

Solarian

MLDA Deep Learning Week 2022 Hackathon

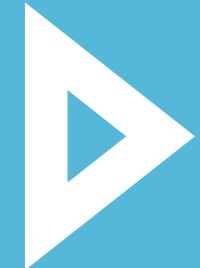
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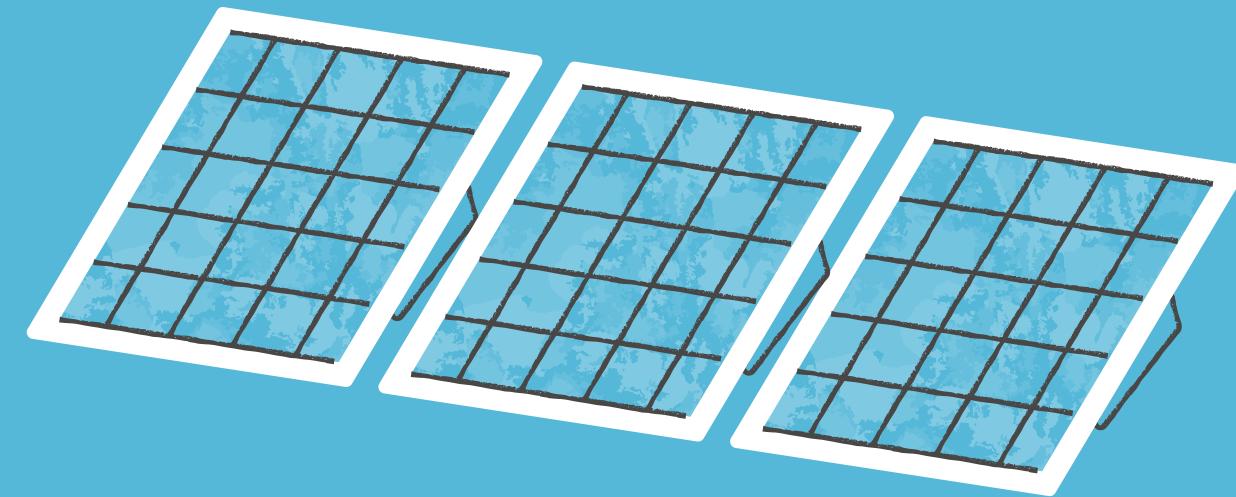


Presentation Overview

Topics to Discuss



- 01 Inspiration**
- 02 Problem Statement**
- 03 What does Solarian do and solve?**
- 04 Algorithm for Solar Panel Efficiency**
- 05 Business Viability**
- 06 Solution Flow & App Demo**
- 07 The Future**





Inspiration

- Demand for sustainable energy increases as Singapore moves towards being a Smart Nation
- Limitations such as lack of space and natural resources, **Solar Energy** would be our most viable renewable energy option
- To further add, Singapore faces an average **annual solar irradiance of 1,580 kWh/m²**
- Hence, developing technologies that incorporate the use of Solar Energy would greatly boost Singapore's transition to a **sustainable Smart Nation**

Problem Statement

How can we detect and classify Commercial and Industrial rooftops in Singapore with the help of AI in order to identify the potential of solar panel installations?

- Renewable energy is how we can sustainably power our future.
- Singapore enjoys high solar energy potential
- The main hurdle people face is the high cost of solar panel installation and the lack of information on savings
- To overcome this, we have developed **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 UNet model.

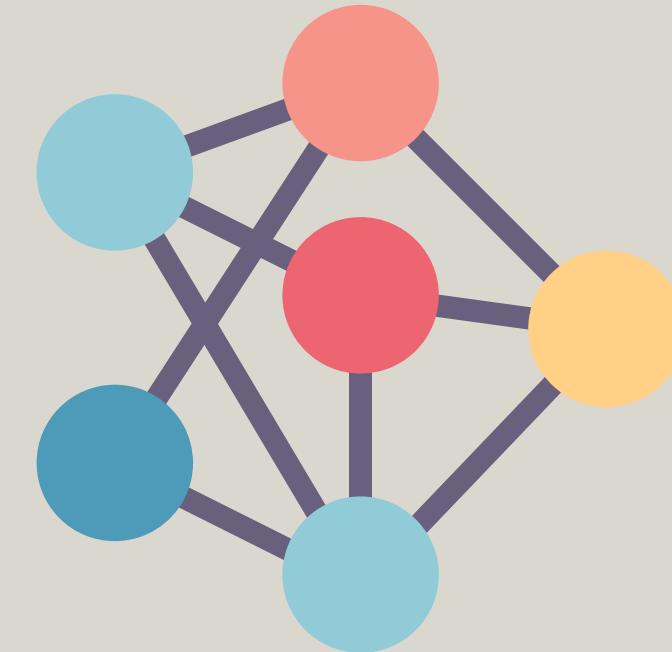
What does Solarian solve?

