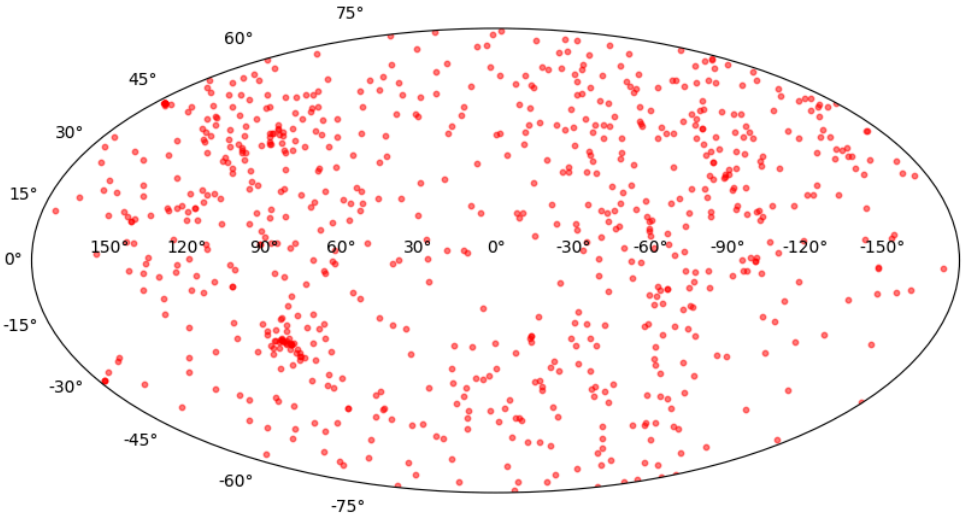
# Introduction

Cataclysmic variables (CVs) are interacting binaries made of a white dwarf which is accreting mass from a main sequence star via Roche lobe overflow.
Depending on the mass ratio between the two components, the mass transfer rate, the orbit inclination and the magnetic fields of the white dwarf, CVs can show a large diversity of observational properties.
In general terms, the spectral energy distribution of a CV is made of a blue component due to the white dwarf, a red component due to the main sequence star and a power law due to the accretion disc. The proportion of these components can vary enormously on the evolutionary state of the CV.
The discovery of these objects have been mostly serendipitous and, lately, mostly the byproduct of quasar searches.
The works by Abril et al. (2020, MNRAS, 492, 40) and Pala et al. (2020, MNRAS, 494, 3799) have taken advantage of the magnitudes and parallaxes available in Gaia DR2.
Interestingly, the low resolution spectra of Gaia DR3 have been largely unused to search for CVs. The only search for CVs based on Gaia DR3 (Canbay et al. 2023, AJ, 165, 163) still focused only on colours and parallaxes.

