Titles

Project Name - YouTube Clone

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Introduction

This YouTube Clone project is a full-stack video streaming web application built using the MERN stack (MongoDB, Express.js, React.js, Node.js) and styled with Tailwind CSS. It replicates the core features of YouTube, enabling users to:

- Sign up and log in securely using JWT-based authentication.
- Create their own channel (only one per user).
- Upload videos with metadata such as title, description, thumbnail, category, and URL.
- View and interact with videos through likes, dislikes, and comments.
- Browse content using search and category filters.
- Manage their own uploaded videos (edit/delete).

The goal of this project is to understand how real-world, production-grade full-stack applications are built and structured — involving both frontend and backend integration, RESTful API design, authentication, CRUD operations, and responsive UI/UX practices.

This project is ideal for developers who want hands-on experience building a complete media-sharing platform with user interaction, protected routes, and modern UI responsiveness.

Organized File Structure

Creating a well-organized file structure is crucial for readability, maintainability, and collaboration in any web project. My project is already structured well, and here's a breakdown of each component:

Description of Files:

backend/ - Node.js, Express, MongoDB (API Layer)

server.js

- Entry point for the backend server.
- Sets up Express, connects to MongoDB, and mounts routes.
- Runs on a port (e.g., 5000).

Controllers/ - Route handlers

- authController.js
 - Handles user registration and login.
 - Returns JWT on login.
- channelController.js
 - Handles channel creation, fetching channel by ID/user.
 - Manages one-channel-per-user rule.
- videoController.js
 - Handles uploading, updating, deleting, liking/disliking, and retrieving videos.
- · commentController.js
 - Handles posting, editing, deleting, and fetching comments for a video.

Models/ - Mongoose schemas

- User.js
 - o Schema for user (email, username, password).
- Channel.js
 - Schema for user's channel.
 - References user and videos.
- Video.js
 - Schema for videos.
 - Includes title, category, thumbnail, likes/dislikes, views, channelld, uploader.

- Comment.js
 - Schema for user comments.
 - References video and user.

Routes/ - Express routes

- authRoutes.js
 - POST /api/auth/register
 - POST /api/auth/login
 - 。 GET /api/auth/me
- channelRoutes.js
 - o POST /api/channels create new channel
 - GET /api/channels/:channelId
 - o GET /api/channels/user/:userId
- videoRoutes.js
 - POST /api/videos upload
 - GET /api/videos list all
 - GET /api/videos/:videoId details
 - PUT /api/videos/:videoId edit
 - DELETE /api/videos/:videoId delete
 - POST /api/videos/:videoId/like
 - o POST /api/videos/:videoId/dislike
- commentRoutes.js
 - POST /api/comments/:videoId
 - o GET /api/comments/:videoId
 - o PUT /api/comments/:commentId
 - DELETE /api/comments/:commentId

Middleware/

- authMiddleware.js
 - Verifies JWT in request headers.
 - Sets req.user if valid.

frontend/ - React + Tailwind CSS (UI Layer) src/

main.jsx

- Entry point for the React app.
- Wraps app in context providers.

App.jsx

- · Main layout.
- Renders Header, Sidebar, and route-based pages.

pages/

- Home.jsx
 - Lists all videos.
 - Filters by category.
 - o Fetches videos from context.
- VideoPlayer.jsx
 - Displays a selected video using iframe.
 - o Handles likes, dislikes, and comment functionality.
- Channel.jsx
 - Allows user to create channel.
 - Lists their uploaded videos.
 - Option to edit or delete.
- UploadVideo.jsx
 - o Uploads new video with details like thumbnail, title, category.
 - Validates and POSTs data.
- EditVideo.jsx
 - o Edit existing uploaded video.
- Login.jsx
 - User login form.
 - Stores JWT token.
- Register.jsx
 - User registration form.

components/

- Header.jsx
 - Logo, search bar, sign-in/sign-out button.
 - Responsive toggle for sidebar.
- Sidebar.jsx
 - Navigation links: Home, My Channel, Explore.
 - o Responsive: hidden on small screen, togglable on medium+ screens.
- VideoCard.jsx
 - Reusable card component to display video thumbnail, title, and metadata.

context/

- AuthContext.jsx
 - Stores user info and JWT.
 - Handles login, logout.
 - Used across protected routes and components.
- VideoContext.jsx
 - Central video store.
 - o Provides all videos and filtered results.
 - Search handler logic for header and home.

api/

- axios.js
 - Axios instance with base URL (http://localhost:5000/api)
 - Simplifies importing axios in components.

routes/

- ProtectedRoute.jsx
 - o Wraps around routes that require authentication.
 - o Redirects unauthenticated users to login.