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.

Algorithm for Solar Panel Efficiency and Energy Output Rates

$$E = A * r * H * PR$$

- E - Energy(kWh)
- A - Area of Panel(^2)
- r - Solar Panel Yield(Ratio of electrical power of one solar panel/Area of one panel)
- H - Annual Average solar radiation on tilted panels
- PR - Energy measured (kWh)/(Irradiance(kWh/m²) on the panel x Active area of PV module(m²) x PV module efficiency

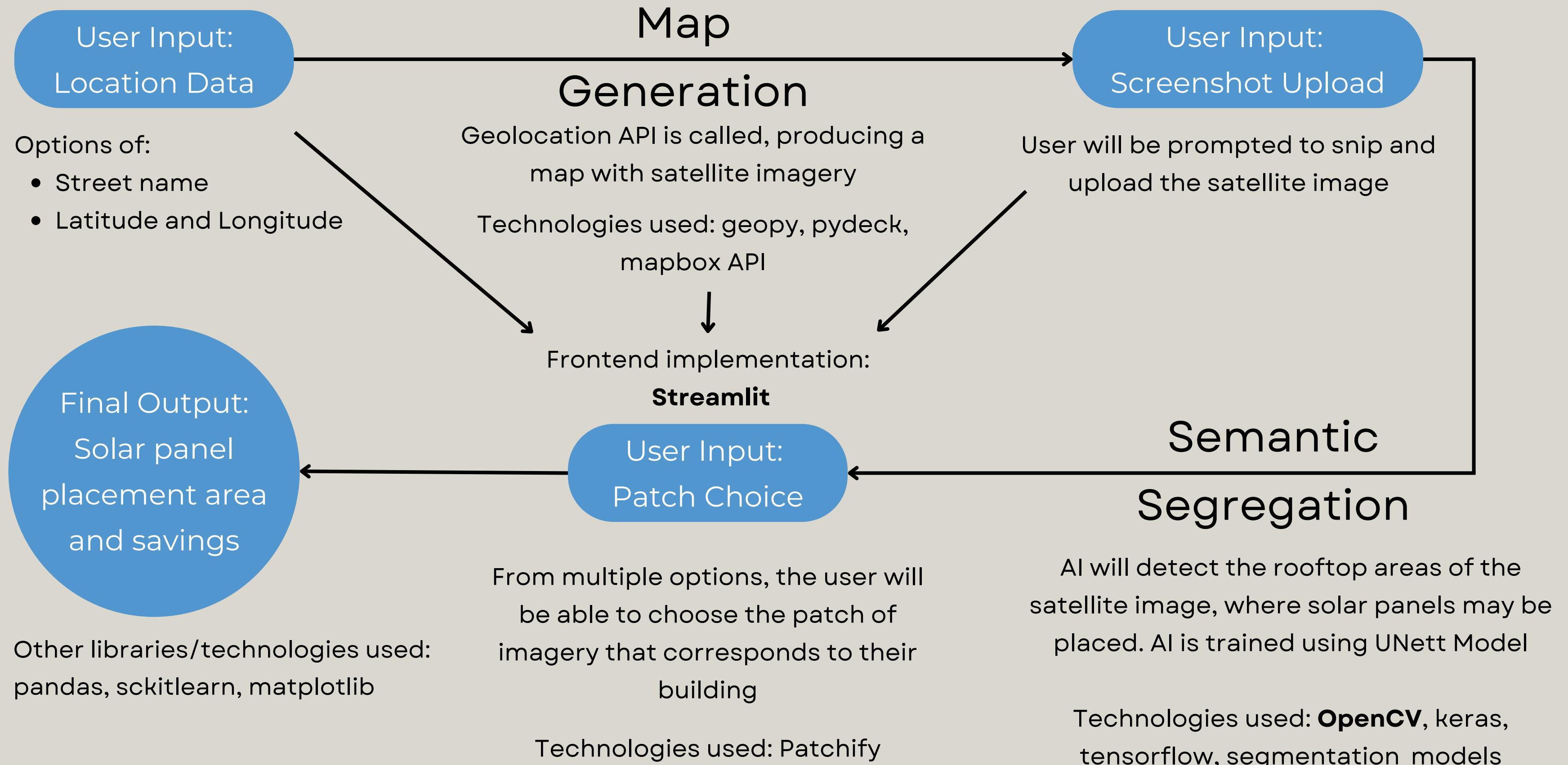


Business Viability

- Opportunity for Commercialisation
- Room for growth in the private industries
- Equip property owners with the knowledge of how to better position the solar panels