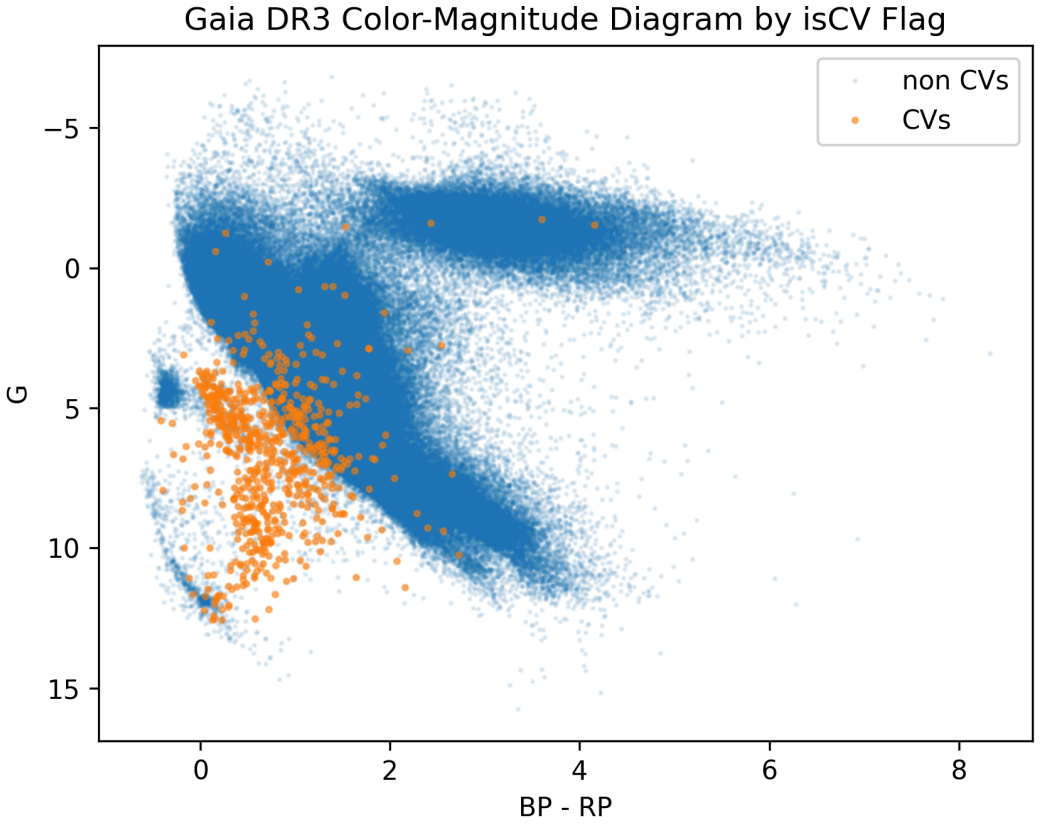


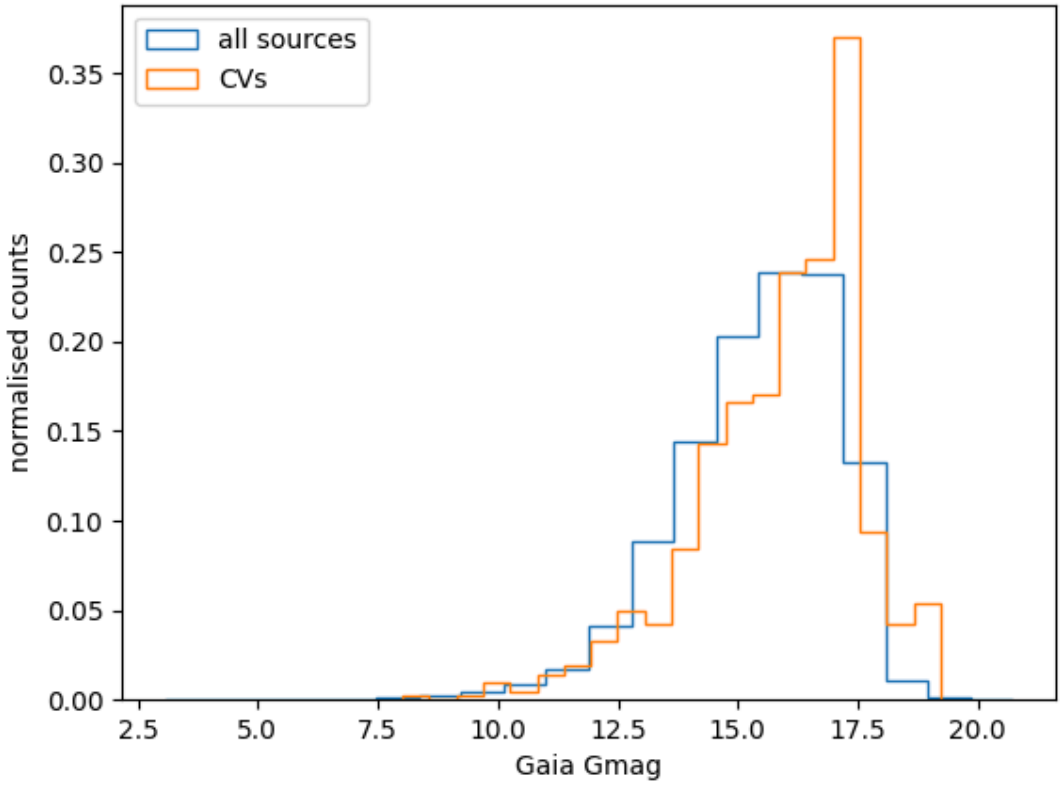

# The data

There are 4402 CVs in Simbad. A cross match (1 arcsec radius) with Gaia DR3 returns 2896 sources.

There are 6.3 million objects in Gaia which have both XP spectra and light curves.

The coefficients of the spectra were downloaded, combined and normalised.



