

Fossil Finder: a case study of the use and development of machine learning models to identify fossils in situ

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Machine learning has developed rapidly over the last few years, both in complexity, versatility and ease of use. A myriad of different cloud platforms and application programming interfaces exist in the common marketplace that could be of use to both professional and citizen scientists alike. However, the machine learning development has been so rapid, that it is somewhat intimidating for anyone that is not a data scientist, or at least an experienced programmer. I am conducting an initial inquiry for the development of machine learning models for scientists in the context of making a smart-device app to identify fossils that can be found in situ at the Joggins Fossil Cliffs, a noteworthy representation of Pennsylvanian Carboniferous flora and fauna. The purpose of the app will be for citizen scientists to use the app to identify fossils and, over the long term, develop a heat map for locating various types of fossils. Various trade-offs between several machine learning platforms are compared and contrasted in the context of the app. A specific platform was chosen for a proof of concept prototype of using machine learning for fossil identification and its effectiveness was analyzed over several iterations.

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