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CORRELATION AND CRITICAL PATH ANALYSIS BASED ROAD TRAFFIC ROUTING ALGORITHM

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ABSTRACT

In this paper, we present a new dynamic road traffic routing algorithm, for enhanced clearing out of traffic from congested areas of the traffic network. The main objective of designing this algorithm is to implement a system that optimizes the rate of flow of traffic throughout the road network by minimizing traffic congestion rates. By cross-correlation analysis the system analyzes the relation between lanes, in particular, the rate of flow of traffic between lanes. It is used to compute the Time Difference of Arrival (TDOA), which in this context estimates the amount of time a fleet of traffic takes to travel from one intersection to the next. These time estimates are then used together with traffic counts at each intersection, and traffic weights which depict traffic flow patterns between lanes, to compute link scores and path scores for each road link and path, respectively. These scores are then presented as a network model based on the concerned road part of the road network. After all this, the algorithm uses this network model to compute an optimized sequential opening of the traffic lights in within that particular area. This algorithm is a dynamic model that mimics the operation of a police officer who controls traffic flow at road intersections during bad traffic congestion, the practice which is common here in Botswana and other third world countries.

KEYWORDS: *Road Traffic, Routing Algorithm, Ant Colony Optimization (ACO), Ant Dispersion Routing (ADR), Critical Path Analysis, Poisson Probability Distribution, Cross Correlation Analysis*

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