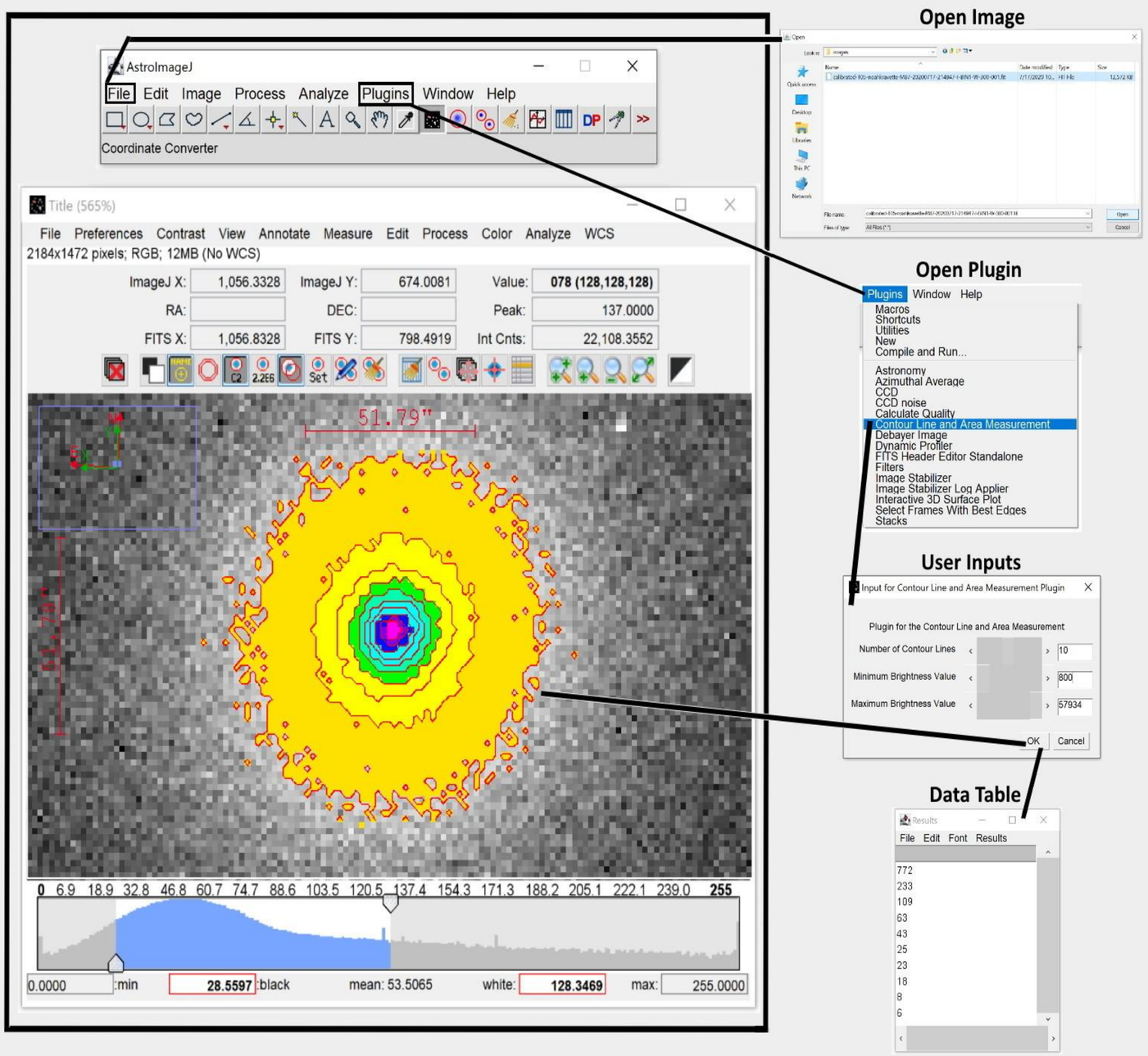
Custom Addons for the Software AstroImageJ #??

Tyler Nourai, Dylan Tivnan, and Evan Williams
CSC4910: Computer Science Capstone & Dr. Stuetzle

Abstract

Research has become more efficient and precise with the use of software. The goal of this project was to create an add-on plugin, Contour Lines and Area Measurement for the software package AstroImageJ to help assist the Merrimack College Astronomical Research Group. Professor Duston expressed the need for Functional Programmers Inc. (FPI). He needed the plugin to take an image, and specific user inputs to produce contour lines and areas of each region of a single star on the image. FPI recruited the MyPear team, consisting of Tyler Nourai, Dylan Tivnan, and Evan Williams to work with Dr. Stuetzle and develop the plugin. The results of this collaboration was a creation of the contour line and area measurement add-on plugin for AstroImageJ.

The Plugin

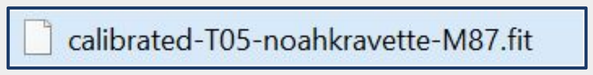


Behind the Scenes

The plugin implements an algorithm known as “Marching Squares”. This algorithm gives each pixel in the image a value, then divides the image into sets of 2x2 pixel squares. Afterwards, a line is drawn in each 2x2 square that separates the high value pixels from the lower value pixels. This draws an outline between the high and low value pixels, forming a singular region within the image.
The algorithm is then repeated a number of times equal to the amount of contour lines requested, each time forming a region between a higher and lower value.

Input

Users must provide a single image of .fit format.



Users must provide the number of contour lines, and the minimum and maximum brightness values via the user interface.

Source Code Location

The plugin is publicly available for download on the Merrimack College Astronomical Research Group’s website and Professor Duston’s Github for download.

Future Work

MyPear would like to add a feature to allow the user to smooth the contour lines, making them appear less jagged and easier to read. We would also like to gain more knowledge of the AstroImageJ Software to create future plugins.