers, and IT professionals
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Problem Statement & Motivation

Programming can be hard for beginners:

- Understanding code logic takes time
- Writing correct and optimized code requires expertise

- 🚀 CodeGenie removes these barriers by:

- Generating runnable code from plain English
 - Explaining any code in a simple, structured manner
 - Providing feedback & learning insights
-

Key Features

User Capabilities

Module	Description
 Secure Authentication	JWT login, refresh tokens, OTP recovery
 Text → Code Generator	Converts ideas to runnable Python / JS / SQL
 Code → Explanation	Breaks down code into logic + complexity
 Ratings & Feedback	User-powered model evaluation system
 Activity History	Track, view & revisit all past operations
 Profile Settings	Secure password updates with re-auth

Admin Features

- Manage User Roles (Max 2 Admins)
- Analytics Dashboard:
 - Language popularity
 - Model usage heatmaps
 - Top contributors leaderboard
- Feedback-focused insights (charts + word clouds)
- Global search across:
 - Code, explanations, users, interactions

Architecture

- ✓ Modular Backend
- ✓ Secure ML integration
- ✓ Token-based user isolation

 Diagrams (To be added)

- System Architecture
 - ER & Database Schema
-

Tech Stack

Component	Technology
Frontend	Streamlit
Backend	Python · FastAPI
NLP Models	Hugging Face Transformers
Database	SQLite (local backend)
Authentication	JWT + bcrypt
Email Services	SMTP with Gmail
Deployment	Docker

Models Used

Model	Use Case	Notes
CodeLlama	Code generation + refinement	Meta AI model
DeepSeek-Coder	Multi-language generation	Efficient code patterns
StarCoder2	Code rewriting & improvements	Robust token understanding

AST Parsing	Python explanation engine	Structural understanding
Tokenizers	JS & SQL code explainability	Custom tokenizer pipelines

📁 Project Structure

```
CodeGenie/
├── app.py                      # Streamlit UI
├── backend/
│   ├── auth.py                  # JWT auth + role management
│   ├── generator.py             # Text-to-code engine
│   ├── explainer.py            # Code explanation logic
│   ├── models.py                # SQLite database
│   ├── history.py               # Logs & saved records
│   ├── feedback.py              # Rating + analytics
│   └── admin.py                 # Admin-only routes
│
├── requirements.txt
├── Dockerfile
├── .env.example
└── docs/
    ├── architecture.png
    ├── flow_diagram.png
    └── screenshots/
```

⚙️ Installation & Setup

Prerequisites

- Python 3.10+
- Git
- (Optional) Docker

Clone & Install

```
git clone <repo-link>
cd CodeGenie
pip install -r requirements.txt
```

Configure Environment Variables

Create `.env`:

```
JWT_SECRET_KEY=your_key_here
SMTP_EMAIL=your_mail_here
SMTP_PASSWORD=your_app_pass_here
```

Run Project

```
streamlit run app.py
```



Usage Guide

1 Sign up / Login

2 Choose module:

- Generate Code
- Explain Code
 - 3 Select Language
 - 4 Submit query
 - 5 Review AI output
 - 6 Rate feedback
 - 7 Access previous results anytime in History

Screenshots included below



History & Analytics

- Every session stored with:
 - Code snippet
 - Language
 - Rating
 - Timestamp
 - User identity
 - Admin dashboard visualizes:
 - Growth metrics
 - Performance chart
 - Word cloud from feedback
-

Screenshots

(To be added with real UI images)

Suggested image list:

- Login Page
 - Dashboard
 - Code Generation Module
 - Code Explanation Module
 - Admin Analytics Page
 - History Log UI
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Team

Name	Role	Responsibilities
Add Names	ML Engineer	Model integration + optimization
Add Names	Backend Developer	Auth, DB, API
Add Names	Frontend Developer	UI/UX with Streamlit
Add Names	Documentation	Report, README, PPT

License

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