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**Efficiency improvement for multi depot vehicle routing: A case study in cash distribution**


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**Abstract**

This research is aimed at increasing efficiency of cash distribution from three distribution centers delivered to 377 branches, and 3,699 automatic teller machines by using Cluster First - Route Second technique. New concept of assignment problem with time window is presented in this paper for clustering. A Group Sweep Algorithm which is modified from a traditional Sweep Algorithm combined with a nearest neighbor search is also presented as the routing methodology. Application software has developed using PHP and MySQL. AMPL with CPLEX 10.0 is used to solve the assignment problem and is perfectly embraced underneath the developed application software to allow the user friendly experience. The software allow the flexibility in changing various parameters such as, capacity proportion of each cash distribution center, speed of vehicle, service time at each branch or ATM, time window of each branch or ATM or distribution center, etc. The result shows that 11 vehicle can be reduced resulting in cost reduction in a total amount of US$195,097 annually. © (2013) Trans Tech Publications, Switzerland.

**Author Keywords**

Assignment problem with time window; Group sweep algorithm; Multi depot vehicle routing problem

**References**

- Jeon, G., Leep, H.R., Shim, J.Y.

- Eksioglu, B., Vural, A.V., Reisman, A.

- Toth, P., Vigo, D.

- Jin, M., Liu, K., Eksioglu, B.

- Rousseau, L.M., Gendreau, M., Feillet, D.

- Ralphs, T.K.

- Yucenur, N.G., Demirel, N.C.

- Dantzig, G.B., Ramser, J.H.
  *The Truck Dispatching Problem* (1959) *Management Science*,


• Bolduc, M.C., Laporte, G., Renaud, J., Boctor, F.F.
  A tabu search heuristic for the split delivery vehicle routing problem with production
  and demand calendars

• Fuellerer, G., Doerner, K.F., Hartl, R.F., Iori, M.
  Ant colony optimization for the two-dimensional loading vehicle routing problem

• Ai, T.J., Kachitvichyanukul, V.
  A particle swarm optimization for the vehicle routing problem with simultaneous pickup
  and delivery

• Baker, B.M., Ayechew, M.A.
  A genetic algorithm for the vehicle routing problem

• Laporte, G., Nobert, Y., Taillefer, S.
  Solving a family of multi-depot vehicle routing and location-routing problems

• Tansini, L., Urquhart, M., Viera, O.

• Beasley, J.E.

• Renaud, J., Laporte, G., Boctor, F.F.
  A tabu search heuristic for the multi-depot vehicle routing problem

• Renaud, J., Laporte, G., Boctor, F.F.
  An improved petal heuristic for the vehicle routing problem

• Qi, M., Lin, W.-H., Lia, N., Miao, L.
  A spatiotemporal partitioning approach for large-scale vehicle routing problems with
  time windows

• Maya, P.
  A metaheuristic for a teaching assistant assignment-routing problem

• Gabriel, T.
  Cluster-Base Heuristics Two Echelon Vehicle Routing Problem
  (2008) CIRRELT.

• Boonsam, P., Suthikarnnarunai, N.
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  Distribution

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