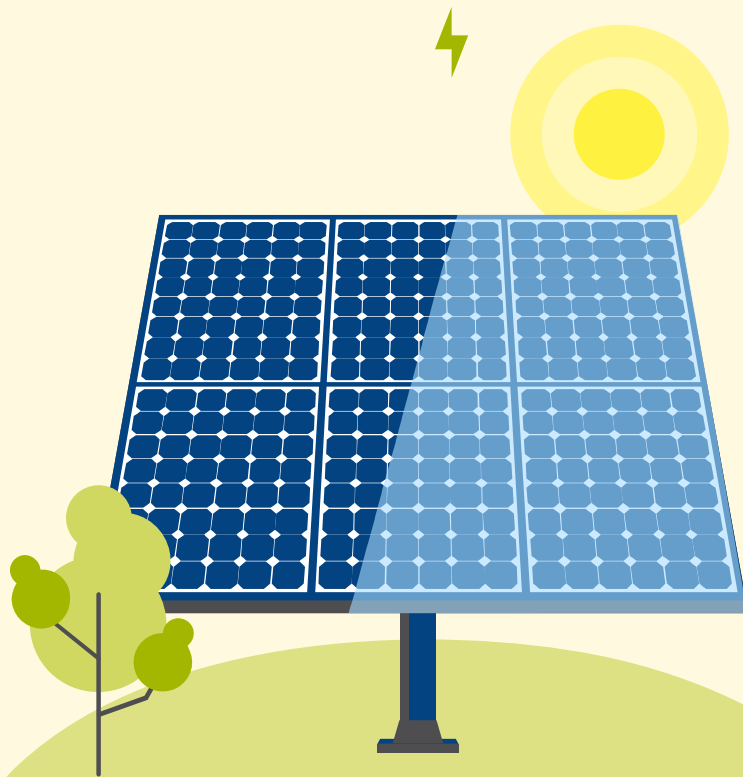




# OptiSolar

Members: Kenny Hermus, Ethan Yeung,  
Yixiang Li, Saadya Rao  
Category: AI and Environment





# Background



## Solar Panels

- Convert sunlight into electricity through the photovoltaic effect
- Increasing in popularity for producing renewable energy

## Installation

- Rooftops, parking shades, open land parcels
- Solar productivity potential varies
- Manual surveys/LiDAR mapping



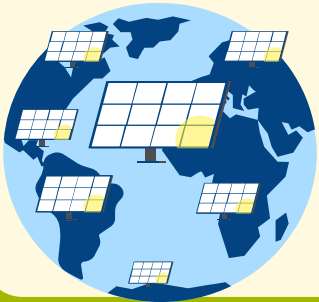
# Motivation

4,200,000

Premature deaths occur annually due to  
air pollution from plants and factories

800,000,000,000

Dollars are spent in U.S annually on respiratory and  
heart disease healthcare costs linked to the burning  
of fossil fuels