- Reduce the amount of cost needed to hire a person to visit the site to deploy solar panels



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
1.3521	E.g. 50 Nanyang Ave
Enter Longitude:	City
103.8198	Singapore
Confirm Longitude and Latitude	
Province	Singapore
Country	Singapore

Find Latitude and Longitude using Street

Enter the details of your desired location

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

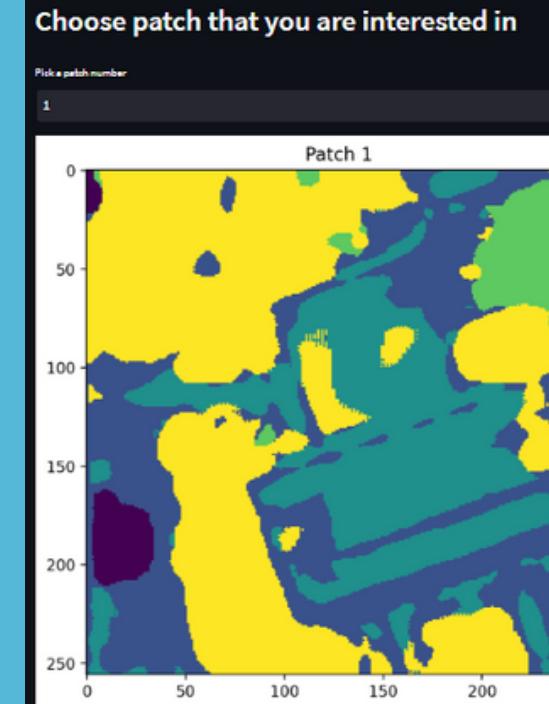
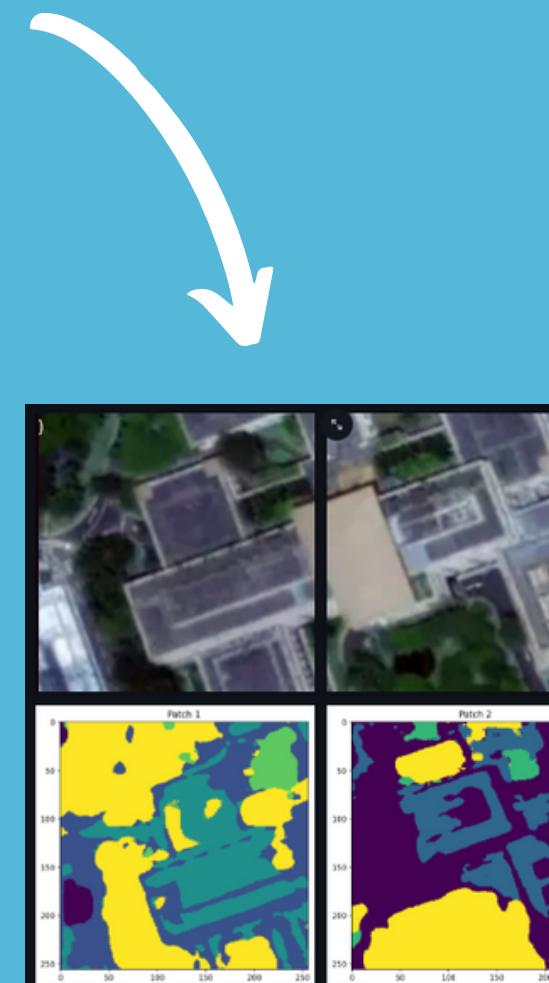
Upload map image file

Drag and drop file here
Limit 200MB per file

Browse files

Screenshot 2022-10-03 043000.png 404.4KB

Your uploaded image:



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.

