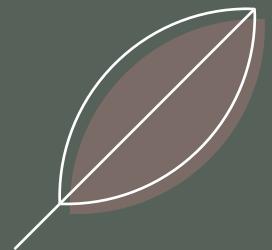


# CITREE

A TREE PLANTING ASSISTANT APP

---



# CITREE: THE BUSINESS



# THE MARKET

## GREEN TECHNOLOGY AND SUSTAINABILITY MARKET

Opportunities: Growing Demand for Climate Solutions & Increased Funding and Investments



# ADDRESSED NEEDS

---



Urban Heat Island  
Mitigation



Climate Change  
Mitigation



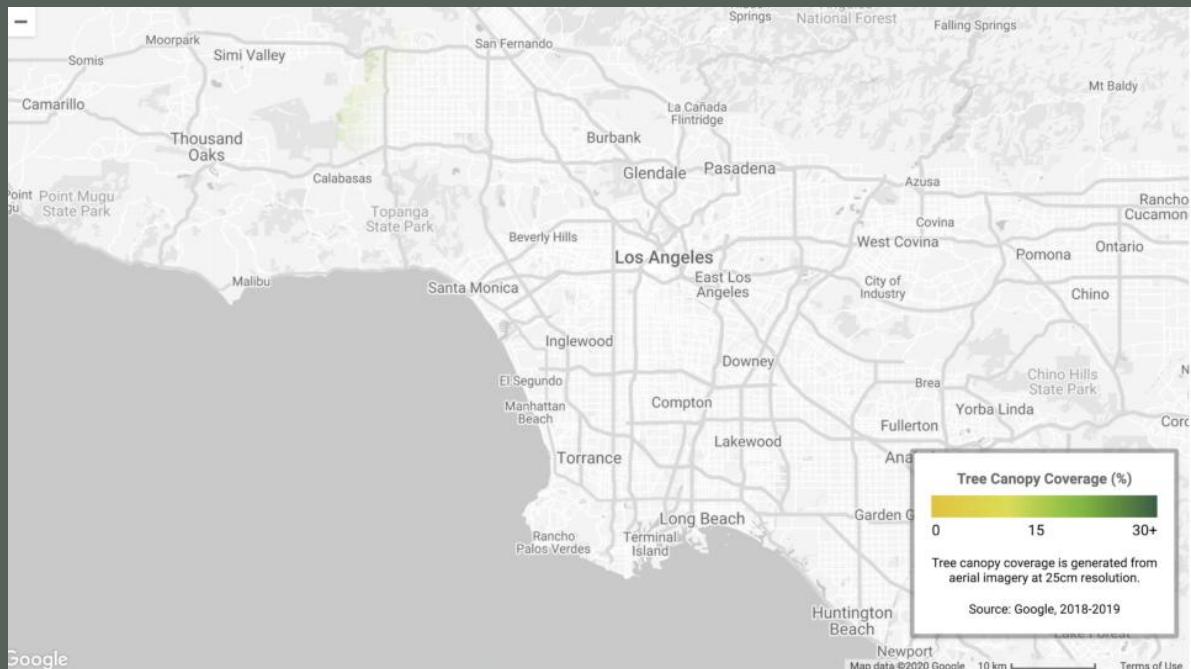
Urban Greening and  
Green Space Expansion



Community Engagement  
in Environmental Action

# COMPETITORS

---



Google's Tree Canopy Lab uses satellite imagery and AI to map urban tree coverage, helping city planners identify heat islands and prioritize areas for greening initiatives.

---

Tech and Sustainability  
Enthusiast

---

Community Oriented

---

Unpleased with the lack of green spaces in  
his town and the extreme heat

---

Needs accessible solutions for climate action  
and access to a like-minded community

---

Wants to contribute to Urban Greening,  
track personal impact and encourage  
others

---

Uncertain about his impact

## CLIENT PERSONA

---



# OUR BUSINESS PLAN

## KEY ACTIVITIES

Develop an MVP, establish a strong presence online, secure initial partnerships, launch and collect feedback

## KEY RESOURCES AND COST STRUCTURE

Large volume of satellitary data and computing power for servers and AI training. Additional costs: team pay, marketing costs

## CUSTOMER RELATIONSHIPS

Periodic social media engagement about special events and partnerships via platforms like Instagram

## REVENUE STREAMS

Subscription based

Free Tier: Basic features such as tree tracking and limited heat island scans.

