



MotorMojo - Web Application

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Overview

MotorMojo Version 1.0 is an advanced platform designed to facilitate motor design, simulation, and analysis. It is tailored for engineers and researchers who seek precision, efficiency, and ease of use in motor development. The platform integrates robust visualization tools, secure computation frameworks, and an intuitive user interface to streamline the motor design process.

Key Features

1. Advanced Visualization

MotorMojo provides interactive graphical representations of motor components, performance parameters, and simulation results. These visual aids help users analyze motor behavior effectively and make data-driven decisions.

2. Secure and Accurate Calculations

The platform ensures reliable and accurate simulations using advanced computational algorithms. Security measures are embedded to protect sensitive data, ensuring a trustworthy environment for motor analysis.

3. User-Friendly Interface

MotorMojo is designed with an intuitive UI that simplifies navigation, making it accessible for both beginners and experienced professionals. Its streamlined workflow allows users to design, simulate, and analyze motors with minimal complexity.

Core Sections of MotorMojo

MotorMojo consists of two primary sections that guide users through the motor development process:

1. Vehicle Dynamics

The **Vehicle Dynamics** section of MotorMojo focuses on analyzing how different motor configurations affect the overall performance of a vehicle. Users can:

- Simulate real-world driving conditions
- Evaluate powertrain efficiency
- Optimize motor and vehicle interactions for improved performance

This section provides engineers with insights into vehicle behavior under various operating conditions, allowing for better design and control strategies.

Vehicle Dynamics Outputs:

- **Torque-Speed Curve:** Displays the relationship between torque and speed to analyze motor performance across different operating conditions.
- **Power-Speed Curve:** Illustrates how power output varies with speed, aiding in performance optimization and energy efficiency calculations.
- **Voltage Specification:** Provides detailed voltage requirements and variations, which are essential for powertrain design and control strategies.

2. Motor Wiz

The **Motor Wiz** module is dedicated to motor-specific design, parameter tuning, and performance evaluation. It enables users to:

- Select motor topology
- Analyze efficiency and torque-speed characteristics
- Conduct magnetic and thermal performance simulations

Motor Wiz guides users through the motor development process, ensuring optimal design and performance alignment with application requirements.

Motor Wiz Outputs:

- **Geometry Diagram:** Evaluates motor structure, including dimensions and design constraints, ensuring optimal mechanical integrity.
- **Winding Diagram:** Assesses coil winding configurations to enhance efficiency and minimize power losses.
- **Flux Density Plot:** Visualizes the magnetic flux distribution within the motor to ensure proper magnetic circuit design.
- **Air Gap Flux:** Studies the magnetic field behavior in the air gap, a critical factor for motor efficiency and performance.
- **Performance Analysis:** Provides efficiency plot, torque vs speed analysis, winding temperature plot, Max Torque Trajectory, Motor Constraint curve, MTPA Table and steel loss estimation.
- **Cost & Weight Estimation:** Helps in selecting appropriate materials while optimizing cost-effectiveness and weight considerations.

Typical Uses of MotorMojo

MotorMojo is designed for a wide range of applications, including:

1. Motor Design and Development

- Create and optimize electric motors for various applications, including automotive, industrial, and renewable energy sectors.
- Design motor typologies (e.g., Permanent Magnet Motors, Induction Motors, Switched Reluctance Motors) based on efficiency and performance requirements.
- Evaluate trade-offs between power density, cost, and material selection.

2. Performance Simulation and Analysis

- Conduct simulations to analyze torque-speed characteristics, power losses, and efficiency maps.
- Optimize motor configurations to enhance performance under different operating

conditions.

- Simulate thermal behavior to prevent overheating and improve cooling system designs.

3. Vehicle Dynamics Evaluation

- Study the impact of different motor configurations on overall vehicle performance.
- Simulate real-world driving conditions to optimize energy consumption and battery life.
- Analyze acceleration, braking, and regenerative energy recovery for electric and hybrid vehicles.

4. Powertrain Optimization

- Integrate motor performance analysis with vehicle powertrain components such as inverters, batteries, and transmissions.
- Improve torque delivery, efficiency, and drivability for electric and hybrid vehicles.
- Identify the best motor and controller settings for specific applications.

