Zooniverse Project

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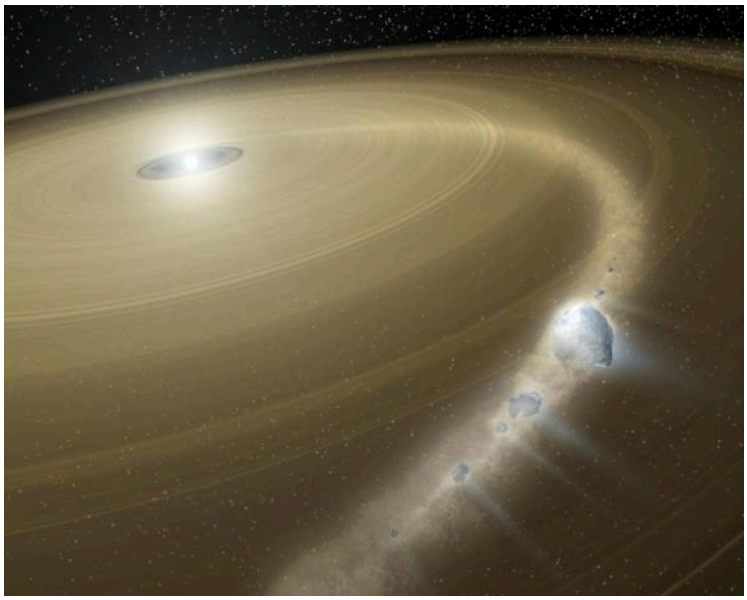
Exoasteroids

Searching for asteroids around dead stars



This project analyzed time-lapse movies of the sky to identify white dwarfs that have changed in brightness over the past decade. Volunteers are asked to examine the data because of how the ability of the human eye to identify patterns that computers struggle to disentangle from noise. Findings from this will provide valuable insights to help researchers train a computer vision model that will one day in future identify repetitive or time consuming patterns. Observations have been made on 100 images in this project.

Basic Info:

The Zooniverse project asked volunteers to identify white dwarfs (After a sun-like-star dies.) that have changed in brightness over the past decade. Those brightness changes

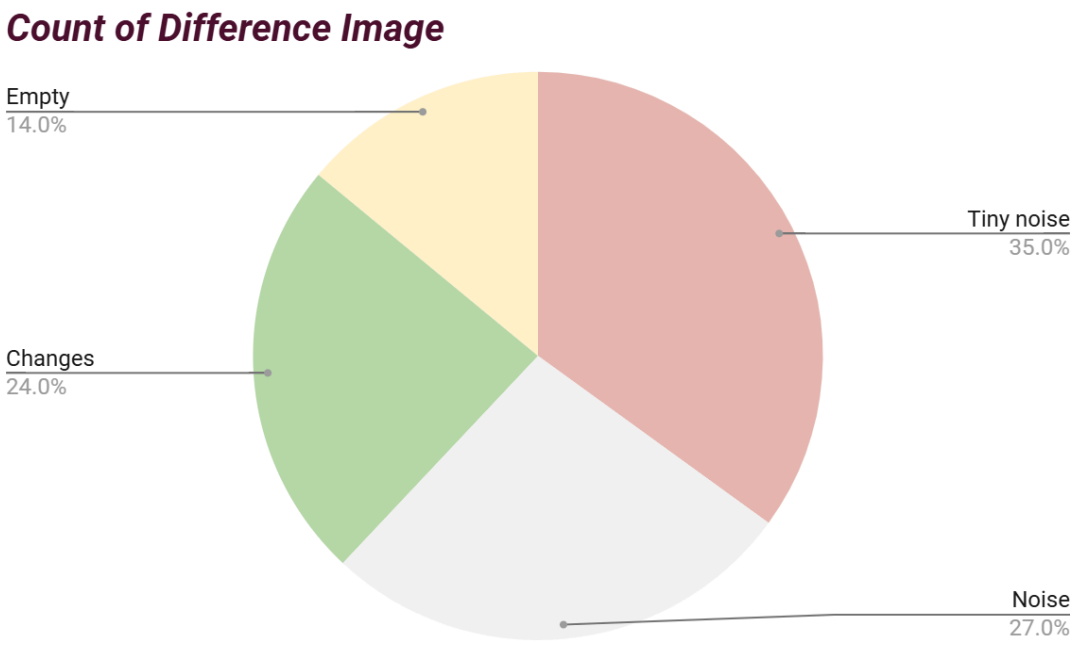
can occur when objects similar to asteroids break in pieces, releasing duct as a result. It is a sign that exoasteroids may be orbiting it.

Methods:

Observations were logged in Google Sheets, tracking difference between false-color images and difference images, color difference from neighbours, and their classification. Charts summarized patterns across all images.