- Monthly Premium: €5
- Annual Premium: €50

# OUR BUSINESS PLAN

## KEY PROPOSITIONS

---



Empowering users  
to make a change  
for the better

Engaging  
Community  
Building



Simplifying  
Environmental Action

Promoting Long-Term  
Sustainability

# CITREE: THE TECHNOLOGY



# MAIN APP FEATURES

---



Urban Heat Island  
Detection (Targets)



Target  
Management

Planted Trees  
Visualization & Impact  
Tracking

# TECH STACK

## BACKEND

---



+



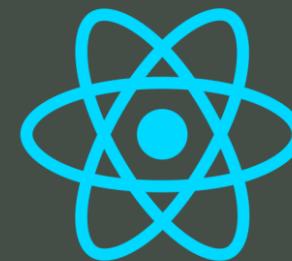
Flask

## FRONTEND

---

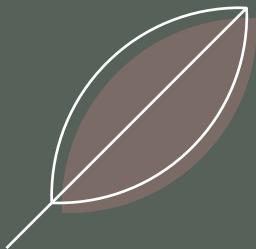


+

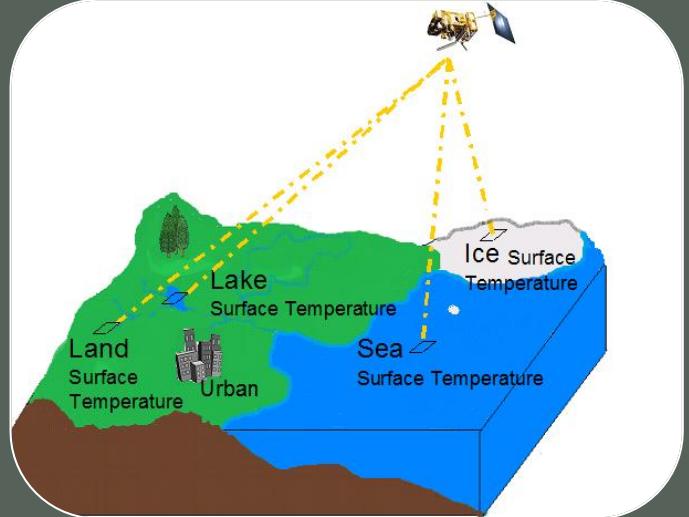


# A.I. MODEL DETAILS

---



# WHY LAND SURFACE TEMPERATURE?



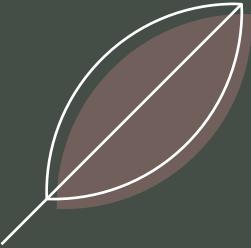
Agriculture  
Better crop management and field health monitoring

**Disaster Management**  
Early warning system for potential disasters

**Climate Studies**  
Identifying and tracking temperature trends

**Urban Planning**  
Understanding heat distribution in urban areas

# DATA REQUIREMENTS & INPUTS



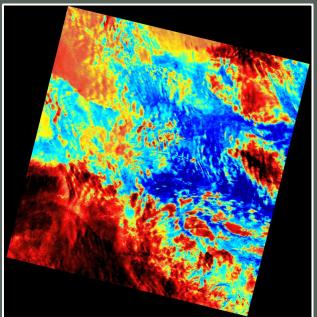
**Band 4 (Red)**  
For surface reflectance measurements

