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Climatic change solution based on Machine learning

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Machine Learning in Farms & Forests

Forests are the largest terrestrial ecosystem of Earth by area and are found around the globe. 45% of forest land is in the tropical latitudes. Forests account for 75% of the gross primary production of the Earth's biosphere and contain 80% of the Earth's plant biomass.

Plants, microbes, and other organisms have been drawing CO2 from the atmosphere for millions of years. Our current economy encourages practices that are freeing much of the carbon trapped/stored deep underground as coal, oil, and biomass of trees through deforestation and unsustainable agriculture. On top of these effects, cattle, and rice farming generate methane. Overall, land use by humans is estimated to be responsible for about a quarter of global greenhouse gas emissions. These emissions not only contribute to global warming, they directly impact climatic change and other sequestered disasters. I propose a method to Estimate and monitor carbon stock in those areas sequestered or releasing carbon across the planet.

Working:

Modeling and estimating the amount of carbon being released from sequestrated places can be hard when it comes to manual work, that's why I studied how to automate the process with Machine learning, explicitly either by computer vision or Reinforcement and control learning. LiDAR – Light Detection and Ranging – is a remote sensing method used to examine the surface of the earth. Remote sensing means that we aren't actually physically measuring things with our

hands. We will be using sensors that capture information about a landscape and record things that we can use to estimate conditions and characteristics. LiDAR is one remote sensing method that can be used to map structures including height, density, and other characteristics across a region. An important requirement for calculating carbon capture in ecosystems at a specific site is acquiring the area and/or volume of the ecosystem that is being investigated.

Using LiDAR to estimate carbon capture.

Typically LiDAR sensors can be found mounted on fixed-wing aircraft, helicopters, ground-based lidar scanners, and even on satellites. But this technique doesn't seem scalable and many areas are closed to such vehicles. Here is where I want to bring Machine learning algorithms to predict the LiDAR's outcome from satellite imagery and estimate the carbon captures using Computer vision. From there, the learned estimator can perform predictions at the scale of the planet.

Further Development.

LiDAR data is often not equally distributed across regions or seasons. Either we can induce an algorithm such as the autoencoders or any generative methods, or techniques such as domain adaptation and transfer learning can be used to generalize the algorithms better.

CONCLUSION

Nature is a boon to mankind, providing numerous gifts such as air, water, land, sunlight, minerals, plants, and animals. It is our responsibility to preserve them. With the current technologies, we cannot save all but can reduce further exploitation of them.

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