5. Research and Academic Applications

- Used by researchers and students for studying motor theory, electrical machine design, and control strategies.
- Supports academic projects and thesis work related to electric motor development.
- Provides a platform for testing novel algorithms and machine learning applications in motor control.

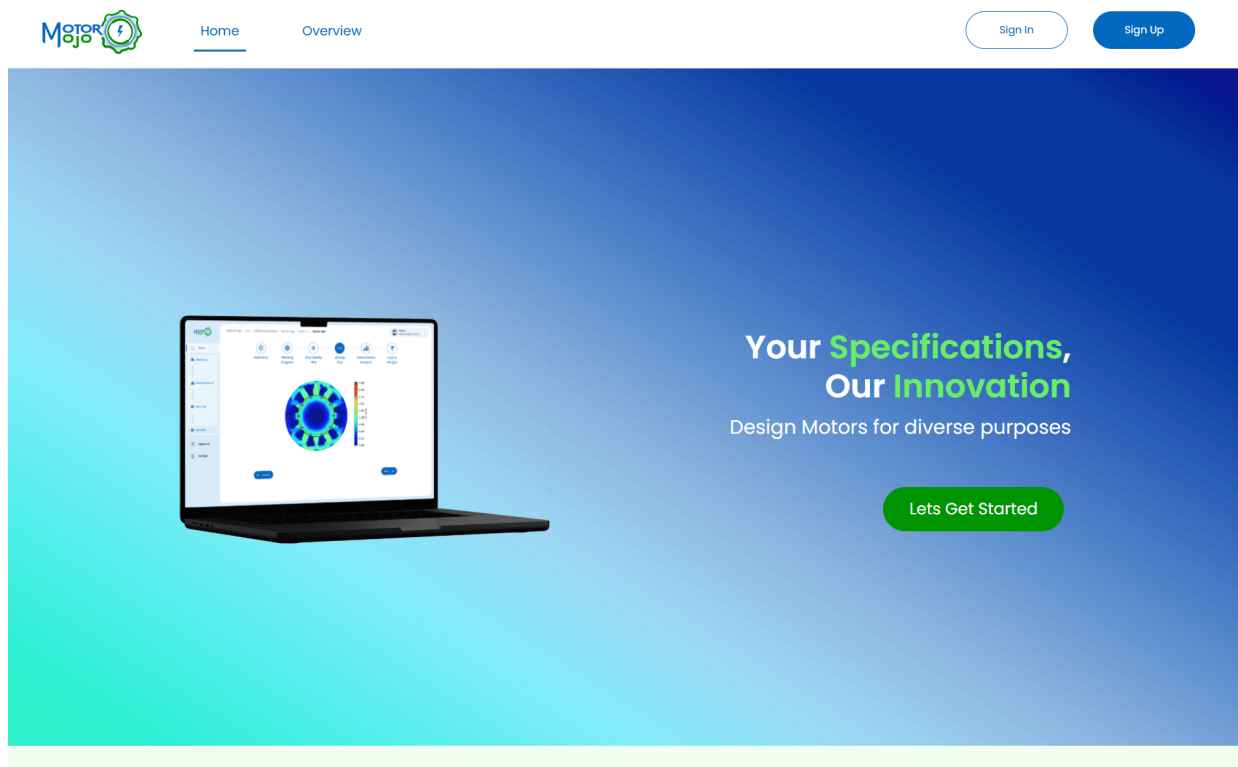
6. Cost and Material Optimization

- Analyze material costs and weight considerations to design cost-effective motors.
- Compare different materials (e.g., Stator Steel, Rotor Steel, Copper, and Magnets) for performance vs. cost trade-offs.
- Ensure sustainable and economically viable motor production.

Below is a step-by-step guide to accessing the website and signing in or signing up.

Navigating to MojoMotor

1. Open any web browser of your choice (Google Chrome, Mozilla Firefox, Microsoft Edge, etc.).
2. In the address bar, type **<https://mojomotor.in/>** and press **Enter**.
3. The homepage of MojoMotor will load, displaying key navigation options.



