I-95 CC New Hampshire Volume & Turning Movement (VTM) Presentation – Questions and Answers Summary

August 8, 2018

Q: What kinds of probe count stations are required to have a functional model. Is there an opportunity to reduce some of the 3-year count stations or the more temporary count stations?

A: (Kaveh Sadabadi, UMD CATT) We did a test on NH data set to be able to answer this exact question! We started with an artificial neural network (ANN) model trained on data from Florida (39M data points compared to NH's 3M data points). We began adding NH data in two-week increments. We found that adding only 2 weeks of NH data, the model produced great volume estimates for NH roadways. This is of course given the assumption we already had access to a good model and FL data. That being said – it's certainly possible to reduce some of the counting stations, but there's a great opportunity to utilize fewer count stations to more benefit. Moving temporary count stations every month to new locations would give the model an opportunity to experience different conditions and produce overall better results.

(Stan Young, NREL) In a parallel study with Colorado DOT we utilized 48-hour count stations for use off-freeway and the model was able to produce great results.

Q: Do you need to be a member of RITIS to have access to this volume data?

A: (Stan Young, NREL) The data that's used to create these volume estimates goes beyond what is available through VPP and RITIS. The requirement is to get probe counts from vendors – it's another item of data that can be provided but isn't currently included in real-time speed data. We also use that speed data, which is given by RITIS or a contract from a probe vendor. NH currently uses TomTom, INRIX, and physical sensors for speed data.

Q: In terms of statewide travel – can the model report volumes on a weekly, monthly, and annual basis?

A: (Stan Young, NREL) When we began this project it was very operations-driven. Our original objective was for the base output to be by hour. We've since been able to aggregate those hourly volumes into those strata, including AADT.

Q: How granular are the volumes – can we look at specific segments (like between interchange ramps) by hour for several days? If we want to plan a lane closure, can we see the affected volume?

A: (Stan Young, NREL) Our estimates operate spatially at the Traffic Message Channel (TMC) segment level. Generally, TMCs are about a mile. Time granularity is per hour. We may be able to drill down to 15-minute rolling windows on freeways with moderate capacity, but that's doubtful for lower functional classes. For lower volume segment, 30-minute or hourly granularity is probably the target.

Q: For clarification – you have 2.3% penetration rate of probe vehicles. You're using that percent of probes with the total counts from the permanent count station to create a model to predict volumes anywhere?

A: (Stan Young, NREL) Yes, that's a good analogy. That probe penetration percentage does change by vendor – we've seen from 2% up to 10%. TomTom provided higher penetration in the Denver metropolitan area, but penetration also varies also by geographic location.

(Kaveh Sadabadi, UMD CATT) 2.3% is the *median* penetration rate – 50% of the time that penetration rate will be higher, and 50% of the time that penetration rate will be lower.

Q: Where are you getting your freight percentages?

A: (Stan Young, NREL) It's a function of the INRIX data – they work with telematics firms who work with trucking, freight, distribution, etc. Light vs. medium vs. heavy trucks don't really correlate with the truck classification system, but in generalities based on the firms that are providing GPS data.

Q: What calibration was used to verify individual segment traffic counts?

A: (Kaveh Sadabadi, UMD CATT) We used a standard model calibration technique.

(Przemysław Sekuła, UMD CATT) We used Adam to calibrate the model and mean absolute error as the loss function.

Q: Are any other agencies using probe data and other data to estimate volumes?

A: (Denise Markow, I-95 CC) This project phase (Phase 1) was determining whether GPS probe data and other factors could be used to create a model to estimate volumes. The next phase is operationalizing this as a product. We've had discussions with a variety of state agencies that have had a lot of interest in this project. No other entity has released a product that can estimate volumes (including HERE).

Q: Is this data sufficiently accurate to use for HPMS reporting and other metrics required by FHWA/USDOT?

A: (Denise Markow, I-95 CC) States are now investigating what kinds of requirements FHWA/USDOT have for their reporting – and the federal agencies are taking great interest in our work. We're seeing now whether or not modeling can give better results than traditional reporting (which takes a lot of time and money). FHWA/USDOT are in the process of procuring a whole year of US data with trajectories from INRIX for that purpose.