Monitoring of the natural plague focus with interval and fuzzy data using immunocomputing[*]

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Immunocomputing (IC) is a new method of solving complex, computationally intensive, real-life problems [1, 2], using a mathematical basis.

This paper provides a further development of the IC approach by applying interval and fuzzy techniques to infection control in natural plague focus. Natural plague foci are present in vast areas. They are characterised by different regulation mechanisms at the population, species, and community levels for the plague triad of carrier, vector and microbe.

The following concepts have been presented:

- the use of singular value decomposition of interval matrices, to illustrate the state of the plague triad at different times;

- techniques of supervised and unsupervised learning on the base interval and fuzzy data, to forecast dynamic epizootic processes at the population level for the area known as the Akdala plane;

- the use of plague risk indices (PRI) that can clearly indicate the risk of plague infection in natural plague foci;

- data fusion of large quantities of variable data relating to this complex, interacting, dynamic system, into a single general value or index, that represents all of those factors;

- the application of data fusion and mathematical models to form PRI on the base interval and fuzzy data using immunocomputing.

References

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