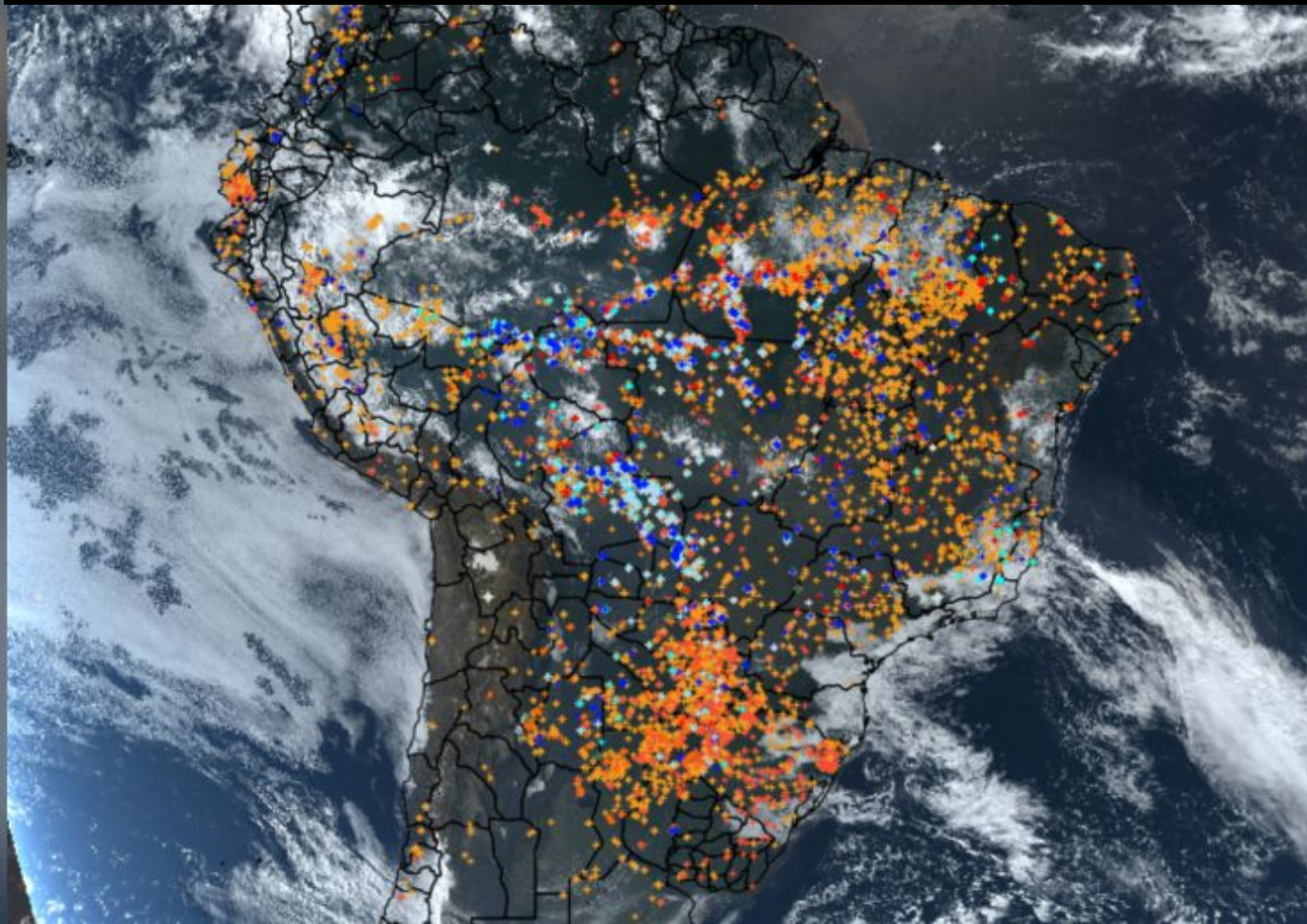# Planet: Understanding the Amazon from Space

Matan Gavish

The Amazon is on Fire!

A problem for all life on Earth

Ecosystem Services and The Lungs of our Planet

- 20% of the worlds oxygen
- Absorbs huge amount (¼) of earth's carbon dioxide (vital to fighting global warming)
- Precipitation feedings regions that generate 70% of South America's GDP
- Biodiversity (has 30% of the worlds species), Medicine, food, other products

THE AMAZON
IS ON FIRE AND THIS IS WHAT IS AT RISK

Between 17 and 20% of the planet's water

6,7 million km² of FOREST

10% of the world's BIODIVERSITY

The habitat of more than 34 million people

At least 6% of the EARTH'S oxygen

Pharmacy to the World

- Home to 70% of the 3,000 identified plants active against cancer cells
- 25% of active ingredients in cancer fighting drugs found only in the rainforest
- 25% of pharmaceuticals derived from rainforest ingredients with only 1% of tree species tested
- 16,000 tree species
- 6.9 million sq kilometers

How can we help save Earth's resources?

Develop a classification model that helps the global community better understand where, how and why deforestation happens, and ultimately, how to respond.