**Band 5 (Near-Infrared)**  
For surface reflectance measurements

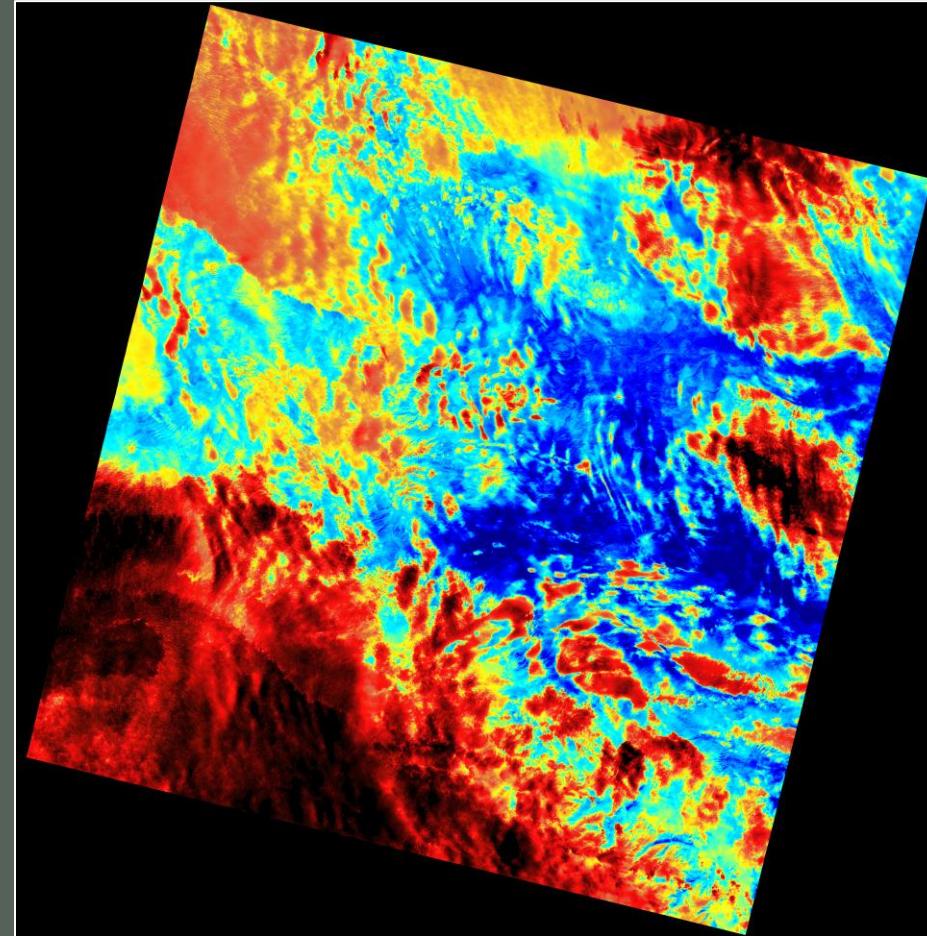
**Band 10 (Thermal)**  
For thermal infrared measurements

**MLT.txt**  
Contains essential calibration coefficients

*Input data obtained from <https://earthexplorer.usgs.gov>*



3x resolution →



RESOLUTION INCREASE FOR  
MORE ACCURATE  
TEMPERATURE ESTIMATION

# MODEL IMPLEMENTATION

---



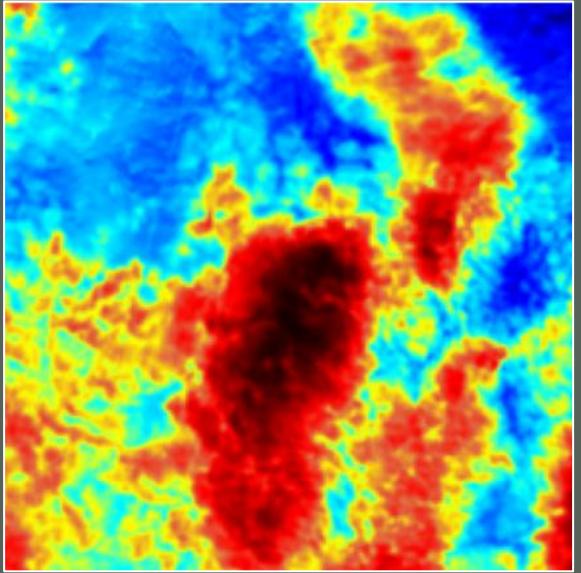
## Model Specifications

- Model size: 67 MB
- Architecture: Modified ESRGAN
- 23 RRDB blocks
- 3x resolution increase

