

# User Manual

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## 1.1 Overview

The Surface Crack Detection App allows you to upload photos of surfaces (e.g., concrete walls, pavements) and automatically detects whether cracks are present. It is designed for ease of use and does not require any technical expertise.

**This tool is ideal for:**

- Civil engineers and construction professionals
- Maintenance teams inspecting infrastructure
- Property owners or site inspectors with minimal technical experience

With just a few clicks, users can upload images and receive instant feedback on the presence of cracks, helping in early detection and maintenance planning.

## 1.2 Getting Started

### 1.2.1 Installation Requirements

To run the Surface Crack Detection App on your computer, you'll need the following:

#### **Install Docker**

Docker allows the app to run in a self-contained environment without needing to install software manually.

## Steps to Install Docker:

### For Windows or Mac:

1. Go to the Docker Desktop download page ([docker-desktop](#)).
2. Download and install Docker Desktop.
3. Follow the installation steps.
4. After installation, open Docker Desktop to make sure it's running.

### For Ubuntu/Linux:

1. Follow the instructions given in [docker-desktop-install-linux](#)
2. Verify installation:(by running the below command in terminal)

`docker --version`

## 1.2.2 Features

The Surface Crack Detection App provides the following features to help you easily upload, analyze, and view surface images for cracks:

### Image Upload

- Upload image of surfaces (e.g., walls, roads) from your computer.
- Supported formats: .jpg, .jpeg, .png.

### Automatic Crack Detection

- The app uses an AI model to automatically analyze uploaded images.
- Each image is processed to detect cracks and classify whether they are present or not.

### Visual Feedback

- After detection, results are shown with the original image and predicted label.
- You can view whether the image is:
  - **Crack Detected**
  - **No Crack Detected**

### Flag Wrong Predictions

- If the prediction is incorrect, you can **flag it** with a single click.
- Flagged images are saved and can be used later to **retrain the model**, improving accuracy over time.

### Clear and Re-upload

- A **Clear** button is available to reset the image upload section.
- This allows you to **remove previous images** and **upload new ones** seamlessly

## 1.2.2 Running the app

After installing docker-desktop you just need to run simple commands to get the project repository and run the full application in your system.

- **Open a terminal window** (Command Prompt, PowerShell, or Terminal depending on your OS).

- **Clone and project and Navigate to the project folder**

Use the cd command to go to the folder where you have stored the application files

```
git clone https://github.com/DA24M010/da5402\_aiapp.git
```

```
cd da5402_aiapp
```

- **Start the application using Docker Compose**

Run the following command to build and start all services (frontend, backend, database, etc.):

```
docker-compose up --build
```

- **Access the web application**

Once all services are up, open your browser and go to:

```
http://localhost:3000
```

