Abstract:
Time-lapse cameras are increasingly being used to assess wildlife and livestock interactions on rangelands. The use of camera-traps is an inexpensive, unobtrusive, and relatively real-time method to estimate various metrics of range use, but extracting information has proven to be costly and time consuming to process collected data. Researchers and managers are in need of new methods for streamlining the digestion of these large datasets. One such problem appears in the quantitative processing of photos from time-lapse camera traps used to estimate frequency of site use by grazing species. Time-lapse cameras collect hundreds of thousands of photos that need to be individually sorted and classified by human observers. Processing time can exhaust months to years of effort, distract from data analysis, and limit the prospective scope of the research. We are testing the use of machine learning techniques via neural networks such as ResNet-18 architecture to automate photo processing and data extraction. Through the use of deep learning, large datasets of thousands of photos can be processed in a matter of days rather than months, greatly reducing the time invested by hired personnel while matching accuracy. Machine learning methods have the potential to provide detailed and current results allowing resource managers to make up-to-date decisions regarding the proper management of rangelands given prevailing conditions. By negating the burden of photo processing time, resource managers can tackle increasingly complex problems across various environments and land ownerships.