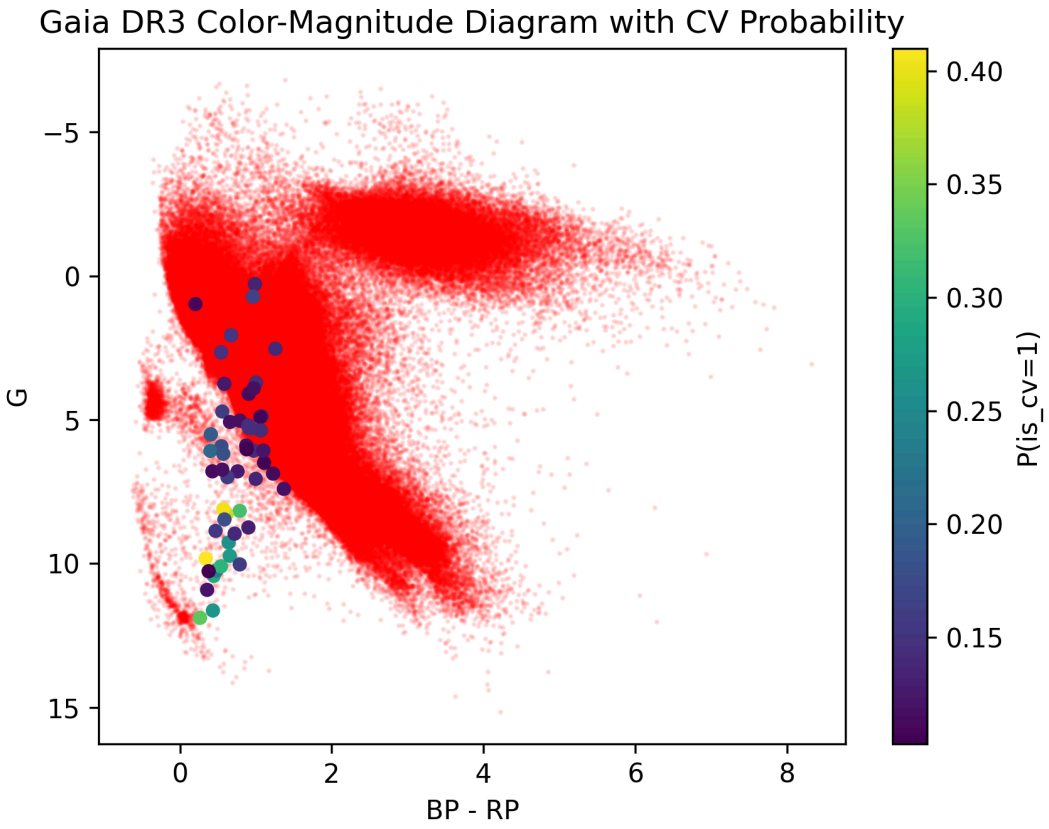


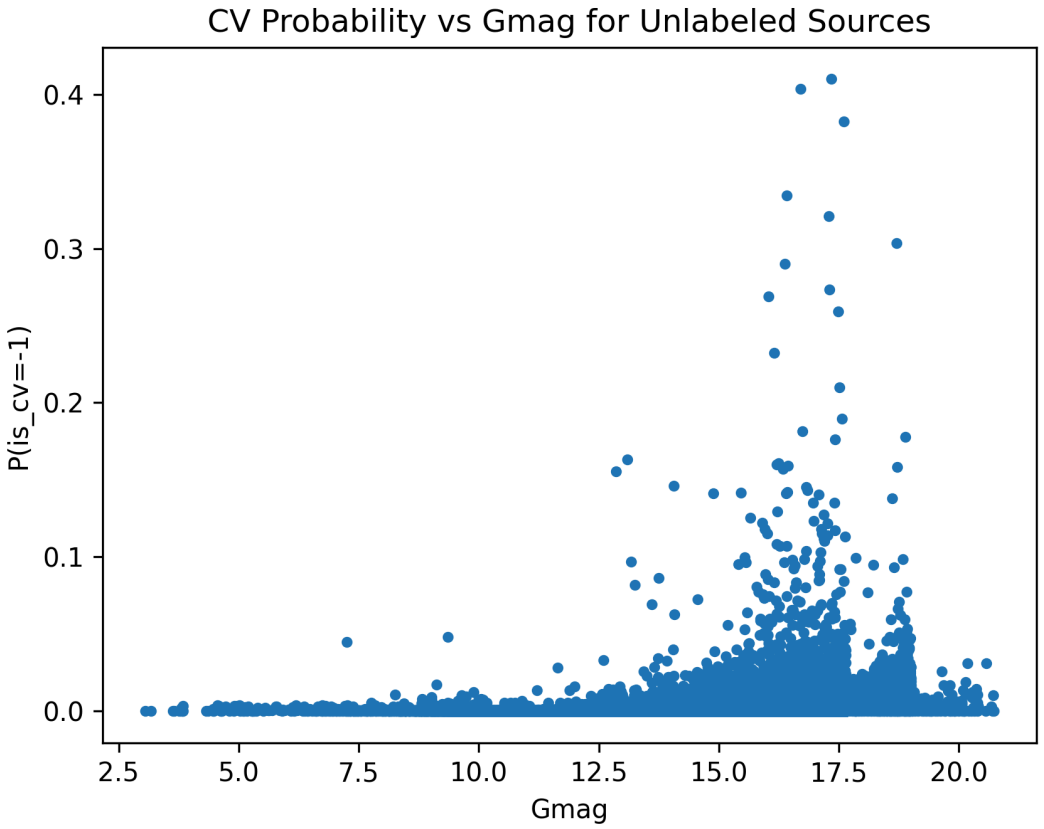

# The methodology

An UMAP projection has been used to project the dataset in two dimensions.

Since the dataset is vastly unbalanced, we used a Random Forest algorithm which is typically more resistant to this issue.

# Results


Gaia DR3 Color-Magnitude Diagram with CV Probability
G
BP - RP
P(is_cv=1)
−5
0
5
10
15
0
2
4
6
8
0.40
0.35
0.30
0.25
0.20
0.15


CV Probability vs Gmag for Unlabeled Sources
P(is_cv=-1)
Gmag
0.4
0.3
0.2
0.1
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
20.0