

# Django React Integration

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**Abstract:** The Research paper studies about Integration of two most popular library and framework, Django and React. Django is a python-based framework that encourages rapid development and clean, pragmatic design. It is an open-source framework which follows the basic MVT(Model-View- Template) structure. On other side React is a JavaScript library created by Facebook. It is tool for building a UI (User Interface) component. It is widely used for making SPA (Single Page Application). Some modifications which are explained inside the paper, and it also help us to know reason to choose React with Django and how we can setup both the frameworks in our system and create a project using both the frameworks with database connectivity. Basically, this paper covers everything required for a person or a student to get started with the web-development with this wonderful integration and learn the basics to create some beginner to advance level projects related to the python full stack development integrating with React framework and make learning interactive and easy for everyone.

**Key Word:** React Native; React; Django;

## 1.INTRODUCTION



Django and React both are the most popular library and framework. Let's look deeper into each framework one by one:  
**A. Django**

Django is a web application framework which is open source and written in python programming language. It is based on MVT (Model View Template) design pattern. The Django is very demanding in current market due to its rapid development feature.

By using Django, we can build web application in very less time. Django is designed in such a manner that it handles much of configure things automatically, so we can focus on application development only.  
History.

IN 2003 by Lawrence, Django was designed and developed and released to the open public under BSDlicense in 2005. Currently, Django software foundation takes care of maintenance and new releases.

Django is widely used accepted and used by well-known sites such as:

- Spotify
- YouTube
- Dropbox
- Pinterest
- NASA

## Installation & Creation of new project

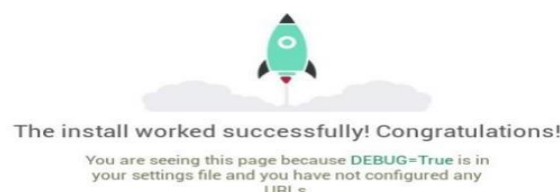
We need to install Django in our local environment meaning python and pip need to be installed. After run pip3 install Django in the terminal to install Django.

Run: "django-admin startproject projectName" to create a number of starter files for our project.

Run: "cd projectName" to navigate into the new project folder.

To start the server we issue this command in terminal "python manage.py runserver"

In your browser visit the url <http://localhost:8000/> to see the default page.



### MVT Structure of Django

To know the MVT Structure of Django firstly we need to know what MVT structure is, the full form of MVT is Model View Template. We say this Model View Template because this framework will work based upon the –

**Model** – Model will work as database management. It acts as a medium for storing the data from the user into database.

**View** – View as a controlling functionality, which is responsible for the whole logic and workings behind the web application.

**Template** – Template will work as a user side for communication interaction. It is responsible for displaying data from database and storing information provided by the user.

### B. React

ReactJS is a declarative, efficient, and flexible JavaScript library for building reusable UI components. It is an open-source, component-based front-end library which is responsible only for the view layer of the application. It was initially developed and maintained by Facebook.

The main objective of ReactJS is to develop User Interfaces (UI) that improves the speed of the app. It uses virtual DOM (JavaScript Object), which improves the performance of the app. The JavaScript virtual DOM is faster than the regular DOM. We can use ReactJS on the client and server side as well as with other frameworks such as we are using ReactJS with Django framework. It uses component and data patterns that improve readability and helps to maintain larger apps.

### React Environment Setup

Set an environment for successful ReactJS application using the create-react-app command. The ‘create-react app’ is a tool maintained by Facebook itself. This is suitable for beginners without manually having to deal with trans-piling tools like webpack and babel. In this paper, I will be showing you how to install React using CRA tool.

1. Install NodeJS and NPM: NodeJS and NPM are the platforms need to develop any ReactJS application.
2. Install React: `npm install -g create-react-app`
3. Create a new React Project: `create-react-app appName`
4. Run the Server: `npm start`



## II.REASON TO CHOOSE REACT WITH DJANGO

- Both React and Django are the most popular library and frameworks and splendid in their respective domains.
- Reacts wonderful SPA (Single Page Application) optimization and Django’s powerful features make it even better.
- They have large community support and provide immediate assistance.Maintaining the Integrity of the Specifications

## III.ADVANTAGES OF CONNECTING REACT WITH DJANGO

As both the parts will be handled separately i.e. React and Django. Here is the list of advantages of using them separately.

