Exploring Day-to-Day Link-flow Variation using Traffic Counter Data in Kumamoto, Japan

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Abstract

Predicting road link flow is vital for future road planning developments and for managing the current transport system. The average link flow is usually estimated in practice, but its variation is also useful to discuss the reliability of the transport system and to operate the transport system more effectively. In other words, the point estimation of link flow is often used, but interval estimation will be also useful. As an existing study, Kawaoka and Maruyama (2016) developed a bootstrap method to provide the interval estimation of link flow in Kumamoto, Japan, but their outputs were not validated with variations in real road flow. This study aims to investigate the real-world day-to-day link flow variation in Kumamoto and compare the variation with those estimated by Kawaoka and Maruyama (2016).

We used the data of traffic counter and investigated the day-to-day variation of flow. At first, we compared the data between weekdays and holidays. The results indicated that the averages of traffic flows on holidays are less than those on weekdays, and its variations during holidays are more than those during weekdays. Next, we examined the effect of weather on the flow comparison between weekdays and holidays. We observed that the average of traffic flows decreased as the weather worsens for both weekdays and holidays, and its variation increased as the weather worsened, especially during holidays. These results can be explained by the change in the purpose of the trip for weekday and holiday travel. Commuting and business trips are dominant during weekdays, and those trips are more stable compared to the leisure and private trips often observed during holidays. Finally, we compared our results and those by Kawaoka and Maruyama (2016). A similar trend related to link flow was observed in the relation between its average and the coefficient of variation, and the relation between the average and the skewness. Specifically, the coefficient of variation tends to decrease as the traffic flow increases, and the skewness value tend to be negative as the traffic flow increases. These findings partially confirm the effectiveness of the method by Kawaoka and Maruyama (2016) and their method can be regarded to be a promising method in practice.