

Open-Source Workflow in QGIS for Robust UAV Image Processing

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January 14, 2023



NAPPN Annual Conference Abstract:

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Keywords: UAV, Processing, QGIS, Open Source, Plot

Unmanned aerial vehicles (UAVs) provide growers and researchers with an efficient way to evaluate fields at high resolution. Flying UAVs and collecting imagery are made easily approachable through high-performance sensors that measure a wide spectrum of light and free flight software available on smartphones and tablets. In contrast to the efficiency of collecting imagery, extracting data from this imagery presents a major hurdle for researchers and growers. Current data analysis options require either an expensive subscription service or complex coding packages, effectively preventing many from utilizing remote sensing data. These solutions also are designed as a “black-box”, where imagery goes in and data comes out, making customization and adaptability to the user’s needs a challenge.

To address these shortcomings, I developed an open-source analysis pipeline that is both approachable and robust. Starting with an orthomosaic and combining stock tools in the QGIS graphical user interface, this pipeline follows a simple step-by-step process to mask out soil and apply any user-defined index. From there the user can segment plots using a fast yet highly customizable gridding system, allowing for plot segmentation in unusual field layouts or planting regimes. This feature has been previously unsupported in many subscription and open-source programs alike. Plot-level data can then be exported for statistical analyses. Ultimately, this pipeline is aimed to attract more researchers and growers towards using remote sensing data in their research.