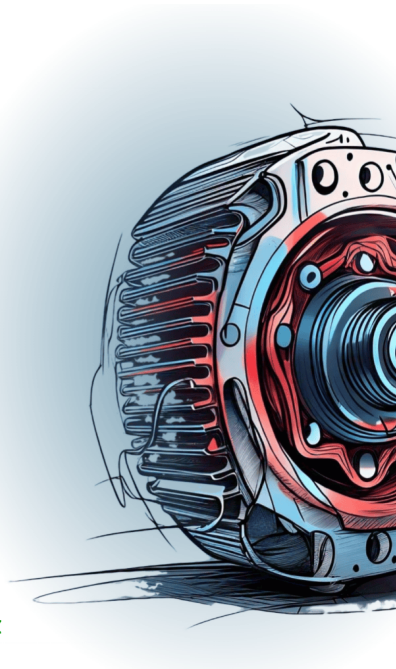
Understanding the Homepage Layout

- ▲ On the **top left corner** of the page, you will find two navigation options:
 - ◆ **Home:** Returns to the main page.
 - ◆ **Overview:** Provides an insight into the platform's functionalities and features.
- ▲ On the **top right corner**, you will find two buttons:

- ◆ **Sign In:** For existing users to access their accounts.
- ◆ **Sign Up:** For new users to create an account.

MojoMotor Sign-Up

Welcome to MotorMojo! Follow these simple steps to sign up and get started.



Powered by



Sign-up

First Name *	Last Name *
<input type="text"/>	<input type="text"/>
Email ID *	Occupation *
<input type="text"/>	<input type="text" value="Student"/>
Bio	
<input type="text"/>	
Password *	Confirm Password *
<input type="password"/>	<input type="password"/>

Create Account

Already have an account? [Login](#)

How to Sign Up

1. Enter Your Details:

- Provide your **First Name** and **Last Name**.
- Enter a **valid Email Address**.
- Select your **Occupation** (optional).
- Add a brief **Bio** (if needed).

2. Create a Secure Password:

- Your password must include:
 - At least **one alphabet**
 - At least **one special character & one uppercase letter**
 - At least **one number**
 - Must be at least **8 characters long**

3. Complete Registration:

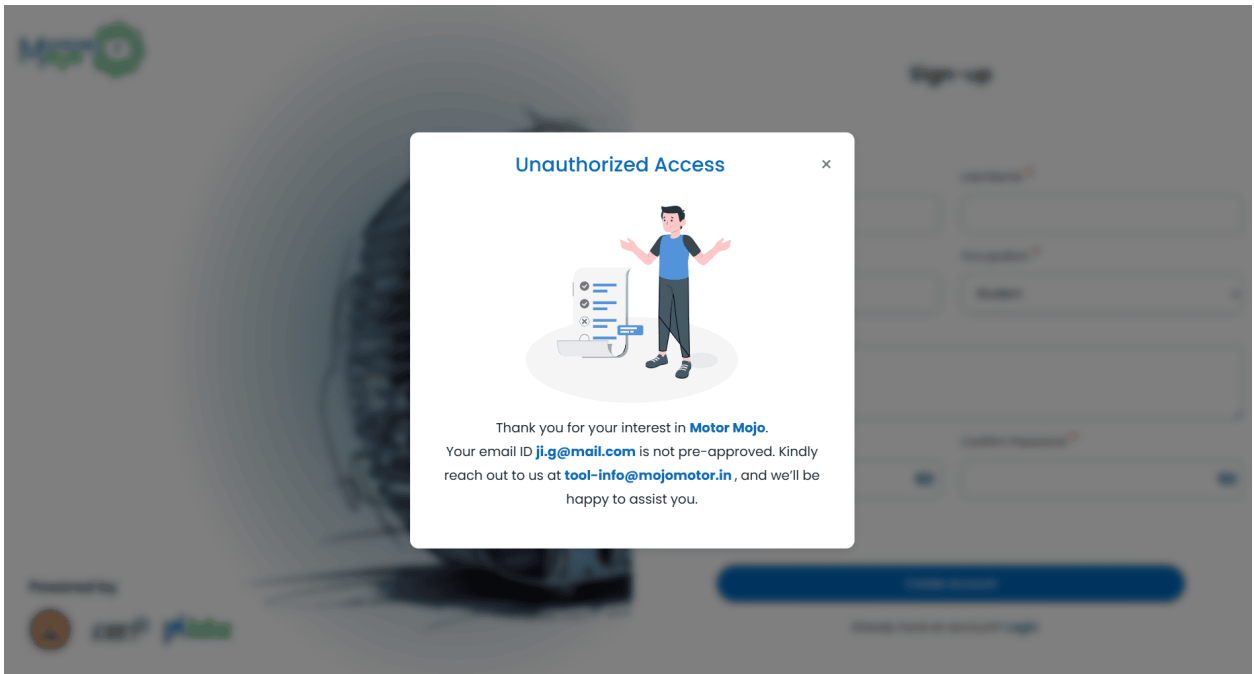
- Click on the **Create Account** button to proceed.