Creativity and Presentation

This project was developed with both functionality and user experience in mind. The goal was to build a YouTube-like video-sharing platform with a clean UI, responsive layout, and interactive features. Below is an overview of the technologies used to build and style the application.

Technologies Used

Backend:

- Node.js JavaScript runtime for building server-side logic.
- Express.js Web framework for creating RESTful APIs.
- MongoDB NoSQL database used for storing users, videos, comments, and channels.
- Mongoose ODM for MongoDB, helps with schema and database operations.
- JWT (JSON Web Token) Used for user authentication and authorization.
- Bcrypt.js For password hashing.
- CORS & dotenv Cross-origin access and environment variable configuration.

Frontend:

- React.js Frontend JavaScript library for building the UI.
- React Router Handles navigation between pages (Home, Video, Channel, etc.).
- Axios For making HTTP requests to the backend.
- Tailwind CSS Utility-first CSS framework for fast and responsive styling.
- React Icons For icons used in the UI (e.g., like/dislike, menu, account).
- Vite Development server and bundler for fast React project bootstrapping.

API and Data Flow:

- RESTful APIs built using Express and consumed using Axios on the client side.
- Protected routes ensure that certain pages (like uploading or editing videos) are only accessible to logged-in users.

Other Tools:

- MongoDB Compass For managing and viewing the database.
- **Postman** API testing and development.

Code

Server.js

```
import express from "express";
import mongoose from "mongoose";
import dotenv from "dotenv";
import cors from "cors";
import authRoutes from "./Routes/authRoutes.js";
import commentRoutes from "./Routes/commentRoutes.js";
import channelRoutes from "./Routes/channelRoutes.js";
import videoRoutes from "./Routes/videoRoutes.js";
//Load environment variable
dotenv.config();
const app = express();
const PORT = process.env.PORT || 5000;
//Middleware
app.use(express.json());
app.use(cors());
//API Routes
app.use("/api/auth", authRoutes);
app.use("/api/comments", commentRoutes);
app.use("/api/channels", channelRoutes);
app.use("/api/videos", videoRoutes);
//Routes placeholder
// app.get("/", (req, res) => {
// res.send("Youtube Clone API is running");
// });
// MongoDB Connection
mongoose
 .connect(process.env.MONGO_URI)
```

```
.then(() => {
  console.log("Connected to MongoDB");
  app.listen(PORT, () =>
   console.log(`Server running on http://localhost: ${PORT}`)
  );
 })
 .catch((err) => console.log("MongoDB connection error:", err));
                                             Models/User.js
import mongoose from "mongoose";
const userSchema = new mongoose.Schema(
 {
  username: {
   type: String,
   required: true,
  },
  email: {
   type: String,
   required: true,
   unique: true,
  },
  password: {
   type: String,
   required: true,
  },
  avatar: {
   type: String,
   default: "",
  },
  channels: [
   {
    type: mongoose.Schema.Types.ObjectId,
```

ref: "Channel",

```
},
  ],
 },
 {
  timestamps: true,
 }
);
const User = mongoose.model("User", userSchema);
export default User;
                                              Models/Video.js
import mongoose from "mongoose";
const videoSchema = new mongoose.Schema(
  videold: {
   type: String,
   required: true,
   unique: true,
  },
  title: {
   type: String,
   required: true,
   trim: true,
  },
  thumbnailUrl: {
   type: String,
   required: true,
  },
  description: {
   type: String,
   required: true,
  },
  videoUrl: {
```

