Automatic Classification and Cataloging of Eclipsing Binary Star Systems with Amateur Telescopes

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The study, calculation, and cataloging of eclipsing binary systems are being done spectroscopy technique. An expensive way to catalog and classify eclipsing binary star systems because of technical and personal resources needed. To overcome this financial problem, we present a new methodology, which aims at reducing the time and costs needed for the classification and cataloging of eclipsing binary stars systems. Whereas current methods' building costs are over millions of dollars and per night costs over a thousand dollars, our methodology uses amateur telescopes worth USD 20,000. Additionally, we develop an algorithm that interprets the data from these telescopes and classifies the eclipsing binary systems regarding important parameters like temperatures, radius relation, and life phase. It should be mentioned that existing systems only use the light curve to draw their conclusions. To test this project we studied GSC01020-00796 which is an eclipsing binary system discovered in June 2019. We explore different aspects of this object: distance, orbital period, temperatures and the radius quotient of the stars. Then, working under the assumption that the system is, indeed binary, we apply the new methodology and algorithm to obtain the first scientific results of this binary system. The images analyzed were retrieved from Santa Maria de Montmagastrell Remote Observatory taken with an SBIG STL-1001E CCD camera attached to a Meade LX600 ACF™ TELESCOPE - 16" F/8. The results from the implemented algorithm indicate that the new methodology is reliable and that allow us to obtain valid results much cheaper and faster.

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