TYRE FOOTPRINT ANALYSER

INSTRUCTION MANUAL

Prerequisites

- **Web Browser:** The application is accessible through any modern web browser like Google Chrome, Mozilla Firefox, or Microsoft Edge.
- **Python Environment:** If you wish to run the application locally or explore the source code, you'll need a Python environment set up on your machine. Python versions 3.11 or later are recommended.
- **Internet Connection:** To setup the application environment a stable internet connection is required for downloading the required python libraries.

Installing Required Python Libraries (if running locally):

1. **Download Application Files:** Obtain the application files provided. This typically includes the Python script file (e.g., `tyre_analysis.py`) and `requirements.txt` file.
2. **Install Libraries:** The application relies on specific Python libraries for functionality. These libraries are listed in a file named `requirements.txt`. Using a terminal window, navigate to the directory containing the downloaded files.
3. **Run Installation Command:** In the terminal window, when inside the directory containing the downloaded files, type the following command and press Enter:

   ```
   pip install -r requirements.txt
   ```

   This command instructs the pip package manager (Python's package installer) to install all the libraries listed in the requirements.txt file. This might take a few minutes depending on the number of libraries required.

Launching the Application

1. **Obtaining the Application:** The application exists as a Python script file with a `.py` extension (`tyre_analysis.py`), which is included within the files provided.
2. **Open Terminal:** Open a command prompt or terminal window and navigate to the directory containing the application script file (`tyre_analysis.py`).
3. **Run the Script:** In the command prompt, type the following command and press Enter:

   ```
   streamlit run tyre_analysis.py
   ```

   This command instructs Streamlit to execute the script and launch the web application.

4. **Webpage Load:** Your web browser will automatically open a new window displaying the application interface.

Uploading the Tyre Footprint

1. **Locate the Upload Option:** The application interface has a dedicated section for image upload. This will be a button labelled "Upload Image" in a designated file selection area.
2. **Select Your Image:** Click on the upload button or browse option. This will open your device's file explorer window.
3. **Choose the Image File:** Locate the image file containing the tire footprint you want to analyse. Ensure the image is in .png format
4. **Upload Confirmation:** Once you select the image file, it will be uploaded to the application.

Analysing the Uploaded Image

1. **Locate the Analyse Button:** The application interface likely has a button labelled "Analyse" or "Process Image." This initiates the image processing pipeline.
2. **Click to Analyse:** Click on the "Analyse" button. The application will start processing the uploaded image. This might take a few seconds depending on the image size and processing complexity.
3. **Processing Status:** The application might provide visual cues like a progress bar or loading indicator to inform you that the image is being processed.

Viewing Analysis Results

1. **Visualization Panel:** Once processing is complete, the application will display the analysis results on the webpage. This typically includes:
    - **Processed Image:** The uploaded image is displayed with additional information like bounding boxes or overlays highlighting specific areas of interest.
    - **Graphs:** Graphs are displayed to visualize the tire footprint parameters, such as pressure distribution and contact area.
2. **Interactive Sidebar:** The application might have a sidebar on the left side of the webpage. This sidebar typically includes:
    - **Dropdown Menu:** This menu lists various analysis results. Selecting an option from the menu allows you to view the specific aspects of the tire footprint analysis.
    - **Additional Controls:** The sidebar offers an additional control to adjust the aspect ratio constant.