

Enhancing natural resource monitoring with Luke NatureWatch

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Abstract

In the era of digital big data, the potential for utilizing artificial intelligence (AI) to automatically extract meaningful insights from visual content has become increasingly evident. The manual processing of vast repositories of digital imagery and video data by researchers often entails an arduous and resource-intensive work. In Luke, researchers conduct periodic manual procedures of collecting and processing of digital data for monitoring the state of Finnish natural resources. These processes consist, for example, the identification of animal species in game data or determining the age of trees by counting of growth rings found in images of trees' cross-sections. There is a growing interest towards AI-based solutions to enhance manual data processing by automating repetitive and monotonic tasks, thus increasing human resources to more demanding tasks. Multitude of various AI-solutions can currently be found on the market, both open-source and commercial, many of which use transfer learning based pretrained models. However, the usage of these solutions can impose limitations depending on the used platform and off-the-self AI-models, while capable, are not necessarily always suitable per se for custom applications. Generally, for an AI-based solution to be implemented and deployed in practice, necessary steps to be taken include building pipelines for data collection and annotation, training and validating the AI-model, and finally deploying and monitoring the model in a real-world application. Also, a common bottleneck in custom AI-applications is the lack of sufficient quantities of training data.

In Luke NatureWatch cloud application (see Figure 1), we provide users easy-to-use pipelines and interfaces for digital image or video data upload, crowdsourcing annotation work via citizen science, creating and monitoring custom computer vision models and AI-generated exportable analytics reports for user provided data. The application's main rationale is to increase efficiency by automating laborious and repetitive data processing tasks and offer a platform for continuous improvement of the underlying AI-models.

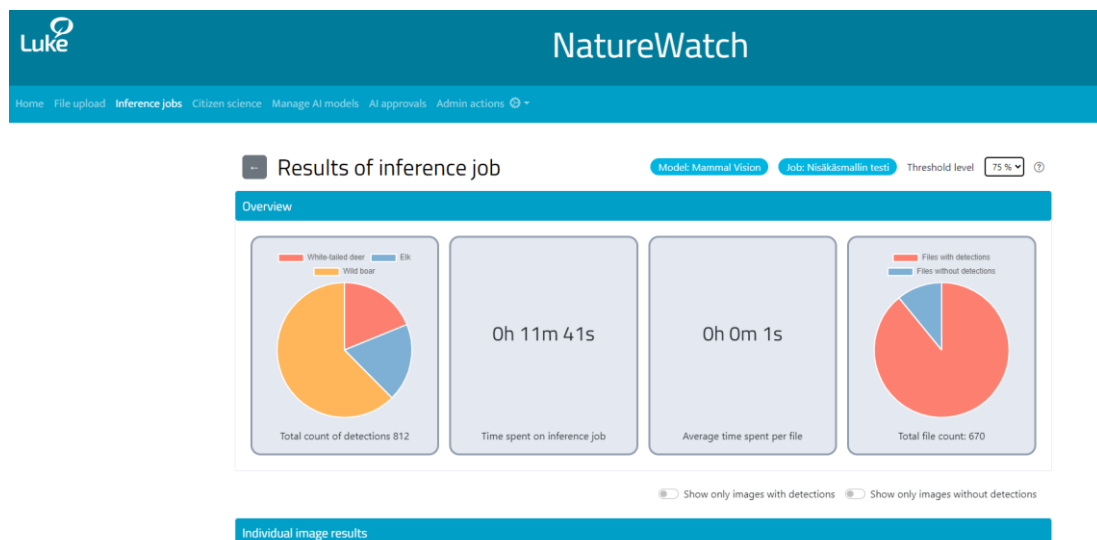


Figure 1: Screenshot of an inference job in Luke NatureWatch application

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