The way of classification:

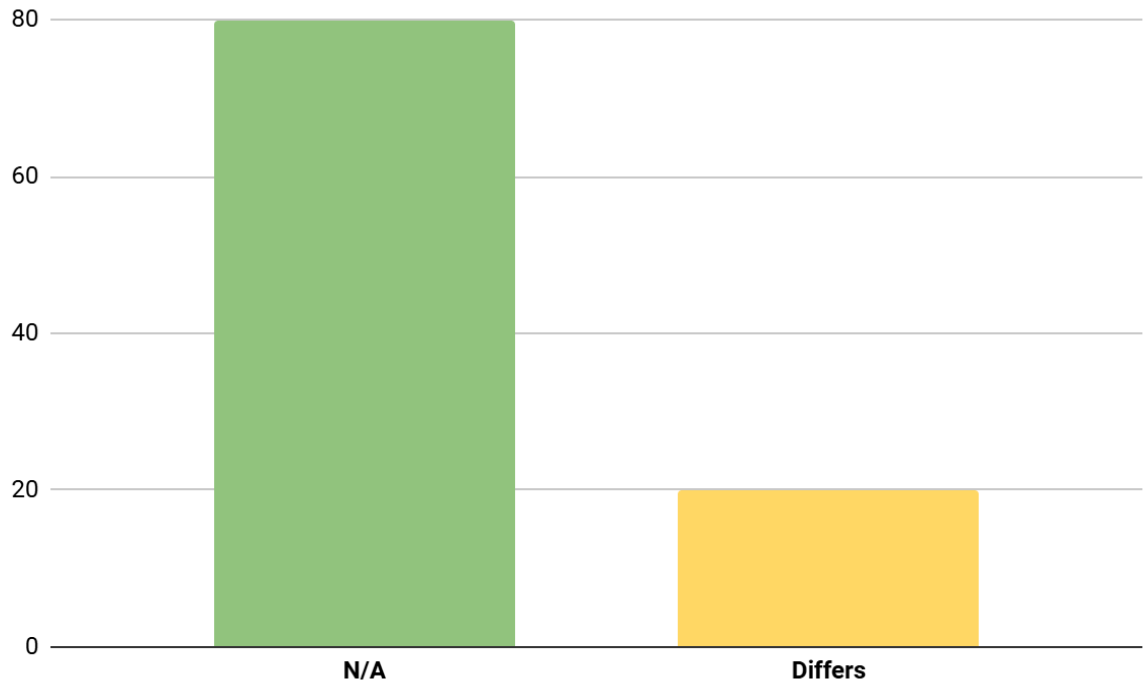
- The left image shows objects at original brightness while the right image shows differences; a bright or changing light indicates a change.
- Tiny random dots or neighbours were ignored unless the change occurred to the object itself.



Noise meaning in this context:

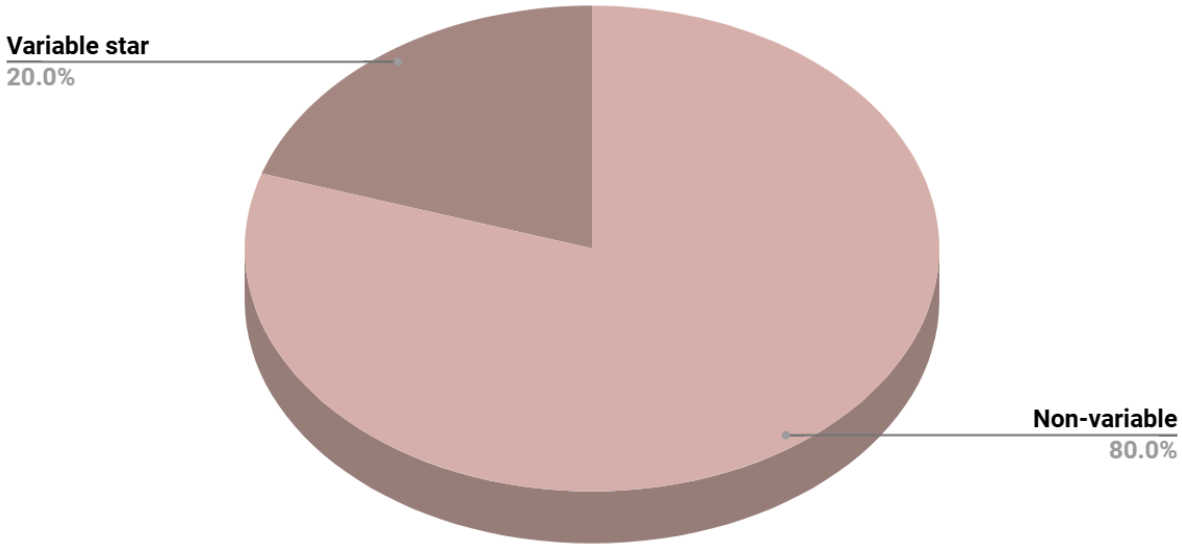
- Random little changes in the image that don't come from real stars or objects.
- It comes from imperfect detectors, background light, or cosmic rays hitting the camera.

Comparison Between Neighbours:



Because of the low amount of variable stars, differences between neighbours was also rare.

Classification:



Most frames covered non-variable stars.

Conclusion:

This project aimed to distinguish white dwarf stars from noise. Over the course of the study, 200 images were carefully analyzed, with observations recorded in Google Sheets. Each image was carefully classified. The majority of stars in the sample were non-variable. Rare variable stars and moving objects were successfully identified using difference imaging. This study demonstrates how systematic classification can detect unusual astronomical objects.