type: String,

```
required: true,
},
channelld: {
 type: mongoose.Schema.Types.ObjectId,
 ref: "Channel",
 required: true,
},
uploader: {
 type: mongoose.Schema.Types.ObjectId,
 ref: "User",
 required: true,
},
category: {
 type: String,
 default: "Other",
 enum: [
  "Movies",
  "Music",
  "TV Show",
  "Gaming",
  "Education",
  "News",
  "Sports",
  "Travel",
  "Food",
  "Other",
 ],
},
views: {
 type: Number,
 default: 0,
},
likes: [
 {
  type: mongoose.Schema.Types.ObjectId,
  ref: "User",
 },
],
```

```
dislikes: [
   {
    type: mongoose.Schema.Types.ObjectId,
    ref: "User",
   },
  ],
  uploadDate: {
   type: Date,
   default: Date.now,
  },
},
 { timestamps: true }
);
const Video = mongoose.model("Video", videoSchema);
export default Video;
                                           Models/Comment.js
import mongoose from "mongoose";
const commentSchema = new mongoose.Schema(
{
  videold: {
   type: mongoose.Schema.Types.ObjectId,
   ref: "Video",
   required: true,
  },
  userId: {
   type: mongoose.Schema.Types.ObjectId,
   ref: "User",
   required: true,
  },
  text: {
   type: String,
   required: true,
  },
  timestamp: {
```

```
type: Date,
   default: Date.now,
  },
},
  timestamps: true,
}
);
const Comment = mongoose.model("Comment", commentSchema);
export default Comment;
                                           Models/Channel.js
import mongoose from "mongoose";
const channelSchema = new mongoose.Schema(
  channelName: {
   type: String,
   required: true,
  },
  owner: {
   type: mongoose.Schema.Types.ObjectId,
   ref: "User",
   required: true,
  },
  description: {
   type: String,
   required: true,
  },
  channelBanner: {
   type: String,
   default: "",
  },
  subscribers: {
   type: Number,
   default: 0,
```

```
},
  videos: [
   {
     type: mongoose.Schema.Types.ObjectId,
    ref: "Video",
   },
  ],
 },
 {
  timestamps: true,
 }
);
const Channel = mongoose.model("Channel", channelSchema);
export default Channel;
                                       Middleware/authMiddleware.js
import jwt from "jsonwebtoken";
const authMiddleware = (req, res, next) => {
 const authHeader = req.headers.authorization;
 if (!authHeader || !authHeader.startsWith("JWT")) {
  return res
   .status(401)
   .json({ error: "Authorization header missing or malformed" });
 }
 const token = authHeader.split(" ")[1];
 try {
  const decoded = jwt.verify(token, "secretKey");
  req.user = decoded;
  next();
 } catch (error) {
  res.status(403).json({ error: "Invalid or expired token" });
 }
};
```

