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Title: Probability Intervals of Speed Estimations from Video Images: The Markov Chain Monte Carlo Approach

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Highlights
- Calculation of probability intervals for speed estimation from video
- Markov Chain Monte Carlo approach explained
- Showing the numerical results of several cases

Abstract: Closed Circuit TV (CCTV) systems often record vehicle motion prior to incidents. From the footage an estimate of the average speed of the vehicle between two frames can be calculated. In a forensic investigation not only an estimate of the average speed is needed but also an estimation of the measurement error. In earlier papers an approach was explained how to estimate the average speed and the corresponding uncertainty in terms of a confidence interval. In practice confidence intervals are often wrongly interpreted as being probability intervals. In this paper we show how to use the Markov Chain Monte Carlo approach to derive probability intervals instead of confidence intervals. We show the robustness of the Markov Chain Monte Carlo approach and the numerical differences between both approaches. In casework the difference between confidence intervals and probability intervals turns out to be very limited. As a consequence the impact of confusion between confidence and probability intervals can also be expected to be limited.