4. Verify Your Email:

- A verification email will be sent to your registered email address.
- Log in to your email account and click the **verification link** to confirm your registration.

Handling Unauthorized Access Issue:

- If you encounter an **Unauthorized Access** pop-up after clicking **Create Account**, please contact tool-info@motormojo.in or reach out to the **MotorMojo Admin Team**.
- Once you contact the admin team via email, they will verify and activate your account.



- After activation, log in using your **registered email and password**.

MojoMotor Sign In

Steps to Sign In:

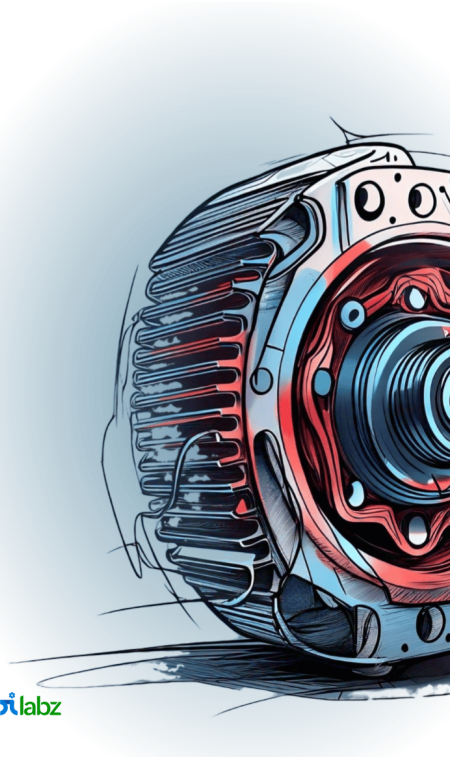
1. Enter your **Email ID** and **Password**.

Common Issues & Solutions:

- ▲ **Incorrect Email/Password:** Check if the email and password entered are correct. Ensure no extra spaces.
- ▲ **Account not found:** Ensure you've signed up before trying to log in.



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Welcome

Login to your account

Email ID

Password

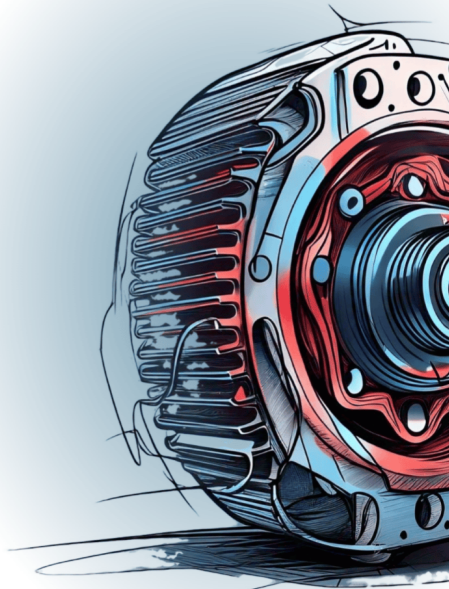
[Forgot password?](#)

Login

Don't have an account? [Sign Up](#)

Verify Your Email:

- ▶ Upon login, an **Email Verification** pop-up will appear.
- ▶ Click '**Click Here**' and follow the instructions to confirm your registration.



