

Data Engineering Project
UCS677

SudarshanX

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Introduction

SudarshanX is Full Stack Web Development project designed to make users familiar to world organisations and member countries enriching their knowledge in the domain of GeoPolitics. This project utilizes MongoDB database with two primary collections - “countries” and “organisations”. These collections have specific Schemas defined with varied field-value pairs.

The User Interface has been developed using EJS (Embedded JavaScript) and styling has been added using Bootstrap framework with customised CSS styling. The backend has been developed using Node and Express. Since most of the API calls begin with either “/countries” or “/organisations”, express router has been used to maintain separate folders for all the API calls for these 2 paths. Additionally these API calls have been handled using REST architecture.

The connection of backend with the MongoDB database has been established using Mongoose Library and the system has been deployed locally using localhost server.

This project has huge scope for development which includes – establishing many-to-many relationships between organisations and its member countries, adding schema validations using Joi Library, Providing user-signup and user-login functionality with restricted access to CRUD operations, etc.

Lastly, Inspired by the might of Lord Vishnu’s instrument of destruction - Sudarshan Chakra, this project embodies the same qualities to provide an impactful service and global knowledge to the users

Problem Statement

“How can we build a scalable, user-friendly interface to browse, search, and manage data on global organisations and countries—including names, capitals, regions, GDP, population, logos, and flags—using a modern JavaScript stack?”

Specific Requirements

1. Connecting Server program app.js with the Mongo Shell for accessing and performing operations on the databases/collections stored on the local device
2. Modelling of the Schemas of the models of the database and calling them in the server program
3. Handling CRUD operations through REST APIs and ensuring smooth parsing of data to eliminate unidentified parameters and values
4. Adding styling for better User experience
5. Good Error Handling at client side and server side to prevent corrupt data to be entered
6. Advanced Searching and Filtering for correct data to be fetched from the collections

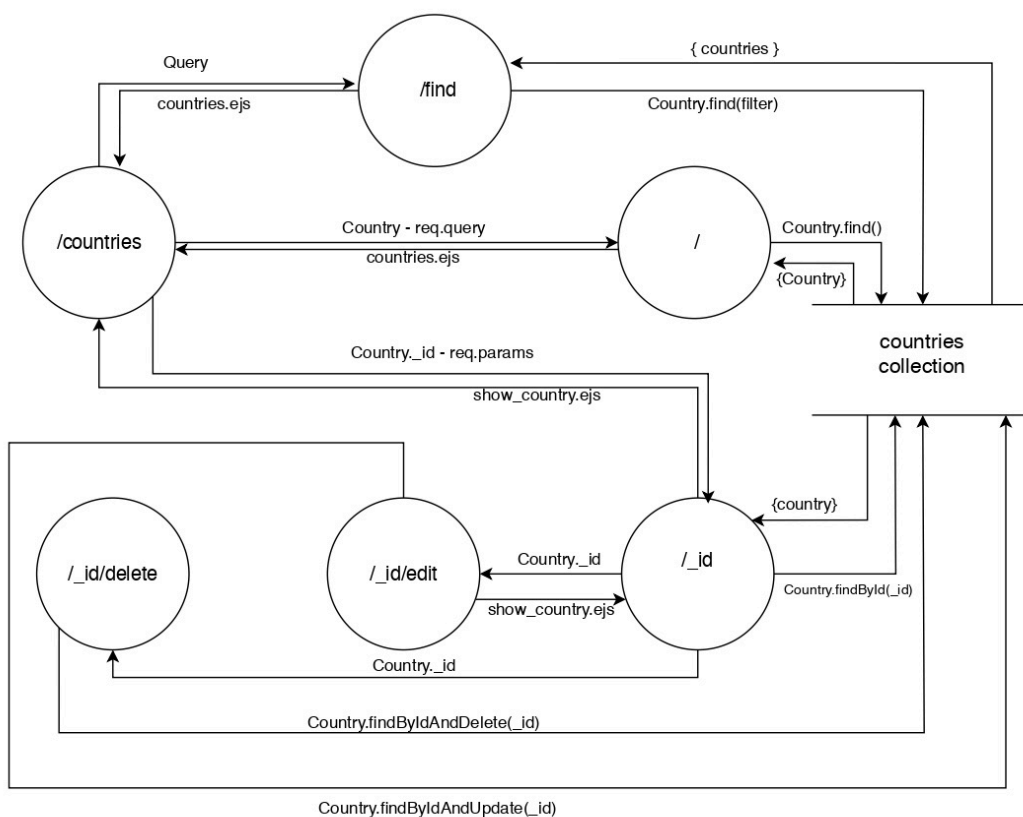
System Specifications

1. Server OS - MacOS Sequoia
2. Node.js - version 20.17.0
3. Database - MongoDB and Mongoose
4. Port - 8080 (<https://localhost:8080/...>)
5. IDE - VS Code
6. Framework - BootStrap