# Motivation



**29%**

Of electricity is  
generated by  
renewable sources

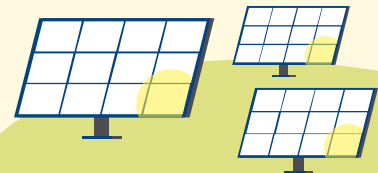


**78%**

Of the world's  
energy is  
consumed by  
cities

**60%**

Of greenhouse gas  
emissions are produced  
by cities



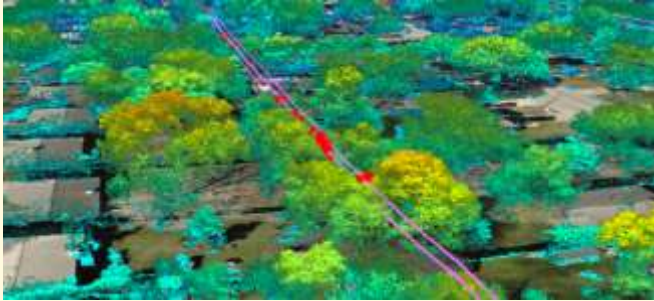


**Our goal: Reducing reliance on  
polluting-fuels by identifying prime  
locations for new solar capacity**





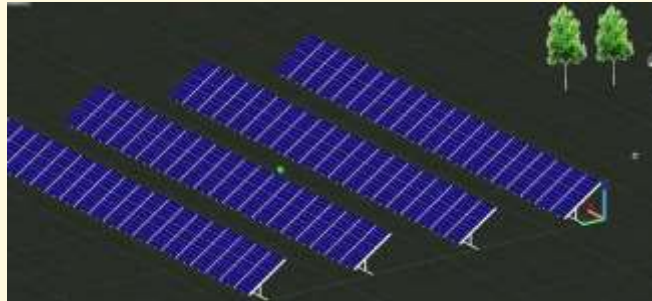
# Existing Solutions



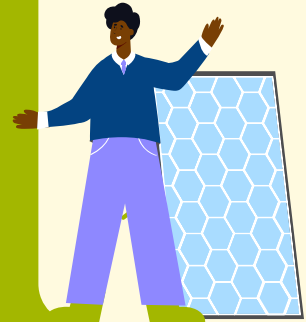
LiDAR - determine roof pitch angles and sun exposure



GIS - get pixel-wise potential solar energy using ground/building surface models



CAD - determine rooftop geometry and aspect ratio



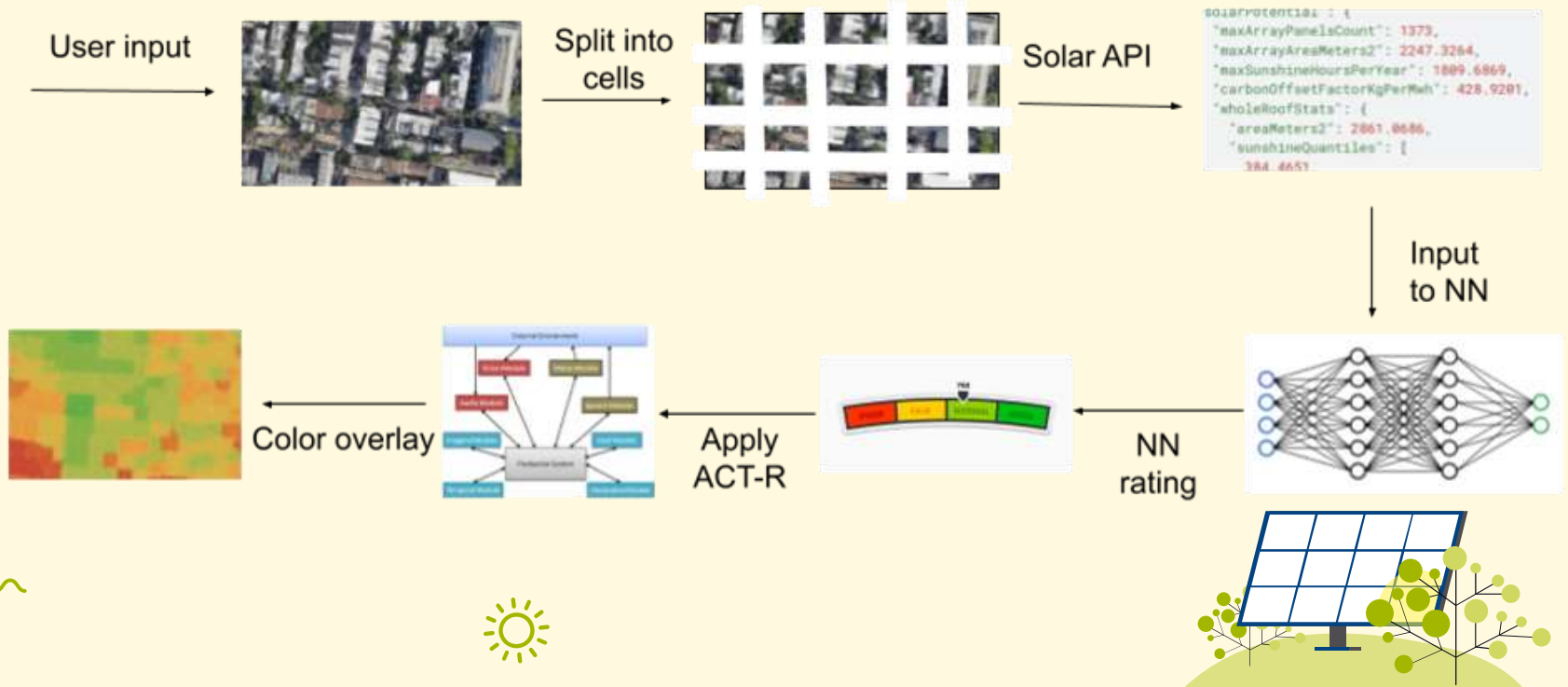


## Our Solution:



**Utilize historical weather data to predict the solar potential of an urban environment through neural networks and cognitive systems**