Also, differentiate between human causes of forest loss and natural causes
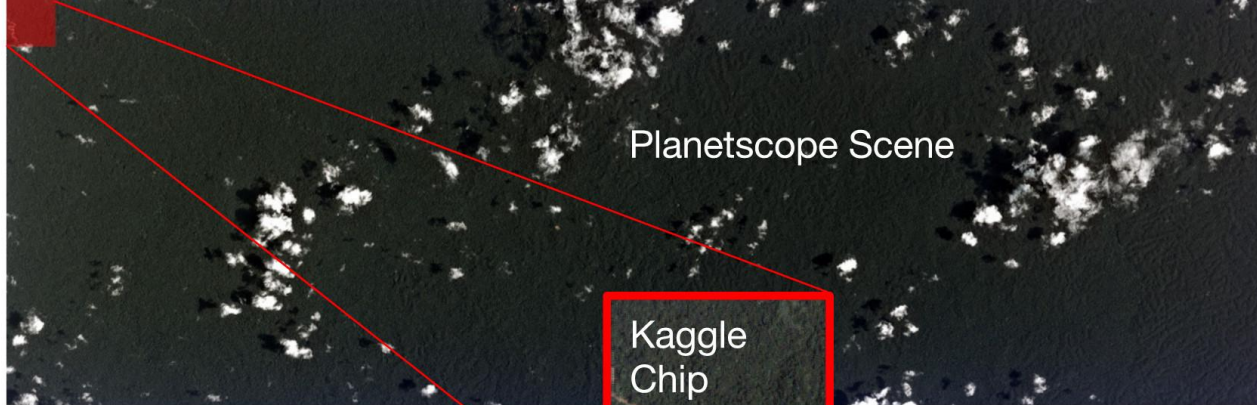
Phenomena of Interest

Atmospheric

- Clear
- Partly cloudy
- Cloudy
- Haze

Common Labels

- Rainforest
- Agriculture
- River
- town/city
- Roads
- Bare ground
- cultivation

Less Common Labels

- Slash and Burn
- Selective logging
- Blooming
- Conventional mining
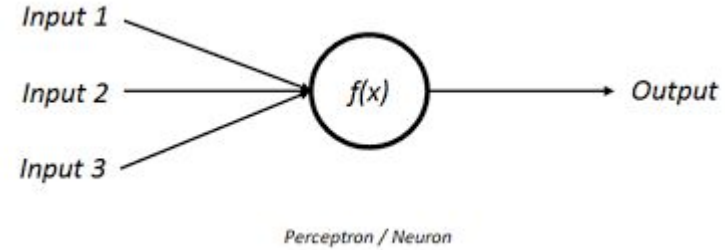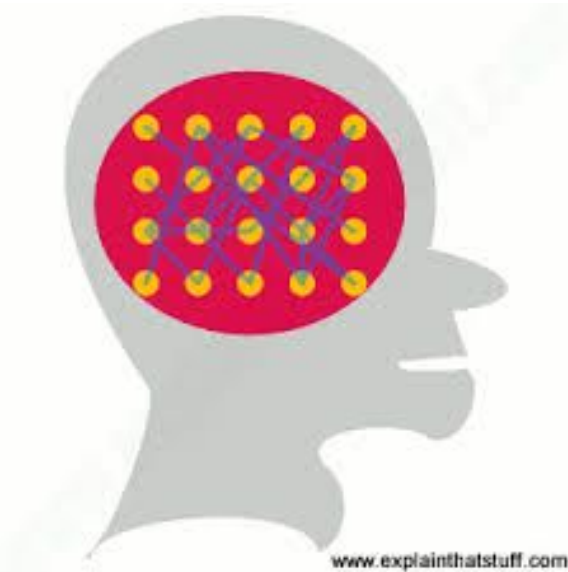- Artisanal mining
- Blow down

Planetscope Scene

Kaggle Chip

Chip Size
256x256 pixels @ ~3.7m GSD
~947.2m x 947.2m = 897187.84 m²
~89.7187 Hectares
~221.7 Acres

Cloudy

Partly cloudy + primary

Haze + primary

Primary

Agriculture + roads + habitation

Primary + selective logging

Agriculture/ pasture + primary + partly cloudy

Habitation + partly cloudy

Agriculture + roads + primary

Water + primary

Shifting cultivation + primary

Roads + primary

Neurons in our brain make connections, learn patterns, and understand shapes

Input 1
Input 2
Input 3
f(x)
Output

Perceptron / Neuron

www.explainthatstuff.com

Artificial Neural Networks use thousands of examples to reduce the error in their understanding, until they can also make connections, learn patterns and understand shapes.

Recommendations

1. Use image data to compare rate of deforestation to something relatable that will grip the public and help precipitate action, eg, a city, neighborhood or park
2. Mobilize protection protocols for instances of Blooming (Blooming is when particuar flowering tree species bloom fruit and flower at the same time to maximize chances of cross pollination)
3. Cross reference Artisinal Mining sites with legal mining permits. Shut down illegal operations as soon as possible and arrest perpetrators.
4. Allow loggers and/or grazing in Blow Down areas (Blow Down is a natrual phenomena and we can allow loggers and farmers to capitalize on these instances)

Future Work

- Further tune the model with Adam optimizer so we can run an equally accurate model on new data in a very small amount of time.
- Work with front-line partners to try and classify early signs of mining operations being prepared so we can shut them down before damage to rainforest begins.

Thank you!