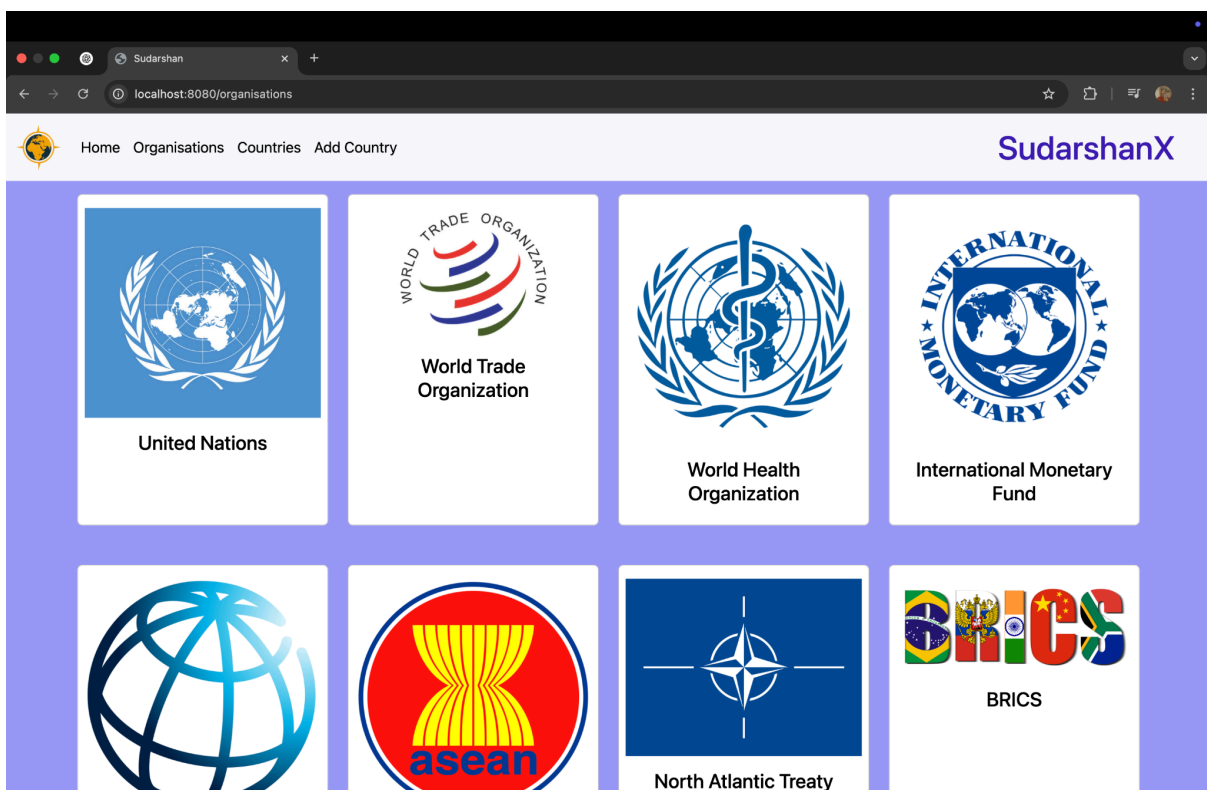
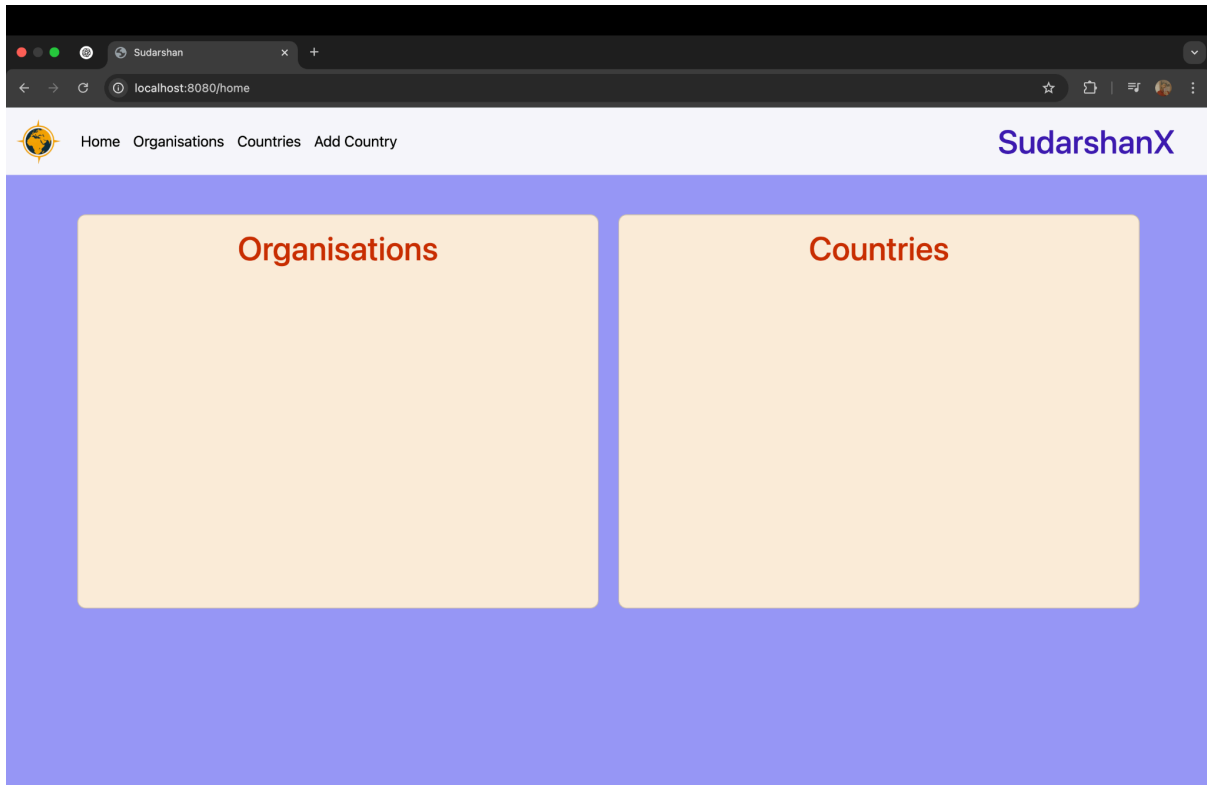
Tools Used