Controllers/authController.js

```
import User from "../Models/User.js";
import bcrypt from "bcryptjs";
import jwt from "jsonwebtoken";
//Register User
export const registerUser = async (req, res) => {
 try {
  const { username, email, password } = req.body;
  const existingUser = await User.findOne({ email });
  if (existingUser) {
   return res.status(400).json({ error: "User already exists" });
  }
  const hashedPassword = await bcrypt.hash(password, 10);
  const newUser = new User({
   username,
   email,
   password: hashedPassword,
  });
  await newUser.save();
  res.status(201).json({ message: "User registered successfully" });
 } catch (error) {
  res.status(500).json({ error: "Registration failed" });
 }
};
//Login User
export const loginUser = async (req, res) => {
 try {
  const { email, password } = req.body;
  const user = await User.findOne({ email });
  if (!user) {
   return res.status(400).json({ error: "Invalid credentials" });
  }
  const isMatch = await bcrypt.compare(password, user.password);
```

```
if (!isMatch) {
   return res.status(400).json({ error: "Invalid credentials" });
  }
  const token = jwt.sign({ id: user._id }, "secretKey", { expiresIn: "1h" });
  res.json({
   token,
   user: {
     id: user. id,
     username: user.username,
     email: user.email,
     avatar: user.avatar,
   },
  });
 } catch (error) {
  res.status(500).json({ error: "Login failed" });
 }
};
                                             Routes/authRoutes.js
import express from "express";
import { loginUser, registerUser } from "../Controllers/authController.js";
import authMiddleware from "../Middleware/authMiddleware.js";
import User from "../Models/User.js";
const router = express.Router();
//Register new user
router.post("/register", registerUser);
//Login user and return JWT
router.post("/login", loginUser);
// Get currently logged in user
router.get("/me", authMiddleware, async (req, res) => {
 try {
  const user = await User.findById(req.user.id).select("-password");
```

```
if (!user) return res.status(404).json({ error: "User not found" });
  res.json(user);
 } catch (err) {
  console.error("/me error:", err);
  res.status(500).json({ error: "Failed to fetch user info" });
 }
});
export default router;
                                              Frontend Code:-
App.jsx
import { Route, BrowserRouter as Router, Routes } from "react-router-dom";
import Header from "./components/Header";
import Home from "./pages/Home";
import VideoPlayer from "./pages/VideoPlayer";
import Channel from "./pages/Channel";
import Login from "./pages/Login";
import Register from "./pages/Register";
import NotFound from "./pages/NotFound";
import { useEffect, useState } from "react";
import Sidebar from "./components/Sidebar";
import ProtectedRoute from "./routes/ProtectedRoute";
import UploadVideo from "./pages/UploadVideo";
import EditVideo from "./pages/EditVideo";
function App() {
 const [isSidebarOpen, setIsSidebarOpen] = useState(true);
  useEffect(() => {
  const handleResize = () => {
   if (window.innerWidth < 768) {
     setIsSidebarOpen(false);
   } else {
     setIsSidebarOpen(true);
   }
```

```
};
 handleResize(); // run once on mount
 window.addEventListener("resize", handleResize);
 return () => window.removeEventListener("resize", handleResize);
}, []);
return (
 <Router>
  <Header toggleSidebar={() => setIsSidebarOpen((prev) => !prev)} />
  <div className="flex relative">
   <Sidebar isOpen={isSidebarOpen} />
   <div className="flex-1 transition-all duration-300">
     <Routes>
      <Route path="/" element={<Home />} />
      <Route
       path="/video/:id"
       element={
        <ProtectedRoute>
         {" "}
         <VideoPlayer />
        </ProtectedRoute>
       }
      />
      <Route
       path="/channel/:channelId"
       element={
        <ProtectedRoute>
         <Channel />
        </ProtectedRoute>
       }
      />