# System: Pipeline

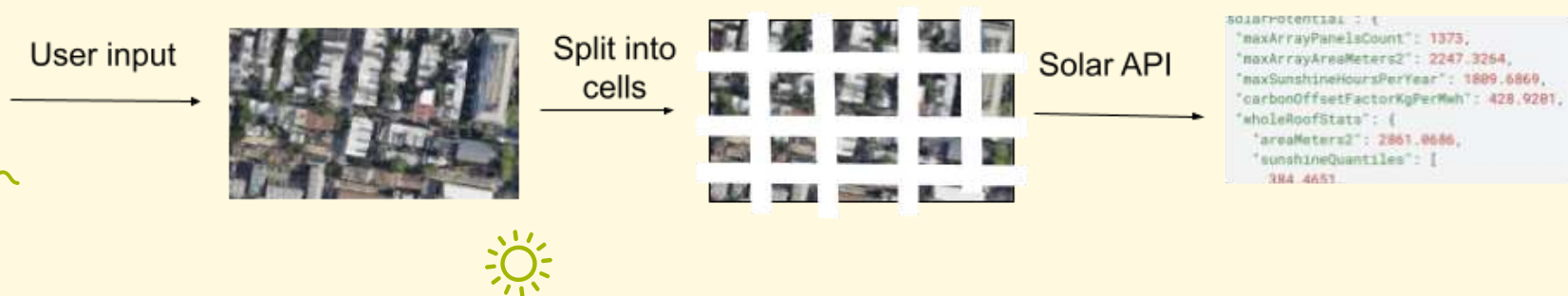




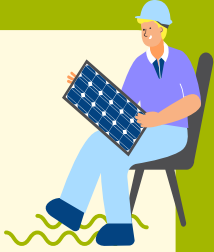
# System: Dataset



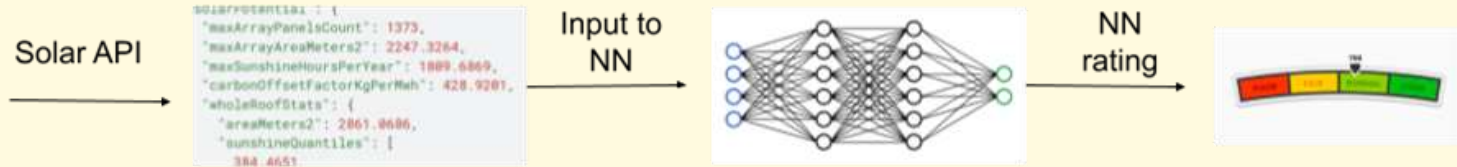
- SolarAPI
  - Historical Weather Data
    - .json files
  - Parsing data into cells



# System: Neural Network



- Feed-forward neural network
- Xavier initialization
- ReLU activation
- Categorical-cross entropy loss





