Introduction To Data Mining Homework

Institutional Affiliation

Student Name

Date of Submission

Manual data collection

Question 1

Manual procedures, including the active participation of transport staff, were traditionally the backbone of data collecting in the transit system. The manual counting and recording of fare payments by conductors as well as ticket inspectors during transit rides was one of the main methods. The goal of this procedure was to illustrate how revenue collection and passenger counts work at a fundamental level. On top of that, periodic manual surveys were used to collect information regarding demographics, travel preferences, and other pertinent data (Ovi et al., 20220). These surveys included aboard and station interviews. The manual nature of these surveys meant that, although informative, they were infrequent and had a small scope.

Ticketing and record-keeping using paper methods was another common conventional approach. Transportation agencies kept arduous records of the sale of tickets, use, and income while passengers bought paper tickets or tokens (Ovi et al., 20220). Even though it was in use for a long time, this manual ticketing method was not up to the task of keeping up with the ever-changing nature of transportation operations. Basically, the transportation system used to rely on paper procedures, occasional surveys, and human labor to gather data. While these approaches worked for simpler transportation systems in the past, they weren't up to the task of handling more complex systems that required more extensive and real-time data for optimization and decision-making.

Question 2

Because of their inherent constraints, the conventional techniques of data collecting in the transportation system are considered inadequate to meet current standards. First of all, there is a

high potential for human mistakes in the manual counting of passengers and revenue recording when it is left to conductors and ticket inspectors. Also limiting the breadth and complexity of data collecting is the occasional nature of human surveys, which only provide snapshots of the passenger experience at specific periods. Furthermore, the transportation system is unable to react quickly enough to changing operational problems due to the time lag linked with manual data-collecting techniques (Ovi et al., 20220). Delays in data collection and analysis hinder the skill necessary to optimize timetables, routes, and resource allocation in an age when making decisions in real-time is critical. Because of the inherent limits of conventional approaches, there has been a trend towards automated technology for data collecting in response to the growing complexity of transportation systems. This change is driven by the need for more extensive, timely, and accurate data.

Question 3

Optimal operation and performance measurement are at the heart of the case study offered by Capri (2015), which centers on a transportation system. The transit authority aimed to use cutting-edge procedures to improve decision-making after realizing the limits of manual data-collecting methods. In order to optimize, one must have a thorough knowledge of passenger runs smoothly, peak travel hours, and route efficiency. To assess performance, one must have precise data on reliability, customer satisfaction, and delays (Vernizzi & Bontempi, 2020). Moving from old-fashioned to modern data-gathering methods has far-reaching consequences. Technology and infrastructures can need significant initial investment and may incur additional expenditures for upkeep over time. Both the time and money required to adopt new technology are highlighted in the case study. There may be a need for more resources to manage the

transition efficiently, and training for the personnel engaged in manual data gathering to adapt to the advances in technology is a possibility.

Optimized decision-making, more excellent service dependability, and enhanced operational efficiency will justify the shift, notwithstanding the hurdles. In order to keep up with the competition and adapt to a city that is constantly changing, the case study stresses the strategic relevance of resolving the labor- and money-intensive obstacles (Vernizzi & Bontempi, 2020). For transportation networks to succeed in the midst of growing complexity and demand, investing in cutting-edge data-collecting techniques is essential.

References

Ovi, M. F. M. (2020). *SMARTer growth neighborhood design manual: application to existing neighborhoods* (Doctoral dissertation, University of British Columbia).

Vernizzi, C., & Bontempi, D. (2020). Can a map save city shops? Applications of data visualization to represent the material and immaterial urban survey. In *Proceedings of the 2nd International and Interdisciplinary Conference on Image and Imagination: IMG 2019* (pp. 1106-1119). Springer International Publishing.