Announcing the Final Examination of Ahmed Tarek Ahmed Farid for the degree of Doctor of Philosophy

Time & Location: March 30, 2018 at 9:30 AM in Engineering Building II 211p
Title: Investigating and Facilitating the Transferability of Safety Performance Functions

Safety performance functions (SPFs) are essential analytical tools in the road safety field. The SPFs are statistical regression models used to predict crash counts by roadway facility type, crash type and severity. The national Highway Safety Manual (HSM) is a generic guidebook used for road safety evaluation and enhancement. In it, default SPFs, developed using negative binomial (NB) regression, are provided for multiple facility types and crash categories. Roadway agencies, whether public or private, may opt to not invest their resources in data collection and processing to develop own localized SPFs. Instead, the agencies may adopt the HSM's. However, the HSM's SPFs may not necessarily be applicable to any conditions. Hence, this research is focused on SPF transferability, specifically for rural divided multilane highway segments. Use of Bayesian informative priors to aid in the transferability of NB SPFs, developed for Florida, to California's conditions and vice versa is investigated. It is demonstrated that informative priors facilitate SPF transferability. Furthermore, NB SPFs are developed for Florida, Ohio, Illinois, Minnesota, California, Washington and North Carolina. That is to evaluate the transferability of each state's SPFs to the other states' conditions. The results indicate that Ohio, Illinois, Minnesota and California have SPFs that are transferable to conditions of each of the four states. Also, two methods are proposed for calibrating transferred SPFs to the destinations' conditions and are shown to outperform the SPF calibration methods in the road safety literature. Finally, a variety of modeling frameworks are proposed for developing and transferring SPFs of the seven aforementioned states to each state's data. Not a single model exhibits the best fit when transferred in all cases. However, the Tobit model, NB model and a hybrid model that coalesces the results of both perform the best in a substantial number of the transferred SPFs.

Major: Civil Engineering

Educational Career:
Bachelor's of Civil and Environmental Engineering, BS, 2012, American University in Duabi
Master's of Civil, Environmental and Construction Engineering, MS, 2015, University of Central Florida

Committee in Charge:
Mohamed Abdel-Aty, Chair, Civil, Environmental and Construction Engineering
Jaeyoung Lee, Civil, Environmental and Construction Engineering
Essam Radwan, Civil, Environmental and Construction Engineering
Naveen Eluru, Civil, Environmental and Construction Engineering
Hsin-Hsiung Huang, Statistics

Approved for distribution by Mohamed Abdel-Aty, Committee Chair, on February 17, 2018.

The public is welcome to attend.