



Noise Infusion as a Confidentiality Protection Measure for Graph-based Statistics

John M. Abowd*

Cornell University, Ithaca, NY, USA- john.abowd@cornell.edu

Kevin L. McKinney

U.S. Census Bureau, Washington, DC, USA - kevin.l.mckinney@census.gov

We use the bipartite graph representation of the employer-employee relation in longitudinally linked employer-employee data, and the associated projections onto the employer and employee nodes, respectively, to characterize the set of potential statistical summaries that the trusted custodian might produce. We consider noise infusion as the primary confidentiality protection method. We show that a relatively straightforward extension of the dynamic noise-infusion method used in the U.S. Census Bureau's Quarterly Workforce Indicators can be adapted to provide the same confidentiality guarantees for the graph-based statistics: all inputs have been modified by a minimum percentage deviation (i.e., no actual respondent data are used) and, as the number of entities contributing to a particular statistic increases, the accuracy of that statistic approaches the unprotected value. Our method also ensures that the protected statistics will be identical in all releases based on the same inputs.

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