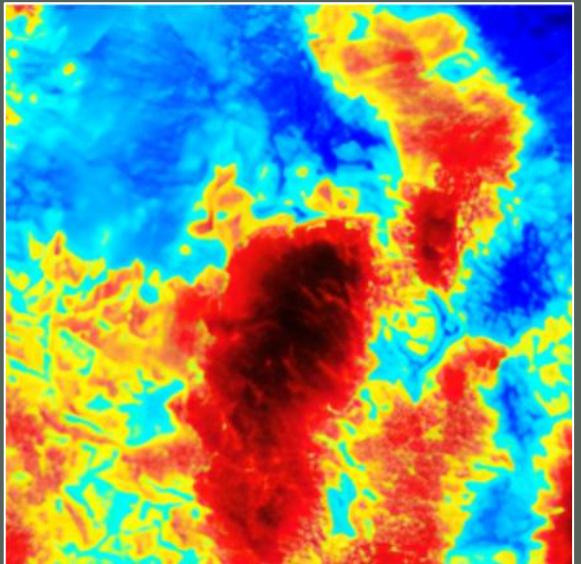
## Processing Strategy

- 512x512 pixel tiles
- 32-pixel overlap
- FP16 optimization
- Progressive processing

# BEFORE



# AFTER



## QUALITY METRICS

Average PSNR

33.59 Db

Average SSIM

0.9029

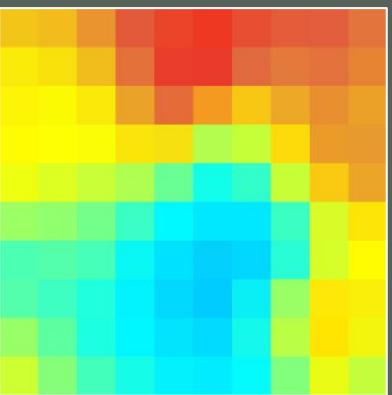
Average MSE

29.34



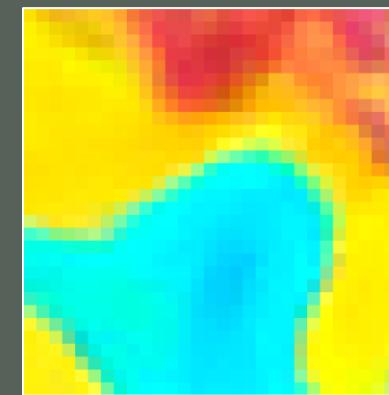
### Distribution

- Model size: 67 MB
- Architecture: Modified ERSGAN
- 23 RRDB blocks
- 3x resolution increase



# ARITHMETIC MEAN

---



154	152	142	125	115	109	119	125	126	134
164	162	153	132	112	111	131	135	133	138
167	168	164	146	131	143	155	147	141	145
169	170	169	162	162	169	169	160	143	143
170	170	170	169	169	169	169	169	156	146
170	170	169	169	168	162	162	169	169	162
169	169	169	167	159	154	157	169	169	169
169	169	169	166	157	153	164	169	164	166
170	169	169	167	160	158	168	170	161	167
170	169	169	169	165	164	168	170	169	169



