TECH OFFER

Eldercare Centre Routing Optimization

KEY INFORMATION

TECHNOLOGY CATEGORY:
Infocomm - Artificial Intelligence

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**
COUNTRY: **SINGAPORE**
ID NUMBER: **TO175162**

OVERVIEW

Eldercare centres have a unique structure due to the several variables & constraints regarding the elder and service type. Unlike the other item or passenger transportation problems, the eldercare industry does not have a standard approach to match the number of elders and vehicle capacity because some elders are transported by a wheelchair which covers approximately two seats, whereas the others may be ambulant. In addition, for some cases, such as an elder with dementia, a caregiver may accompany the elder, making the capacity-elder match more complicated & dynamic per vehicle trip.

Considering this capacity utilization problem in the eldercare & healthcare industry, this technology was developed, which is a routing algorithm that optimally matches the number of elders and vehicle capacity to minimize the number of vehicles deployed per trip while maximizing vehicle utilization by providing the minimum travel distance and travel time. As a result, eldercare service providers will provide faster services to customers and reduce their outsourced vehicle costs.

TECHNOLOGY FEATURES & SPECIFICATIONS

The routing optimization model was designed to improve the transportation service quality eldercare centers by focusing on:

- Optimal elder routing & sequence per vehicle trip
- Database structure to eliminate manual workload
- Optimal vehicle scheduling
- Operational KPIs structuring

The algorithm is able to be integrated as a microservice under a platform interface whereby all applications are accessed & monitored by the end-user.

The capacitated vehicle routing problem with time windows (CVRPTW) has a wide range of applications where each customer service should start at a specified time window. In this technology, CVRPTW was adapted into eldercare transportation cases considering the particular specifications such as elder type as ambulant, with wheelchair, service type as daycare or rehab and caregiver accompaniment. As a result of the model, approximately a 20% improvement was observed in travel distance and travel time per vehicle trip for some centers.

POTENTIAL APPLICATIONS

Routing optimization of elderly to and from eldercare homes.

MARKET TRENDS & OPPORTUNITIES

Data Bridge Market Research analyses that the elderly care market which was USD$832.8 billion in 2021, would rocket up to USD$1,268.43 billion by 2029, and is expected to undergo a CAGR of 5.40% during the forecast period 2022 to 2029.

UNIQUE VALUE PROPOSITION

- High customization for the eldercare sector: No requirement for further customization, time and resource-saving
- Niche product: Low level of competition, similar algorithms need to be customized first for the specific considerations of the eldercare industry
- Optimal output: Proof of the model reliability, safe to implement
- Integrability: Flexible to interact with other applications