      <Route path="/login" element={<Login />} />
      <Route path="/register" element={<Register />} />
      <Route path="/upload" element={<UploadVideo />} />
      <Route path="/edit-video/:videoId" element={<EditVideo />} />
      <Route path="*" element={<NotFound />} />
     </Routes>
```

```
</div>
   </div>
  </Router>
 );
}
export default App;
                                                 Header.jsx
import { HiMenu } from "react-icons/hi";
import { Link } from "react-router-dom";
import { IoLogoYoutube } from "react-icons/io";
import { FiSearch } from "react-icons/fi";
import { MdAccountCircle } from "react-icons/md";
import { useContext } from "react";
import { AuthContext } from "../context/AuthContext";
import { useVideo } from "../context/VideoContext";
function Header({ toggleSidebar }) {
 const { user, logout } = useContext(AuthContext);
 const { search, setSearch, handleSearch } = useVideo();
 return (
   <header className="flex items-center justify-between px-6 py-3 bg-white shadow-md sticky top-0 z-</p>
100">
   <div className="flex item-center gap-4">
     <button onClick={toggleSidebar} className="text-2xl">
      <HiMenu />
     </button>
     <Link
      to="/"
      className=" flex items-center gap-1 text-xl font-bold text-shadow-lg"
      <loLogoYoutube className="text-2xl text-red-600" />
      YouTube
     </Link>
```

```
</div>
   {/* Search Bar */}
   <div className="hidden md:flex justify-center flex-1 mx-4">
     type="text"
     placeholder="Search..."
     value={search}
     onChange={(e) => setSearch(e.target.value)}
     className="w-1/2 border rounded-l-xl py-1 px-4"
    />
    <button
     onClick={handleSearch}
     className="bg-gray-200 px-4 py-1 rounded-r-xl"
     <FiSearch />
    </button>
   </div>
   {/* Auth Section */}
   <div className="flex items-center gap-3">
    {!user ? (
      <Link
       to="/login"
         className=" flex items-center gap-1 text-blue-500 text-sm font-semibold bg-gray-100 hover:bg-
gray-300 px-3 py-1 rounded-md"
       <MdAccountCircle className="text-2xl" /> Sign In
     </Link>
    ):(
       <span className="flex items-center gap-1 text-sm font-medium text-gray-700 bg-zinc-300 py-1 px-4</p>
rounded">
        <MdAccountCircle className="text-2xl" /> {user.username}
       </span>
       <button
        onClick={logout}
        className="text-sm font-semibold bg-red-500 hover:bg-red-700 text-white px-3 py-1 rounded-md"
```

```
Logout
       </button>
      </>
    )}
   </div>
  </header>
 );
}
export default Header;
                                                 Home.jsx
import { useEffect, useState } from "react";
import VideoCard from "../components/VideoCard";
import { useLocation } from "react-router-dom";
import { useVideo } from "../context/VideoContext";
function Home() {
 const categories = [
  "All",
  "Movies",
  "Music",
  "TV Show",
  "Gaming",
  "Education",
  "News",
  "Sports",
  "Travel",
  "Food",
  "Other",
 ];
 const [activeCategory, setActiveCategory] = useState("All");
 const { videos, filteredVideos, setFilteredVideos } = useVideo();
 const location = useLocation();
 const searchParams = new URLSearchParams(location.search);
```

```
const search = searchParams.get("search")?.toLowerCase() || "";
useEffect(() => {
 let filtered = [...videos];
 if (activeCategory !== "All") {
  filtered = filtered.filter(
   (video) =>
     video.category?.toLowerCase() === activeCategory.toLowerCase()
  );
 }
 if (search) {
  filtered = filtered.filter((video) =>
   video.title.toLowerCase().includes(search)
  );
 }
 setFilteredVideos(filtered);
}, [videos, activeCategory, search]);
return (
 <div className="flex">
  <main className="flex-1 p-4 ml-0">
   {/* Category Filters */}
   <div className="flex justify-center flex-wrap gap-2 mb-4">
     {categories.map((cat) => (
      <button
       key={cat}
       onClick={() => setActiveCategory(cat)}
