Innovations in technology, both software and hardware, have helped to advance many disciplines of science through streamlining processes involved in research and allowing scientific knowledge to advance assisted by the computing power modern computers provide. Our project aims to contribute to that pool of computer tools that allows scientists to do their jobs more efficiently. The project that we are proposing is a tool which would enable biologists studying moths and their patterns to do so more efficiently in the field. In the current state of the field biologists have to individually find, classify, and measure moths individually and by hand. This system obviously presents some limitations in that there is only so much that one person or one team of biologists can examine at one time. We aim to assist in that field by creating a two part system of tools which streamline the processes of collection, classification, and sorting of data regarding moths. The two portions to our project are as follows: a mobile application interface for submitting images of moths to the project, a machine learning algorithm trained to identify and measure moths of different species. The completion of this project will enable biologists and others researching moth populations to spend more time focusing on the actual data at hand and less time on processing vast amounts of raw data.

Our project aims to help significantly decrease the number of working hours spent on processing and data that is collected in the field. We aim to do this by creating a mobile application which will allow users to submit photos for classification without any other work or steps involved. The mobile application infrastructure will handle ensuring that data is properly formatted and evaluated in such a way that is efficient for the system, meaning that users will have to do nothing more than upload an image to the application and submit. A system that functions like this simply does not yet exist in the field and, when completed, will greatly expand the pool of potential data available to biologists through crowdsourcing data points. In addition to the mobile application, the project will also involve a machine learning algorithm specifically trained to identify different species of moths and measure them based on the image provided. Through the use of such an algorithm, our project will enable researchers in the field to track and identify certain species of moths through a simple photo, rather than having to painstakingly collect data in the field and analyze in a lab at a later point. This will allow for professionals in this field to be exposed to more data points, thus improving the accuracy of their research and predictions. This project's main objective, achieved through the tools described, is to streamline the efficiency and availability of systems for identification of moth species for biologists actively doing research in this field.

The completion of this project will permit the biologist community at large to more effectively research patterns in moth populations, which is becoming an increasingly important issue as the world deals with the onset of climate change. Through both a mobile application and a web based machine learning algorithm, our project will provide the utility of computers to the scientific community in an area where it is much needed. The sensitivity of moths ecologically has led them to be called an "indicator species" in some instances, which speaks to how important it is that biologists be able to monitor their populations across the world. This project will ensure that the evaluation of moth populations is a simpler process that is more accessible to researchers across the globe. Our project seeks to enable researchers to more effectively monitor the health of our environment. Instead of forcing people to complete a job that computers are much more suited for, our project will allow researchers to focus more on the substance of the data rather than its collection and processing.