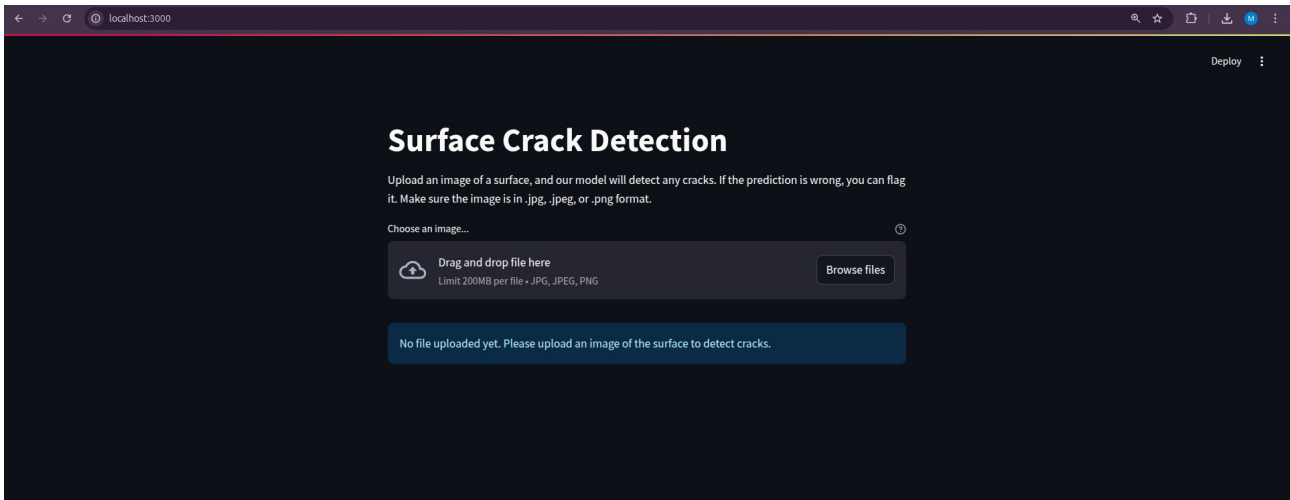
- **Stopping the application**

To stop the application, press `Ctrl + C` in the terminal where Docker is running, and then run:

```
docker-compose down
```

## 1.3 Application Interface

On launching <http://localhost:3000> on your browser window the below application window will appear.

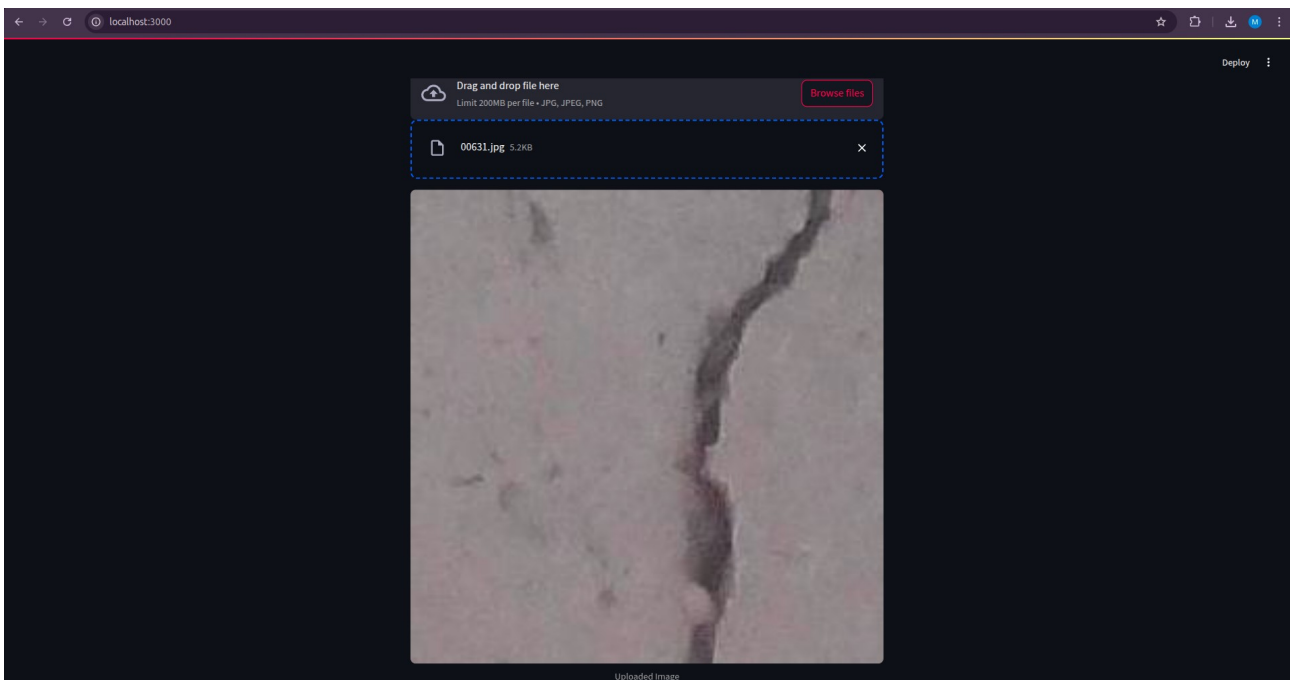


### Upload an Image

- Click on the "**Browse files**" button.
- Select an image of a concrete surface from your computer (e.g., .jpg, .png).
- The uploaded image will be displayed on the screen.

