Maryland All-Sky Network: Optimization and Expansion

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Science, Discovery, and the Universe

Issue

For this project we worked with the University of Maryland Observatory to continue development of the All Sky network. The network uses a program called Astride to detect streaks in the night sky. So far the network consists of 1 Starlight Xpress Oculus camera, taking photographs with exposure times between 25 and 55 seconds depending on light conditions. Some of the issues were that while the Astride program does a good job detecting streaks, it also often encounters false positives, and occasionally fails to detect certain streaks. In addition, while the streak detection software is well developed, it was lacking in user functionality, and lacked an effective means of distributing the processed data.
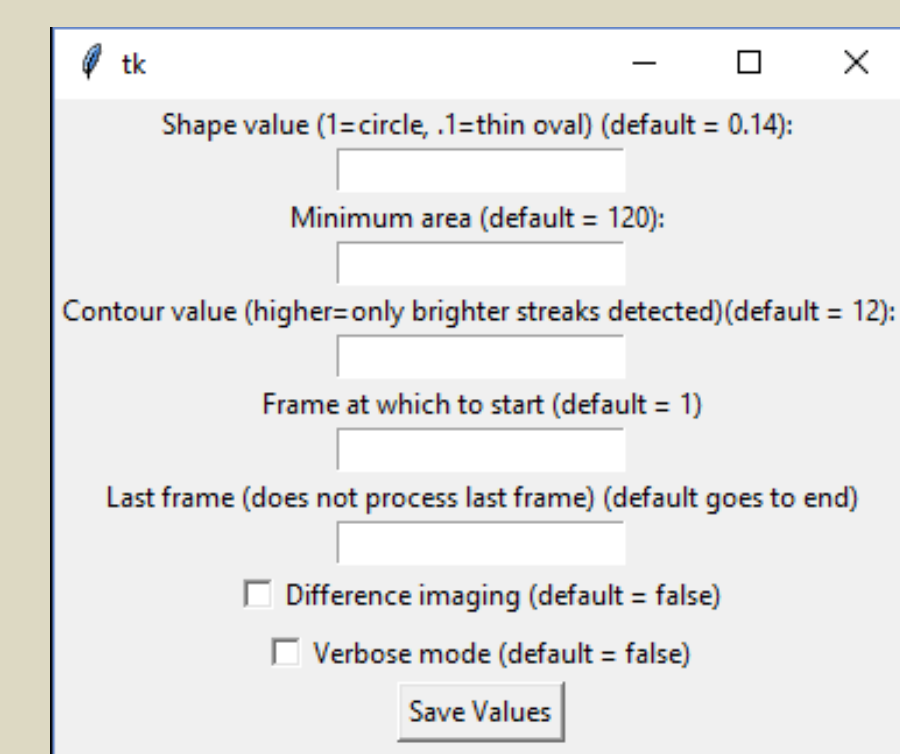
Unprocessed Meteor Exposure

ASTRIDE Streak Detection

Portion of try_astride.py

Impact

Through our work, we've been able to further improve the ASTRIDE software and provide a more complete package. For us, this has been a valuable learning experience in furthering our programming skills, and introducing us to software development. In particular, we strengthened our skills in Python and learned HTML and CSS as well. This really helped us develop our confidence in Python in particular. We also became more familiar with the use of Github to organize our work in a team project. In addition, work on this project also inspired a greater interest in astronomy and the role of programming in astronomy, leading Zach to begin on an Astronomy minor.

Activities

Our main additions to the ASTRIDE software were in adding more user options, such as optional difference images, a verbose mode, and allowing a user to process subsets of the whole data. This is useful because a whole night of data can contain upwards of 1400 files. In addition we developed a GUI as another option for users. Finally, we developed a set of programs to parse the data output and format it into tables that can then be presented on a website that we made.

GUI feature implementation

Future Work

There is still work to be done in making a complete software package. Given more time, we would like to further improve the design and organization of our website for presenting the processed data. There is also still work to be done in further automating the program, like for example creating an automated database for satellite flyovers. In addition, there is still work to be done in optimizing Astride's streak detection. For Zach, this project resulted in more interest in exploring programming careers in astronomy. For Dmitriy, the programming experience of the project resulted in a greater interest in autonomous systems.