# System: ACT-R



- Decision making
- Using ACT-R for color overlay

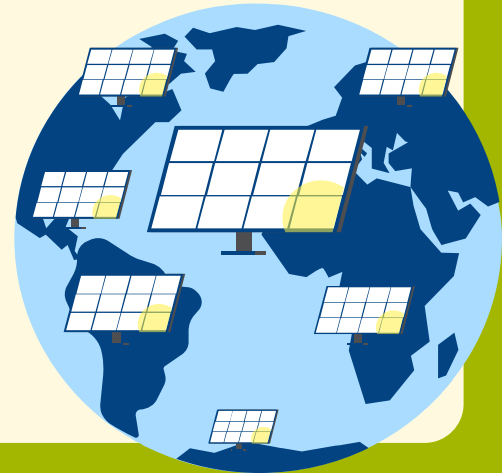




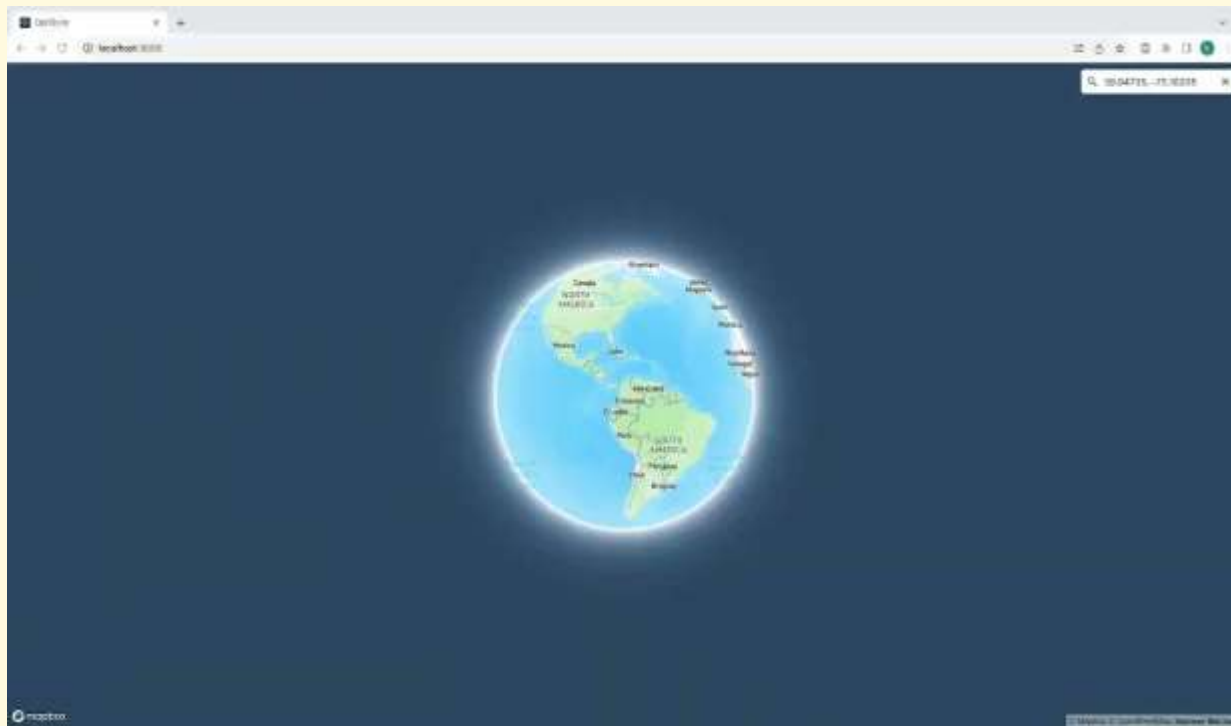
# System: Justification



- Switching to green energy methods reduces emissions
- Easy to use and understand
- Facilitating easy installation



# Demo



# Ethics: Sylvia Wynter



- Genre of the Human:
  - Entrenched in Eurocentrism
  - Man1: Tradition Definition of Man
  - Man2: Acknowledgement and Acceptance of Diversity
- AI
  - Man1 is intrinsic to modern thought
    - Logic/Reasoning
    - Dataset Bias
    - Accessibility
  - We hope to adopt the mindset of Man2



# Ethics: Issues

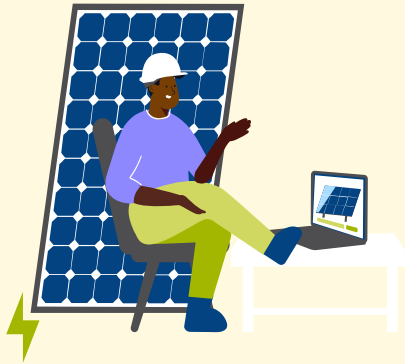


- Eurocentrism
  - Decolonization
  - Universalization
  - Hierarchy
- Underprivileged Communities: Unrecognized by the System
  - Understanding AI
    - User Interface
  - Infrastructure
    - Value



# Challenges

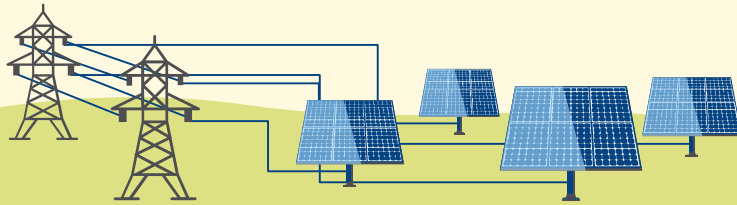
- Obtaining an API suited for our needs
- Getting fine-grained weather and solar data
- Preparing the dataset
- Model adoption ability





# Takeaways and Future Changes

- Difficulty in identifying and removing colonialism
- Existing data and infrastructure excludes underprivileged
- More granularity for pinpointing ideal locations on urban structures





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Thanks!

Are there any questions?