       className={`px-4 py-1 text-sm rounded-full ${
        activeCategory === cat
          ? "bg-zinc-900 text-white font-semibold"
          : "bg-gray-200 hover:bg-gray-300"
       }`}
       {cat}
      </button>
```

```
))}
     </div>
    {/* Video Grid */}
    {filteredVideos.length === 0 ? (
      No videos found.
    ):(
      <div className="grid m-6 sm:m-0 gap-4 grid-cols-1 sm:grid-cols-2 md:grid-cols-2 lg:grid-cols-3">
       {filteredVideos.map((video) => (
        <VideoCard key={video._id} video={video} />
       ))}
      </div>
    )}
   </main>
  </div>
 );
}
export default Home;
                                            UploadVideo.jsx
import { useContext, useState } from "react";
import { useNavigate } from "react-router-dom";
import { AuthContext } from "../context/AuthContext";
import axios from "../api/axios";
function UploadVideo() {
 const { user } = useContext(AuthContext);
 const navigate = useNavigate();
 const [formData, setFormData] = useState({
  title: "",
  description: "",
  category: "",
  videoUrl: "",
  thumbnailUrl: "",
 });
```

```
const [error, setError] = useState("");
const handleChange = (e) => {
 setFormData((prev) => ({ ...prev, [e.target.name]: e.target.value }));
};
const generateVideoId = () => {
 return "vid_" + Date.now().toString(36);
};
const handleSubmit = async (e) => {
 e.preventDefault();
 const token = localStorage.getItem("token");
 const channelld = localStorage.getItem("channelld"); // stored after login/channel creation
 console.log("Uploading to channelld:", channelld);
 if (!channelld) {
  setError("No channel found. Please create a channel first.");
  return;
 }
 const payload = {
  videold: generateVideold(),
  title: formData.title,
  description: formData.description,
  thumbnailUrl: formData.thumbnailUrl,
  videoUrl: formData.videoUrl,
  channelld,
  category: formData.category || "Other",
 };
 try {
  await axios.post("/videos", payload, {
    headers: {
     Authorization: `JWT ${token}`,
   },
  });
```

```
navigate("/channel/my");
 } catch (err) {
  setError(err.response?.data?.error || "Upload failed");
 }
 console.log("Uploading:", payload);
};
if (!user) return Please login first.;
return (
 <div className="max-w-2xl mx-auto mt-10 p-6 bg-white rounded shadow">
  <h2 className="text-2xl font-bold mb-6">Upload New Video</h2>
  {error && {error}}
  <form onSubmit={handleSubmit} className="space-y-4">
   <input
    name="title"
    placeholder="Video Title"
    value={formData.title}
    onChange={handleChange}
    required
    className="w-full border p-2 rounded"
   />
   <textarea
    name="description"
    placeholder="Video Description"
    value={formData.description}
    onChange={handleChange}
    required
    className="w-full border p-2 rounded"
   />
   {/* Category Dropdown */}
   <select
    name="category"
    value={formData.category}
    onChange={handleChange}
    required
    className="w-full border p-2 rounded bg-white"
```

```
<option value="">Select a Category</option>
   <option value="Movies">Movies</option>
   <option value="Music">Music</option>
   <option value="TV Show">TV Show</option>
   <option value="Gaming">Gaming</option>
   <option value="Education">Education
   <option value="News">News</option>
   <option value="Sports">Sports</option>
   <option value="Travel">Travel</option>
   <option value="Food">Food</option>
   <option value="Other">Other</option>
  </select>
  <input
   name="videoUrl"
   placeholder="Video URL"
   value={formData.videoUrl}
   onChange={handleChange}
   required
   className="w-full border p-2 rounded"
  />
  <input
   name="thumbnailUrl"
   placeholder="Thumbnail URL"
   value={formData.thumbnailUrl}
   onChange={handleChange}
   required
   className="w-full border p-2 rounded"
  />
  <but
   type="submit"
   className="w-full bg-blue-600 text-white py-2 rounded hover:bg-blue-800"
   Upload Video
  </button>
 </form>
</div>
```

