Crop Classification (Uganda and Rwanda) Proposal

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Smallholder crop classification is a challenging task due to the size of the plots/farms. This paired with manual irrigation techniques where farmers carry water to their fields adds to the challenge. Several of the methodologies found in literature are applied to areas such as in the US where the farms are large and thus these methods are more easily applicable. Given the richness of the dataset from Uganda that contains information about the crops grown and a similar smaller dataset from Rwanda, the Power/Agriculture e-GUIDE group has shown interest in working on this problem that may lead to a publication. The timeline for the project is to complete it before the next e-GUIDE retreat.

Datasets

UGANDA

Columbia World Project CWP enumerators surveyed about 42% of Uganda's total area for Productive Uses of Energy. This survey also contains information about horticulture crops grown, methods and water sources used for irrigation, geo-tagged images etc. from the 23,723 plots. The survey was completed in the dry season months of 2023. A map of this is shown in Figure 1

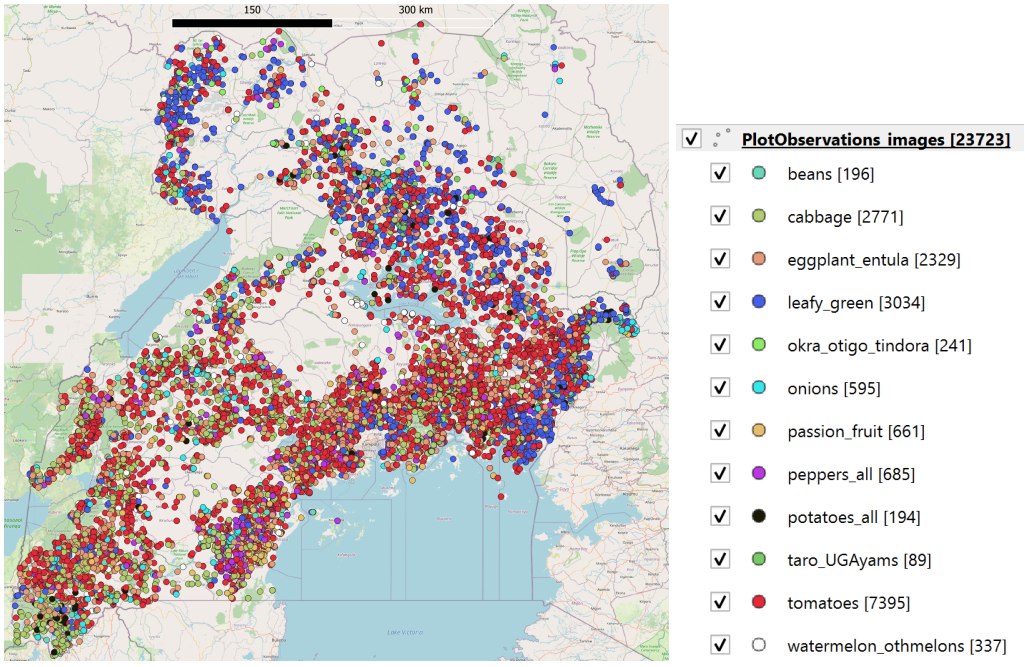

Figure 1: Map of horticulture crops identified through surveys in Uganda

RWANDA

A similar but smaller dataset is provided for Rwanda by AfSIS (Africa Soil Information Services). Their workflow outlines collection of a visual dataset using high resolution imagery that is used to generate a land cover map. This is then used to identify areas of interest to send out survey teams which resulted in georeferenced, field tagged data and photos of 2,824 plots that is accessible here collected from April - August of 2021.

Proposed to-do items

1. Literature review of existing methodologies preferably using GEE that have demonstrated reasonably accurate classifications of crops in sub-Saharan Africa and other areas.
2. Clean and share the survey dataset with the Power/AG group using GitHub. This will contain coordinates of the fields with attributes such as crops grown, irrigation methods etc.
3. Shortlist methodologies to try different crop classification techniques and make an overall assessment of patterns in identification of certain crops
4. Use Rwanda data to verify assumptions and test transfer learning
5. Writeup for publication