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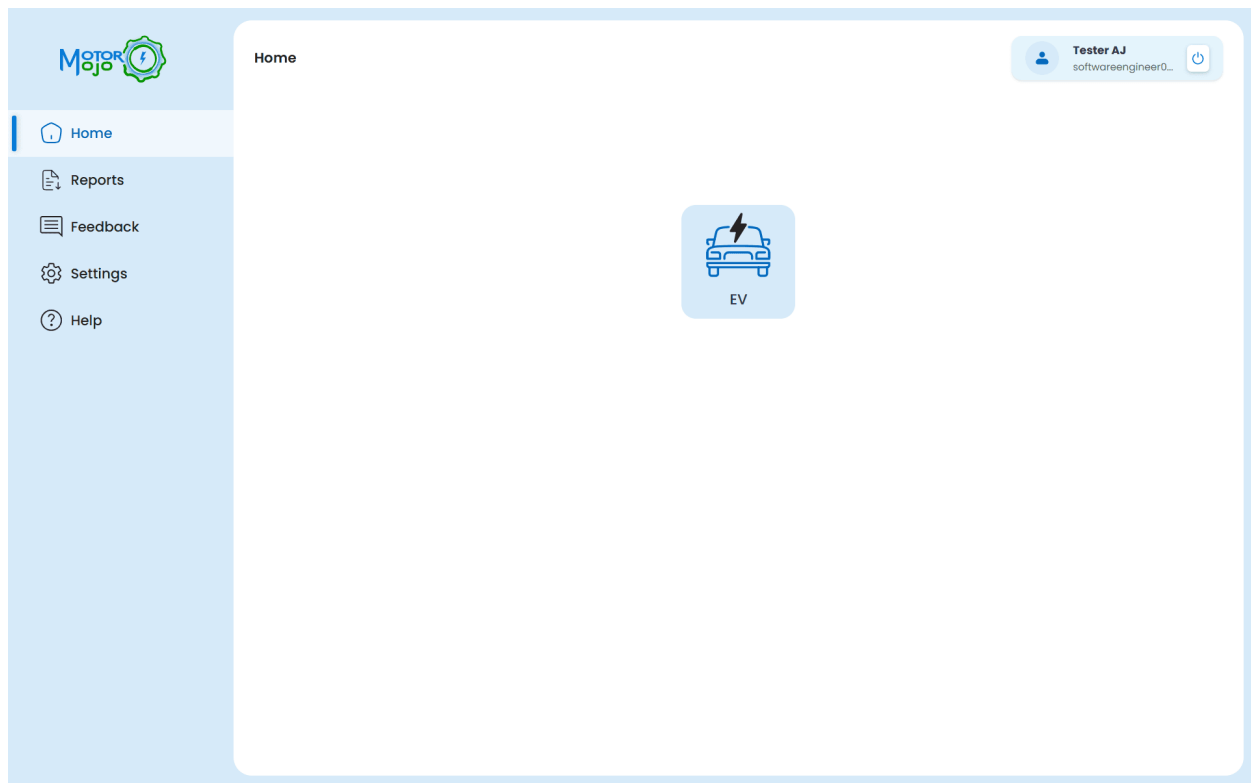


Email verification

An email with instructions to verify your email address has been sent to your address aravindhan.a@pilabz.in.

Haven't received a verification code in your email?
[Click here](#) to re-send the email.

Once your email is verified, you're all set to explore the features of MotorMojo!



Start your journey with MotorMojo!

(Note)

- ✓ **Browser Zoom Recommendation:** For optimal usage of the app, please set your browser zoom to **100%** if you are using **Chrome, Brave, or Microsoft Edge** to ensure the interface displays correctly.
- ✓ **Responsive Design:** The app is **fully responsive** for **tablets and higher laptop display resolutions**, providing a seamless user experience.
- ✓ **Mobile Restriction:** The app is **restricted for mobile resolutions** to maintain functionality and usability standards.