

# Solarian

MLDA Deep Learning Week 2022 Hackathon

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## Inspiration:

As Singapore moves towards being a SmartNation, the demand for sustainable energy increases. With SG facing limitations such as lack of space and natural resources, our most viable renewable energy option will be **Solar Energy**. Being in the tropical sun belt, Singapore enjoys an average annual solar irradiance of 1,580 kWh/m<sup>2</sup>/year.

As such, technologies that boost the use of solar power will ultimately help SG transition to a fully sustainable Smart Nation

## Problem Statement:

The goal of our **AI Solution** is to detect and classify Commercial and Industrial rooftops in Singapore in order to identify the potential of solar panel installation.

Solar rooftop potential for the entire country is the number of rooftops ( in terms of surface area ) that would be suitable for solar power, depending on factors such as: uncluttered surface area, shading, weather, location etc.

Our final deliverable solution will be in terms of an application named **Solarian**.



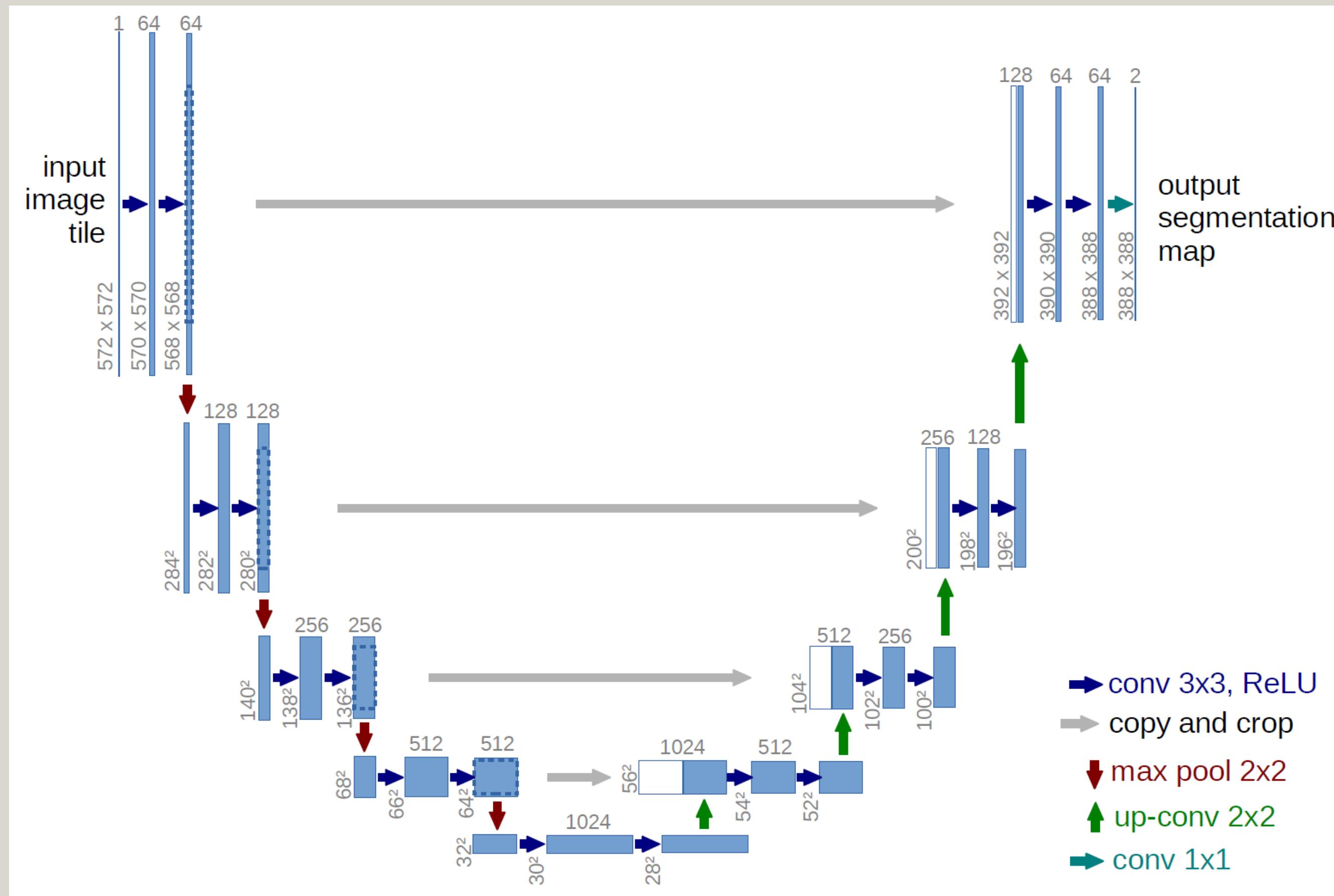
## What does Solarian do?