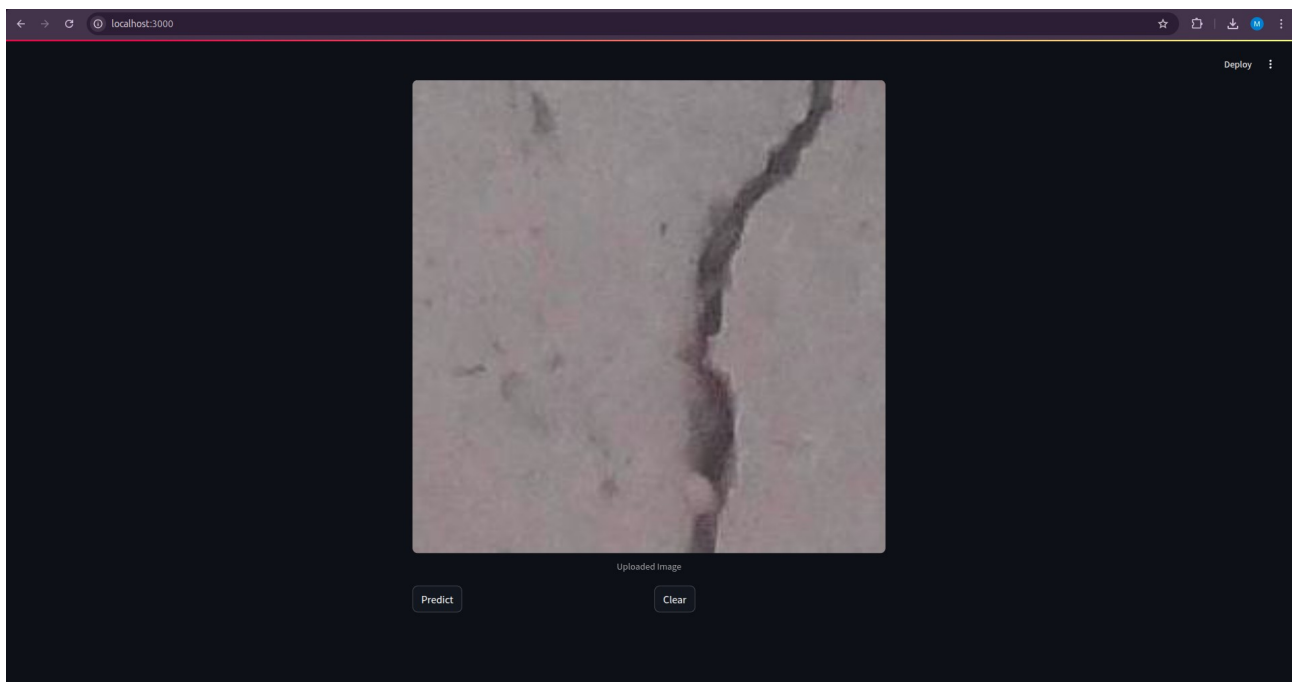
OR

- The image can also be dragged from the system on top of the specified place to load the image.



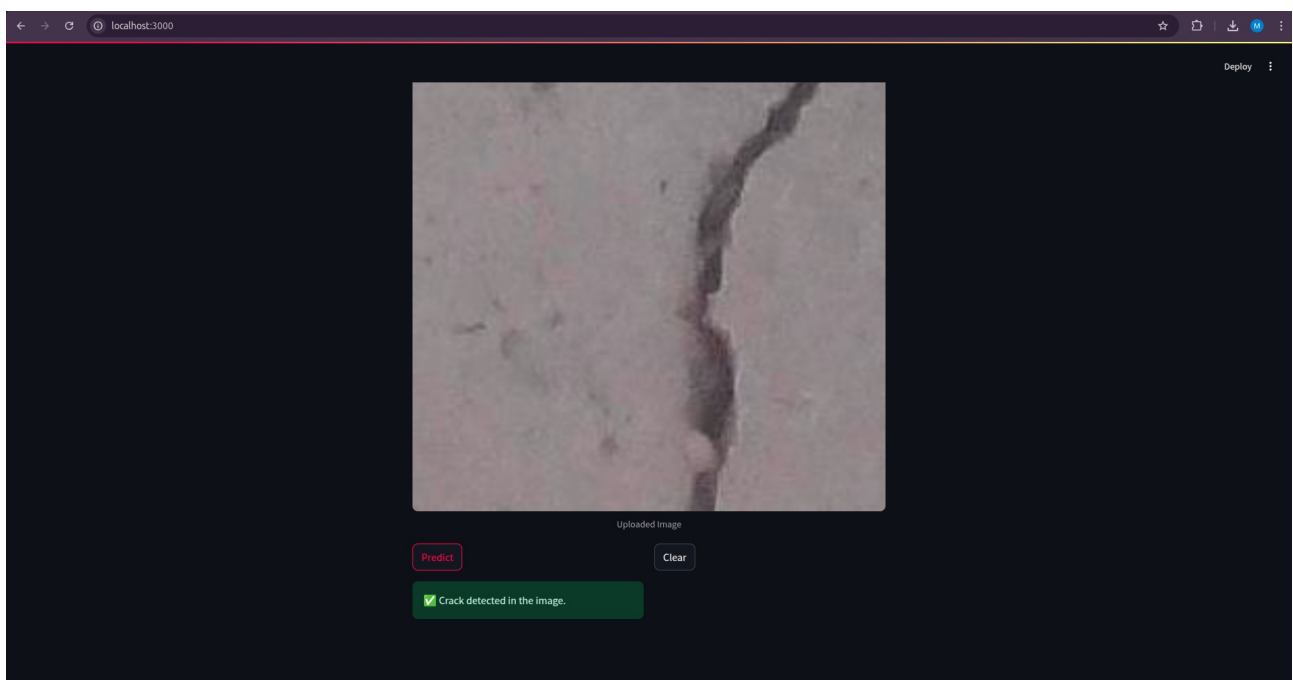
The above screen shows the loaded image on the screen.

