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Automated Text Analysis on Open-Ended Response Surveys: Measuring Attitudes Regarding Autonomous Vehicles

Despite open-ended surveys bringing richer insights, extracting information is difficult and time-consuming. Therefore, surveys that aim for a large sample often use closed-ended responses. Topic Modelling approaches could speed up the analysis of open-ended responses, while eliminating subjective bias. Therefore, this project pursues two objectives, i) to analyse the suitability of using Topic Modelling to extract information from open-ended responses and compare it with closed-ended responses; and ii) to develop a framework that allows respondents to choose the questionnaire type to answer surveys, while allowing analysts to use their preferred models to predict behaviour. This was achieved by using questionnaires that collected information from respondents on the attitudes related to autonomous vehicles, by randomly presenting alternative questionnaire versions that consider open- and closed-ended questions. 3002 responses were collected from the USA on the intention-to-use autonomous vehicles for commuter trips, and Probabilistic Graphical Models were deployed to model the choice. In this project's context, Topic Modelling techniques are deemed effective in extracting information from open-ended responses. However, models estimated using open-ended responses could not match the performance of those estimated using closed-ended responses. Thus, a modelling framework that allows researchers/analysts to let respondents choose their preferred questionnaire types (closed- or open-ended) is proposed. Using this study's framework, analysts can still use state-of-the-art models to predict behaviour, regardless of the questionnaire type used to answer. The research demonstrates how researchers/policymakers could use this framework for practical applications, as its use could be beneficial, particularly when voice-based surveys are gaining popularity, with some respondents preferring them over closed-ended surveys.