Anita Chandrasekaran
DATA 606

Predicting Elephant Poaching

Project Overview

The aim of this project is to create a machine learning model which will aid in conservation efforts for the African elephant by examining patterns in illegal poaching and related factors. Factors that will be examined include geographic features where elephant carcasses are found, economic pressures such as ivory demand and illegal trade, and seasonality.

Background and Sources

From the mid-20th century to today, the free roaming African elephant population has drastically reduced from 1.2 million to approximately 400,000 members (Thouless, et al., 2016). The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) monitors illegal killing of African elephants in designated sites across the African savannah where poaching is known to occur despite active efforts of local rangers and conservationists. In a 2019 press release, CITES analyzed elephant carcasses that were found to have been illegally killed along with associated factors that were thought to have been related (CITES, 2019). Ivory demand in the black market and local governance (ie, corruption) were found to have the greatest influence on these findings.

These analyses, while interesting, were not performed with other factors in mind such as greater economic pressures in the local areas, political pressures in the country and surrounding countries, time of year, geographic or weather phenomena, and reporting bias due to limited patrolling areas and low reporting numbers. This project will attempt to use some of these analyses as a jumping off point to create more advanced models of factors previously analyzed and those not already considered.

CITES data sources for illegal trade of ivory and demand are largely self-obtained datasets based on prices and amounts of goods in Chinese markets. Found carcasses and cause of death will be obtained directly from government sources such as national parks, protected lands, and other primary sources. An overlay of elephant migration from the Great Elephant Census will also provide a background of seasonal patterns which will be considered in this study (Allen, 2014). Additional sources for weather/climate patterns, economic factors, and political factors will be gathered from openAFRICA, a repository of open data specific to African countries.

Timeline

As outlined in the DATA 606 syllabus, a comprehensive literature review and EDA will follow. Advanced analysis of geographic, economic, and political factors will aid in determining influence on poaching rates through feature selection and extraction. From this, a training set will be created and used to build a model to predict future poaching events.

References

Allen, P. "The Great Elephant Census." *The Great Elephant Census* (2014).

Convention on International Trade in Endangered Species of Wild Fauna and Flora. “New report highlights continued threat to African elephants from poaching.” *CITES Press Release.* 10 May 2019.

Thouless, Christopher, et al. "African elephant status report 2016." *Occasional Paper Series of the IUCN Species Survival Commission* 60 (2016).