

Project: URL Shortener Web Application using Flask

Organization:

Innomatics Research Labs – Internship Project

Technology Stack:

Python, Flask, SQLAlchemy, SQLite, HTML, Bootstrap

Introduction

Objective

The objective of this project is to build a web-based URL Shortener application that allows users to convert long URLs into short, shareable links. The application also stores user-generated URLs in a database and allows users to view their history.

Motivation

Long URLs are difficult to share and remember. A URL Shortener simplifies sharing and improves usability. This project simulates real-world backend development using Flask and database ORM concepts.

System Architecture

Frontend

- HTML templates rendered using Flask
- Bootstrap used for styling
- Copy button implemented using JavaScript

Backend

- Flask framework handles routing and logic
- URL validation using validators library
- Short code generation using random and string libraries

Database

- SQLite database managed by SQLAlchemy ORM
 - Table stores original URL and short code
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Implementation Details

Workflow

1. User enters URL.
2. System validates URL.
3. Unique short code generated.
4. URL saved into database.
5. Short URL displayed to user.
6. Redirection handled dynamically.
7. History page shows all records.

Security and Validation

- Prevents invalid URL entries
 - Ensures unique short code generation
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Results & Learnings

Results

- Fully functional URL shortener
- Database persistence achieved
- User-friendly interface
- Redirect functionality tested successfully

Learnings

- Flask routing and templates
- ORM database integration
- Debugging real-world errors
- Project structuring
- End-to-end application development