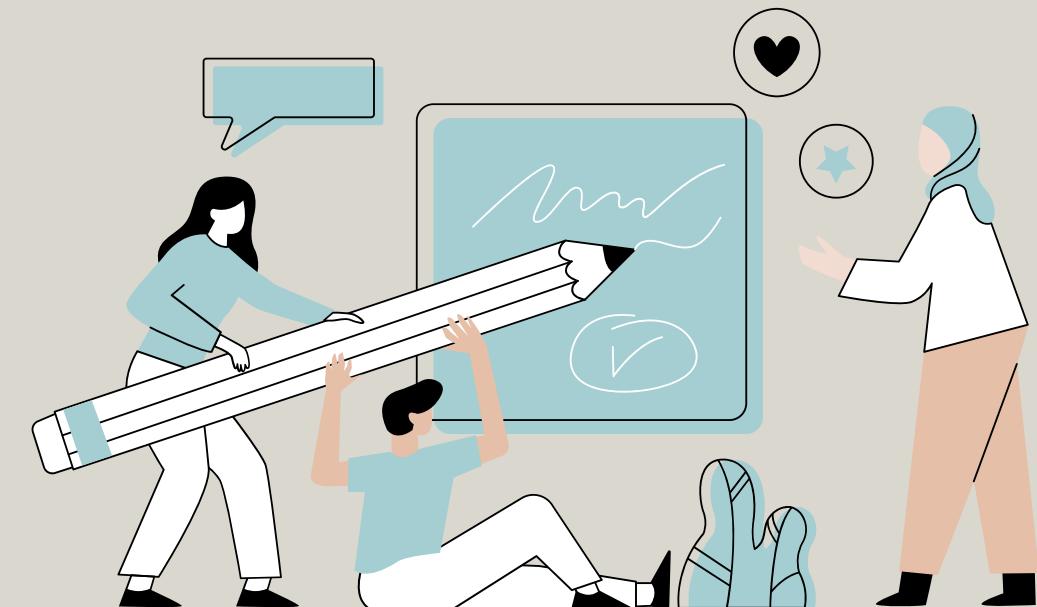
A more in-depth walkthrough of the app will be shown

FUTURE



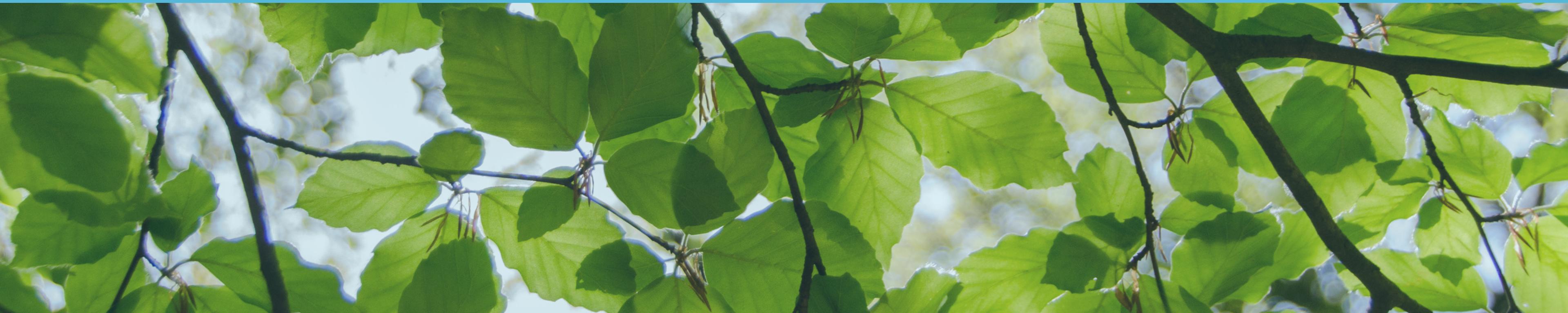
Plans for the future

- 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
- 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





THE END



Thank you for your kind attention :)