Solarian allows property owners to identify all solar panel placement spots on their property in just a few simple steps. This is done by running a satellite image of the target property through our pre-trained computer-vision based **UNett** model.

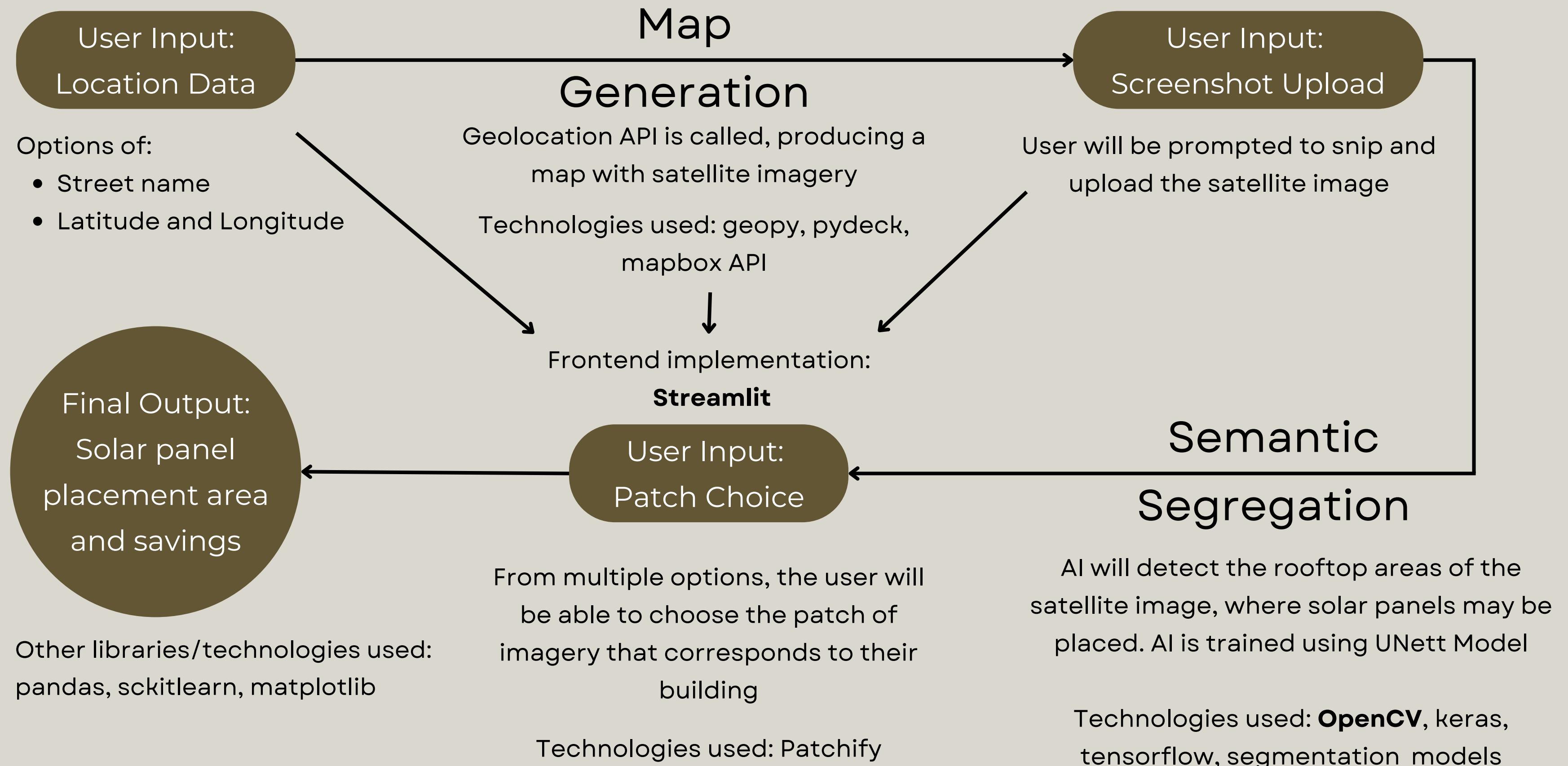
## What does Solarian solve?

Solarian quickly assesses the viability and efficiency of solar panel installation on any property, equipping owners with information on energy and monetary savings, thereby streamlining the process and increasing the use of solar panels in Singapore.

# UNett Model used for segmenting Satellite images:



## Solution flow:



# Welcome to Solarian

## How it works:

- Input a location (via address or longitude/latitude).
- Take a screenshot (using our button) of the specific area which will be ran through our Machine Learning model.
- Choose the patch of image that best represents the area you want the statistics of.
- We will return you information such as: Surface area of rooftops/flat surfaces in image and money saved by installing commercial solar panels there.