1. **MongoDB**: Document store for Countries & Organisations
2. **Mongoose**: ODM for schema definition, validation, and queries
3. **Express.js**: Routing, static file serving
4. **ejs & ej-mate**: Server-side templates with layouts & partials
5. **BootStrap** : Responsive grid, cards, forms, validation classes
6. **Node.js**: JavaScript runtime
7. **VS Code**: Development IDE
8. **Postman** : API testing
9. **HTML, CSS, JavaScript**

Data Flow Diagram



Sample Screenshots



SudarshanX


Home Organisations Countries Add Country

Search Country


Search Country Search Capital Search Currency

Select Regions - ☐ Asia ☐ Europe ☐ Europe/Asia ☐ Africa ☐ Americas ☐ Oceania


Min pop. Max pop. Max GDP Min GDP




United States of America




India




Japan




Germany




United Kingdom



France



Italy



Brazil

SudarshanX


Home Organisations Countries Add Country

Search Country


Search Country Search Capital Search Currency

Select Regions - ☐ Asia ☒ Europe ☐ Europe/Asia ☒ Africa ☐ Americas ☐ Oceania


Min pop. Max pop. Max GDP Min GDP




Germany




United Kingdom




France




Italy




Spain



Netherlands



Sweden



Algeria

Sudarshan Iran - Google Search Flag of Iran - Flag of Iran - W localhost:8080/countries/new

Home Organisations Countries Add Country SudarshanX

Add New Country

Enter Name
Iraq

Enter Capital
Tehran

Select Region
Asia

Enter GDP
400

Enter Population
10000000


Enter Currency
Iranian Riyal (IRR)

Enter URL of Flag
/flags/iran.png

Submit

Sudarshan Iran - Google Search Flag of Iran - Flag of Iran - W localhost:8080/countries/6811a6904cf1290eedc8e72a

Home Organisations Countries Add Country SudarshanX



India

Capital - New Delhi
Region - Asia
GDP - 2,875 US Billion Dollars
Population - 1,38,00,04,385
Currency - Indian Rupee (INR)

Delete Edit Back

Sudarshan Iran - Google Search Flag of Iran - Flag of Iran - W localhost:8080/countries/6811a6904cf1290eedc8e72a/edit? SudarshanX

Edit Details of India

Enter Name
India

Enter Capital
New Delhi

Select Region
Asia

Enter GDP
2970


Enter Population
1380004385

Enter Currency
Indian Rupee (INR)

Enter URL of Flag
/flags/india.png

Submit cancel

Sudarshan Iran - Google Search Flag of Iran - Flag of Iran - W localhost:8080/organisations/680e5c7888e17dc3e13771ca SudarshanX



World Health Organization

Headquartes - Geneva, Switzerland
Date of Formation - 7 April 1948
Purpose - International public health agency
Official Website - <https://www.who.int>

back

localhost:8080/organisations

Conclusion

SudarshanX has provided an ideal solution to developing a Full Stack Web Project using MongoDB, Express, Node, BootStrap and EJS. It provides great insights into International Organisations and Countries. Beyond providing a polished interface for exploring international entities, *SudarshanX* illustrates key architectural patterns – modular routing, async error handling, and schema-driven validation, that scale readily to larger projects.