

Applications of an AI Tree Living Status Detector

Utilizing the layered convolutional network Alexnet, a trained artificial intelligence program that detects whether a tree is alive or dead was developed. Instructed on 50 unique images of trees, 25 of which were alive and 25 of which were dead, the AI uses convolutional manipulation techniques on images to detect what the living status of an inputted tree is (alive or dead). Alexnet consists of 8 layers. Each layer is convolved in order to capture features of an inputted image; as the layers go on, the features become more specific. The layered feature extraction was the basis for the tree detection neural network. This program was developed with a few real world applications in mind.

In residential and public areas, maintaining healthy trees is vital to the aesthetic and health of the region. A study by the Centre for Environment & Health shows that healthy greenery in urban areas leads to greater mental health and physical health¹. With cameras that implement this AI, dead trees could be quickly identified and replaced in urban areas; this would reduce the need for people to directly report dying greenery and, as the study suggests, lead to greater public health. This implementation of AI would be a very helpful addition to urban regions.

Another application of this algorithm can be put into gathering more data on global climate change. The IPCC Special Report on Climate Change and Land reports that the “warming of land” leads to “increased tree mortality”². An AI capable of detecting when a tree has died could prove beneficial to gathering more climate change data. Cameras could be set up in areas that are highly affected by climate change to detect how many trees there are dying. With such data, a greater understanding of the effect that climate change has on tree mortality can be gained.

Precision agriculture is the study of developing techniques to optimize farming crop yields. The growing prominence of artificial intelligence has led to it being a significant subject of study for precision agriculture. A paper on the applications of data and AI in farming describes how AI could be used to reduce crop wastage in agriculture yields³. Applying the AI tree detector to agriculture would be very useful to farmers who need to ensure that their tree-based crops are not dying. In a similar vein, this AI would be helpful to forestry workers that cut trees for lumber. Agriculture and forestry businesses often involve large farms; it can prove difficult to make sure that all the crops/trees are living and healthy. An AI tree living detection system can help greatly remedy this issue.

Understanding and monitoring tree mortality is important in a variety of cases. This technology has strong potential to help people: benefitting urban areas, building an understanding of climate change, and decreasing waste in agricultural businesses. Such uses display the capabilities of this program and artificial intelligence as a whole.

1. Centre for Environment & Health. 2017. Urban Green Space and Interventions of Health. World Health Organization, 202
2. Change, I. P. O. C. (2022). Climate change and land. <https://doi.org/10.1017/9781009157988>
3. Bhat, S. A., & Huang, N. (2021). Big data and AI revolution in precision agriculture: Survey and challenges. IEEE Access, 9, 110209–110222. <https://doi.org/10.1109/access.2021.3102227>