## Find Current Location

Please Enter the Longitude and Latitude of your current location

Enter Latitude:  Street:

Enter Longitude:  City:

Confirm Longitude and Latitude:

Province:   
Country:

## Find Latitude and Longitude using Street

Enter the details of your desired location

Upload map image file

Drag and drop file here  
Limit 200MB per file

Browse files

Screenshot 2022-10-03 043000.png 404.4KB

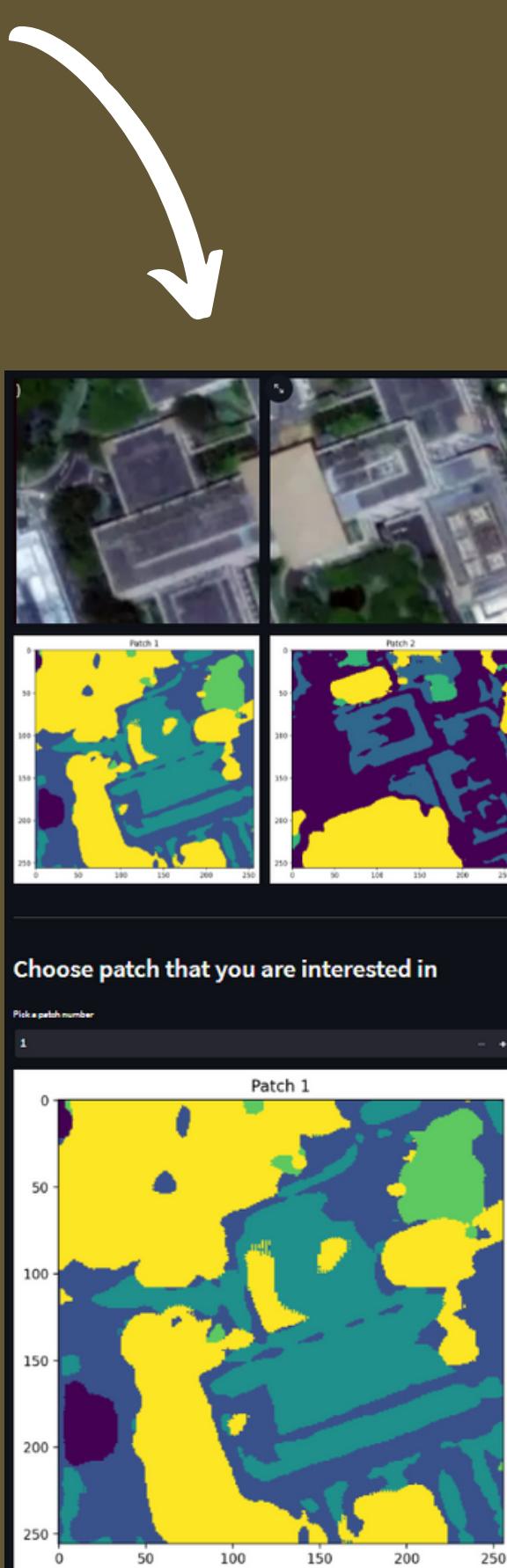
Your uploaded image:



Please crop out the map using a snipping tool and upload the file



Please move to next page 'map' after snipping the image of the map



Number of 'flat area'-encoded pixels: 19973

Estimated surface area: 1785m^2

The current region of location input in Singapore is: West

	Nort	Per Day	Per Month	Per Year
Energy output over a period of 1 Year, By Region(kWh)	386.			
North	3.7624	112.8721	1,354.4646	
South	3.3566	100.6990	1,208.3874	
East	2.7193	81.5789	978.9468	
West	3.0018	90.0555	1,080.6655	
Central	2.3645	70.9354	851.2248	

Assuming every inch of surface area can be used to deploy solar panels

Area for Commercial Solar Panels = 1.636141m^2

Money saved per day: \$2580

Money saved per month: \$77414

Money saved per year: \$928975

## Disclaimer

We understand that the values might be inaccurate and largely overestimated in terms of money saved. This is due to the previous assumption.

Therefore, without further data, computational power and better models, we are unable to provide a better estimate.

A more in-depth walkthrough of the app will be shown in the demo hack video

## Implications and challenges faced:

- Getting accuracy for the actual commercial and industrial use due to lack of data and optimisation of model
- Unable to allow users to specify exactly what buildings to be ran through the model
- Integration hell trying to integrate everything together
- Certain quality of life functionalities not implemented on time

## Plans for the future:

- Fine-tune the model and feed more data for training the model to get extremely high accuracy for actual use
- Fully implement all front-end quality of life features such as an automatic screenshot of the map
- Expand the usage of this app outside of Singapore
- Give more accurate metrics of and conversion of pixels to the surface area
- Addition of more features in Computer Vision aspect such as calculating angle of the roof