);

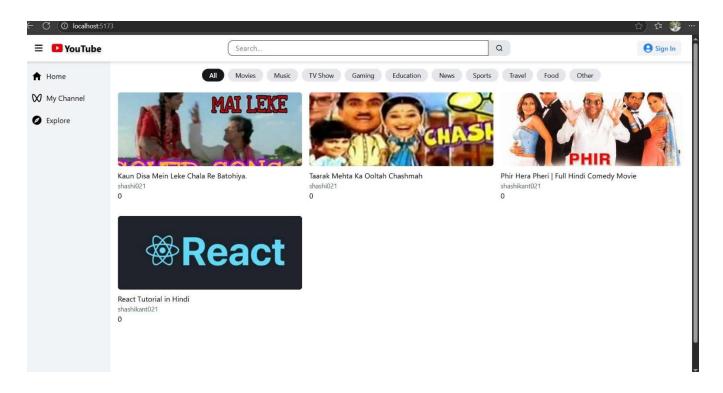
```
export default UploadVideo;
```

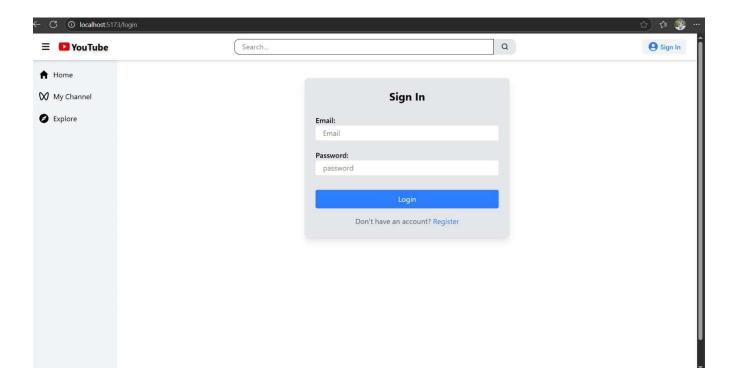
}

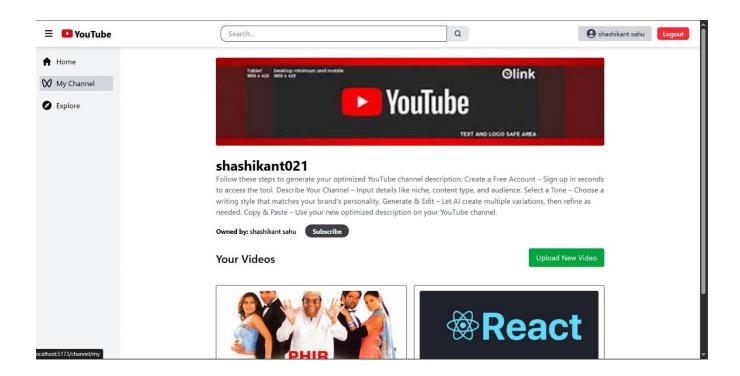
Sidebar.jsx

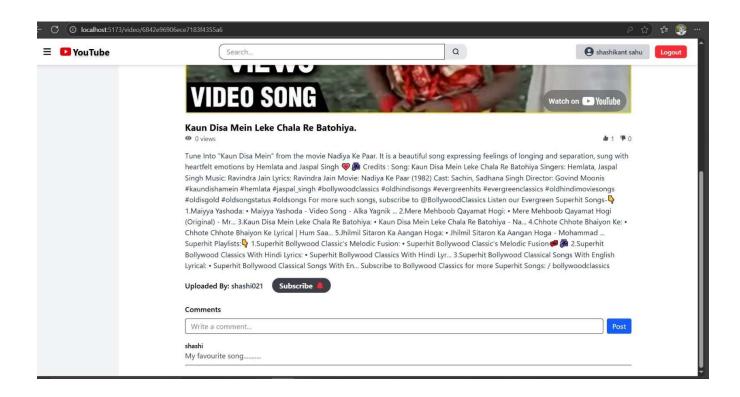
```
import { Link } from "react-router-dom";
import { IoMdHome } from "react-icons/io";
import { MdExplore } from "react-icons/md";
import { RiWechatChannelsLine } from "react-icons/ri";
function Sidebar({ isOpen }) {
 return (
  <aside
   className={`
     bg-gray-100 min-h-screen top-[55px] z-50 overflow-hidden transition-all duration-300
    fixed md:static
     ${isOpen ? "w-48" : "w-0"}
     ${isOpen && window.innerWidth < 768 ? "left-0 absolute shadow-lg" : ""}
   `}
   {" "}
   <nav
    className={`flex flex-col gap-4 p-4 ${
      isOpen? "opacity-100": "opacity-0"
    } transition-opacity duration-300`}
     <Link
      to="/"
      className="hover:bg-gray-300 p-1 rounded flex items-center gap-2"
      <loMdHome className="text-2xl" /> Home
     </Link>
     <Link
      to="/channel/my"
      className="hover:bg-gray-300 p-1 rounded flex items-center gap-2"
      <RiWechatChannelsLine className="text-2xl" /> My Channel
     </Link>
```

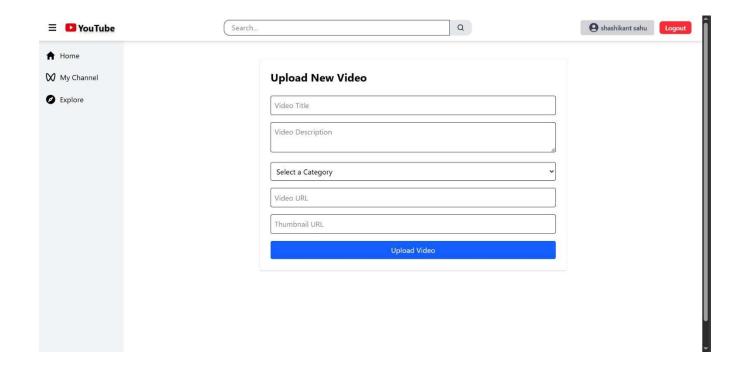
Screenshot:-











■ GitHub Link:- https://github.com/shashikant021/YouTube-Clone.git