to make resources of the system applicable to receive a change of CPU allocation, I/O memory process and RAM. So, any possible change could be prepared by identifying the workload prediction so DBMS could be performed efficiently and effectively.

In handling large spatial database especially spatial data from Merapi Volcano satellite, there was a need to find an accurate and fast prediction of incoming workload so system recourses could be more efficient and effective especially in giving decision making of disaster management response. Case-Based Reasoning (CBR) prediction model as machine learning had been proposed to answer the research question. CBR had used old experiment data to predict new experimental data. When there is no past experiment data, the similarity of new experimental data performed until new experience data became new knowledge of CBR. So, the need for accurate prediction of workload could be the answer as shown in the results of the fourth section prediction evaluation to evaluate workload performance efficiently and efficiently. In handling fast prediction for incoming workload spatial data, CBR prediction model had been optimised with Hash Search technique to make matching similarity become fast. Optimization with Hash Search technique was involved in retrieving steps from CBR. In addition, with the help of Euclidean distance to minimise the finding to the nearest destination with smaller execution time than without using hash search optimisation.

The overall conclusion of the prediction that was performed with Hash Search technique in CBR together with the selected parameters has proven to fulfil the requirements to handle large spatial database. Therefore, future works for evaluation can be continued to system resources after workload handle large spatial data. It is a must to have an enlarged system so that schedules could predict and thus, on the workload suggest the database management.

REFERENCES

Abdul, M., Muhammad, A. M., Mustapha, N., Muhammad, S., Ahmad, N., 2014. Database workload management through CBR and fuzzy based characterization. *Applied Soft Computing*, 22, pp. 605–621.

Boser, B. E., Guyon, I. M., Vapnik, V. N., 1992. A training algorithm for optimal margin classifiers. In: *Proceedings of the fifth annual workshop on Computational learning theory*, pp. 144-152.

Cao, X., Cong, G., Guo, T., Jensen, C. S., Ooi, B. C., 2015. Efficient Processing of Spatial Group Keyword Queries. *ACM Transactions on Database Systems*, 40(2), pp. 1–48.

Chen, Y. Z., Shen, S. F., Chen, T., Yang, R., 2014. Path optimization study for vehicles evacuation based on Dijkstra algorithm. *Procedia Engineering*, 71, pp. 159–165.

Chiba, T., Onodera, T., 2016. Workload characterization and optimization of TPC-H queries on Apache Spark. In: *IEEE International Symposium on Performance Analysis of Systems and Software*, pp. 112–121.

Elnaffar, S., Martin, P., Schiefer, B., Lightstone, S., 2008. Is it DSS or OLTP: Automatically identifying DBMS workloads. *Journal of Intelligent Information Systems*, 30(3), pp. 249–271.

Firdaus, Hidayat, S., Sahroni, A., Setiawan, H., Akbar, R., 2013. Design technology in wireless mesh network system for eruption disaster mitigation of Merapi volcano. In: *3rd International Conference on Instrumentation, Communications, Information Technology, and Biomedical Engineering*, pp. 255–259.

Flores-Contreras, J., et al., 2015. A performance prediction model for database environments: A preliminary analysis. In: *IEEE 17th International Conference on High Performance Computing and Communications, IEEE 7th International Symposium on Cyberspace Safety and Security, IEEE 12th International Conf on Embedded Software and Systems*, pp. 1707–1712.

Han, J., Kamber, M., Pei, J., 2011. *Data Mining Concept and Technique, 3rd ed*. San Francissco: Morgan Kaufmann.

Holze, M., Haschimi, A., Ritter, N., 2010. Towards workload-aware self-management: Predicting significant workload shifts. In: *IEEE 26th International Conference on Data Engineering Workshops*, pp. 111–116.

Khushi, M., 2015. Benchmarking database performance for genomic data. *Journal of Cellular Biochemistry*, 116(6), pp. 877–883.

Marhaento, H., 2016. Gis-Based Analysis For Assessing Landslide And Drought Hazard In The Corridor Of Mt. Merapi And Mt. Merbabu National Park, Indonesia. *Journal of Geomatics and Planning*, 3(1), pp. 15-22.

Matuszka, T., Kiss, A., 2014. Experimental evaluation of some geodata management systems. In: *9th International Conference on Computer Engineering and Systems*, pp. 92–97.

Molka, K., Casale, G., 2015. Experiments or simulation? A characterization of evaluation methods for in-memory databases. In: *11th International Conference on Network and Service Management*, pp. 201–209.

Qaddah, A. A., Abdelwahed, M. F., 2015. GIS-based site-suitability modeling for seismic Stations: Case study of the northern Rahat volcanic field, Saudi Arabia. *Computers & Geosciences*, 83, pp. 193–208.

Sarwat, M., 2015. Interactive and Scalable Exploration of Big Spatial Data - A Data Management Perspective. In: *16th IEEE International Conference on Mobile Data Management*, pp. 263–270.

Zewdu, Z., Denko, M. K., Libsie, M., 2009. Workload Characterization of Autonomic DBMSs Using Statistical and Data Mining Techniques. In: *International Conference on Advanced Information Networking and Applications Workshops*, pp. 244–249.