Abstract

Feedback data loss can severely degrade the overall system performance and as well as it can affect the control and computation of the Cyber-physical Systems (CPS). CPS hold enormous potential for a wide range of emerging and time critical applications including different traffic patterns. Therefore, incomplete feedback makes a great challenge in any uncertain condition to maintain the real-time control of the CPS. In this paper, we proposed a data recovery called Efficient Spatial Data Recovery with an error refinement (ESDR/ER) procedure for CPS to minimize the error estimation and maximize the accuracy of the scheme. In this scheme, we present an algorithm with Pearson Correlation Coefficient (PCC) to efficiently solve the missing data for both deterministic and stochastic traffic patterns. We also present an error refinement procedure to refine the error thus to maintain high accuracy. Numerical results reveal that the proposed ESDR/ER outperforms both WP and STI algorithms regardless of the increment percentage of missing data in terms of the root mean square error, mean absolute error and integral of absolute error.
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Index Terms

Computer Science                     Information Systems

Keywords

Data recovery, Cyber-physical systems, error refinement, deterministic patterns.