Big Data Era Challenges and Opportunities in Astronomy—How SOM/LVQ and Related Learning Methods Can Contribute?

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Abstract Astronomy is facing a paradigm shift caused by the exponential growth of the sample size, data complexity and data generation rates of new sky surveys. For example, the Large Synoptic Survey Telescope (LSST), which will begin operations in northern Chile in 2022, will generate a nearly 150 Petabyte imaging dataset. The LSST is expected not only to improve our understanding of time varying astrophysical objects, but also to reveal a plethora of yet unknown faint and fast-varying phenomena. In this talk I will present big data era challenges and opportunities in astronomy from the point of view of computational intelligence, machine learning and statistics. In particular, I will address the question of how SOM/LVQ and related learning methods can contribute to cope with these challenges and opportunities.

Keywords Astronomy · Astrophysics · Big data · Self-organizing map · Learning vector quantization

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