- Cleaner and clear interface between front-end and back- end logic and functions.
- Easy to deploy either the front-end part or the back-end part without redeploying the other.
- Smoothing User Experience, with less loading times and less perceived transition-data is fetched in the background and only a part of the whole component will be reloaded.
- If there are separate teams working in front-end and back-end respectively they need not worry about another part as both can work independently.
- Can create scalable and multiple client (web, mobile) apps. All the clients will have to consume the same API provided by the back-end side.

## IV.PREREQUISITES

- A Development machine with any OS.
- Python 3 Installed.
- Node.js installed (version 12+).
- NPM installed (version 6+).
- Basic understanding of both the frameworks (Django and React).Authors and Affiliations

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### V.CONNECTING FRONTEND WITH BACKEND

This usually happens because we start learning either front-end part (HTML, CSS, Bootstrap, or React, Angular, or Vue if using the framework) or back-end part (Node.js, Django, etc. or any other framework). Let's understand the basic workflow of the connection. These 2 key points are building blocks of web technologies.

- In the back-end, we will create API using Django-Rest (having methods like GET, POST).
- In front-end, we will consume the API made in Django by hitting it using React.

### VI.BOUT THE PROJECT

Digitalization is the new target in the ongoing phase, where the students also expect their college protocols to move towards digital approach. To make Educational Institutes worth competing with the real-world complications which vanishes precious time of students and Institute, we are introducing a totally time and effort saving platform which will enable the students to get the progress report, status of their attendance, submit the assignments, status of due and undue fees with online payment facility, access to digital library including topper's notes, books recommendation based on the subjects and much more features.

### VII.SETTING UP THE BACKEND

Create a project folder for Django by creating a virtual environment. You must have installed virtualenv package.

**Step 1:** Install Virtualenv Package

```
python3 -m pip install --user virtualenv
```

**Step 2:** Create a Virtual Environment

```
python3 -m venv env
cd env
source bin/activate
```

**Step 3:** Install below packages by using pip

```
pip install django
pip install djangorestframework
python -m pip install Django-cors-headers
```

**Step 4:** Create a project name of your choice

```
django-admin startproject myapp
cd myapp
django-admin startappmyapp
```

**Step 5:** Final Part of Back-end

```
python manage.py makemigrations (this command is used to detect changes made in database)
python manage.py migrate (this command applies those changes to the database)
python manage.py createsuperuser (for creating super user who will be the admin)
python manage.py runserver (this command willrun the server)
```

### VIII.SETTING UP THE FRONTEND

There is no boundation to make the front-end folder in the same directory where the back-end folder lives. Also, there is no need of making a virtual environment for React. Use the following commands to get ready for React Application. Using Bootstrap and Material UI for styling and better look and feel, jQuery is for the dependencies with bootstrap.

**Step 1:** npx create-react-app myapp

**Step 2:** cd myapp

**Step 3:** npm install bootstrap jqueryaxios

Axios is the main tool for connecting back-end with front-end. All the requests will be sent to the server (back end) with the help of Axios.

### IX.SETTING UP THE DATABASE

We are using MongoDB as a backend database for our Django Project. The best part is that we can setup Django with MongoDB by adding just one line of code. There is no need to change serializers, views, or any other modules.



### Working

Django translates a SQL query string into a MongoDB query document. Therefore, there is no need to change models, serializers, views or any Django features. Django supports all Django contrib libraries which make it an easy to use connector.

### Features

- **Reuse Django Models/ORM**

As Django Models are compatible with Django, we can use reuse them.

- **Integrity checks**

Django allows integrity checks like missing values before they are saved to the database.

For e.g. – missing values are never stored if we set null = false, blank = false in embedded field

- **Validators**

We can apply validation checks like URLValidator, EmailValidator, RegexValidator etc. before each field are saved to the database.

### Usage

Step 1: Setup Virtual Environment Virtualenv\myenv\Myvenv\scripts\activate

Step 2: Install Django pip install django

Step 3: Install Django pip install djongo

Step 4: Start Django Project

django-admin startprojectmyapp

Step 5: Make changes to settings.py file

Now, open settings.py file. Comment out or remove previous SQL Database configuration and add the following code in settings.py file: settings.py

```
DATABASES = {
    'default': {
        'ENGINE': 'djongo',
        'NAME': 'your-database-name',
    }
}
```

That's it. Now you can use MongoDB as a backend database for your django project, without changing a single Django model!

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