159	151	147	154	156	162	163	155	139	134	134	126	124	135	135	122	129	136	131	120	114	138	143	133	134	143	150	155	142	136			
165	159	151	149	146	151	162	163	150	144	128	127	126	129	123	115	118	125	122	120	131	152	159	153	133	134	138	151	154	154	154		
166	163	158	152	147	140	148	164	163	150	130	124	129	117	109	105	107	110	114	129	139	152	160	157	143	134	135	140	163	171			
165	164	164	164	159	151	152	163	164	157	137	120	120	113	105	103	112	114	113	124	142	148	153	150	143	138	131	126	148	152			
163	163	163	167	166	163	159	160	161	158	139	119	113	114	109	106	113	119	118	134	150	147	151	153	151	147	139	143	147	152			
163	163	163	162	164	164	165	166	162	162	159	139	125	118	116	116	107	116	122	128	155	160	149	144	146	156	161	167	177	171	155		
162	162	161	162	162	162	165	164	162	158	143	128	123	120	115	104	114	128	144	153	155	154	150	146	155	162	166	173	173	178			
162	161	160	161	162	162	163	162	162	161	150	139	133	127	123	119	124	138	148	149	152	160	161	158	152	147	151	166	175	178			
163	162	162	161	162	163	162	161	161	158	155	150	145	143	142	147	155	161	162	161	161	161	163	160	150	142	136	148	166	177			
164	162	161	161	161	161	161	160	159	157	156	154	151	154	155	158	165	171	181	177	170	166	159	152	151	157	139	133	141	154			
163	162	162	160	161	160	159	159	158	158	156	156	155	155	161	178	190	183	182	183	179	172	154	152	157	155	155	140	140	138			
160	161	161	160	161	161	160	159	160	161	157	158	161	179	186	177	169	157	165	167	164	164	159	156	153	153	152	128	131	127			
160	160	161	161	161	161	161	160	159	160	161	160	159	172	184	183	168	166	170	170	169	160	150	169	177	171	161	155	148	144	140	155	
161	161	161	161	162	162	164	162	160	162	161	175	175	185	174	161	168	170	169	176	166	174	168	155	153	155	157	161					
161	162	162	163	164	162	163	164	175	175	180	168	166	168	167	167	165	163	164	164	162	163	161	175	174	157	157	162	162	164			
162	165	165	167	167	169	164	176	182	173	164	170	169	166	166	165	164	162	163	164	164	166	155	167	174	161	163	163	164				
189	179	170	170	174	176	177	177	179	170	165	170	170	166	165	165	163	161	161	162	164	167	164	155	174	170	166	168	166	166			
174	179	169	170	178	188	182	165	166	168	169	169	167	164	162	160	159	161	163	164	167	166	163	154	170	166	168	166	166				
161	162	162	161	159	159	158	167	170	169	166	164	164	161	158	159	161	164	165	168	166	170	185	167	166	165	166	166					
165	164	166	166	168	170	170	168	168	169	166	165	163	159	156	155	154	160	165	165	170	165	175	167	165	166	167						
161	162	160	164	165	165	164	165	167	168	167	163	156	154	152	156	163	165	166	170	170	170	174	166	164	165	166	167					
154	156	159	163	164	164	163	161	162	164	165	160	155	154	152	159	161	167	166	170	157	171	167	164	163	164	164	167					
162	159	157	162	162	162	160	159	161	159	156	154	152	160	163	166	167	165	173	189	166	164	163	165	164	167							
182	163	154	158	162	162	160	159	163	164	162	157	156	155	162	164	167	167	151	176	172	164	163	164	165	165	166						
182	178	167	157	158	164	160	161	163	162	164	160	159	157	159	163	166	167	167	169	185	169	165	165	165	166	169						
168	175	179	155	145	163	163	165	165	162	163	160	160	159	161	163	168	167	166	174	169	167	166	168	174	169	167	166	172				
169	172	176	174	143	155	164	162	162	166	163	164	161	161	162	163	167	167	164	169	168	170	168	169	166	167	170	178					
169	174	171	170	150	155	163	164	163	164	167	164	162	161	162	162	166	167	170	172	169	170	168	167	169	170	181						
169	170	171	170	184	176	151	161	166	167	166	164	162	162	163	163	164	166	182	178	170	169	168	168	167	170	188						
169	169	172	171	170	190	173	154	164	166	169	170	169	166	163	164	166	170	177	172	170	169	165	176	185	182							

## FUTURE IMPROVEMENTS

---

1. Enhanced processing speed optimization
2. Integration of additional satellite bands
3. Real time processing capabilities
4. Advanced error correction methods

## KEY ACHIEVEMENTS

---

1. Successful implementation of RealESRGAN
2. High structural similarity preservation
3. Efficient large-scale image processing
4. Practical agricultural applications

# THANK YOU



The Team

*Cretu Gabriel-Nicolae*

*Costea Gabriel-Antonio*

*Cozma Gheorghe-Alexandru*

*Ciubotariu Veronica*