When you scroll down slightly, the UI shifts to the next section, where two new buttons become visible: "Predict" and "Clear."



## Predict Button

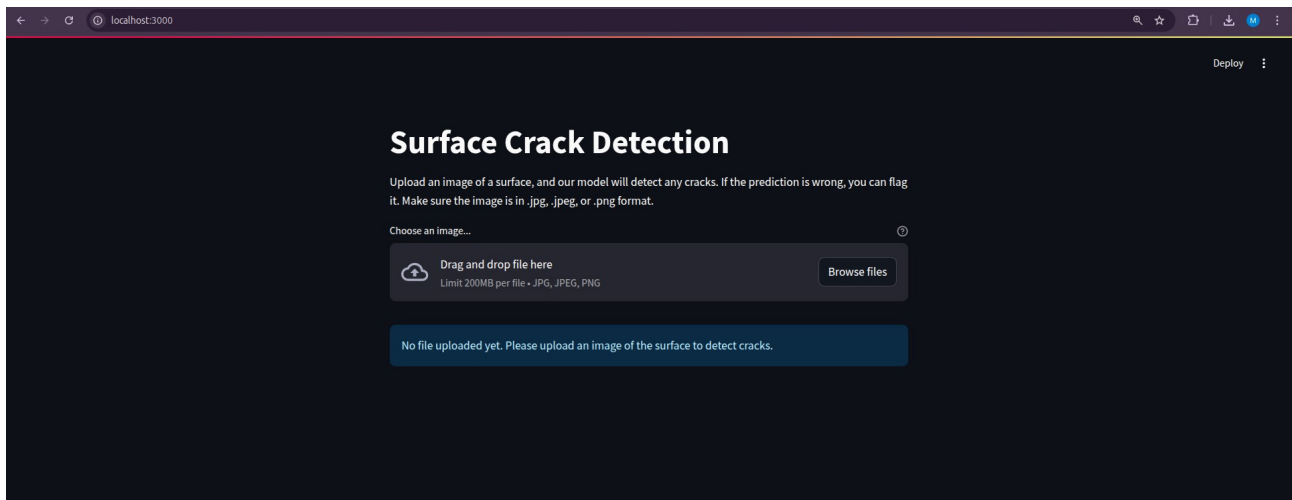
- The app will automatically process the image and display whether the surface contains a **crack** or **no crack**.



The image above displays the prediction for the input image, which indicates a crack has been detected, resulting in a positive outcome.

## Clear Button

- Click the "**Clear**" button to remove the uploaded image and prediction result.
- You can now upload a new image.



The UI resets back to the original UI, removing any image that you inserted or any prediction

## Flag Wrong Prediction

- If you believe the prediction is incorrect, click the "**Flag this prediction**" button.
- This image will be saved for future model retraining, helping improve accuracy over time

