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Optical monitoring of a transitional millisecond pulsar PSR J1023+0038

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PSR J10203+0038 is a transitional millisecond pulsar (tMSP) in an eclipsing binary system, which has been observed to switch between the radio loud millisecond pulsar (MSP) and low-mass-X-ray binary (LMXB) states. This behavior offers a great opportunity to study the origin of MSPs and confirming the 'recycling' scenario, a theoretical model of MSP's origin. We develop an automated pipeline to monitor the system using Python programming language and Source-Extractor software for detecting the objects and measuring its magnitude. We obtain a series of observations with the 0.6m PROMPT-8 telescope at Cerro Tololo in Chile. The magnitude threshold for alert has been set 16.884 mag in R filter. When the magnitude of the system increases over the limit, 16.884 mag in filter R, the pipeline will alert us about the next possible switching of this system. The pipeline has been running on server at National Astronomical Research of Thailand (NARIT) since January 2018. We have found that, during January and February 2018, the system still remains in LMXB state.

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