Thursday 29th November, 2018

1 Preliminaries

Definition 1. *A database $\mathcal{D}$ is a finite multi-set of m-tuples associated with an m-tuple for column names $\mathcal{C}$ and an m-tuple of finite sets for column domains $\mathcal{F}$, such that $\mathcal{D} \subseteq \times_{F \in \mathcal{F}} F$. Let the function of taking the absolute be such that it implicitly transforms a multi-set into a set by removing the duplicates.*

Definition 2 (k-Anonymity). *k is an integer. A database $\mathcal{D}$ is k-anonymous iff, for all entries $d \in \mathcal{D}$ and some subsets of column names $Q \subseteq \mathcal{C}$, there exist a subset $S \subseteq \mathcal{D}$ of size at least k such that $\Pi_Q s = \Pi_Q d$ for all $s \in S$.*

Definition 3 (MultiR k-Anonymity). *k-Anonymity with multiple databases joined.*

Definition 4 (ℓ-Diversity). *Extension of k-Anonymity. ℓ is an integer. A database $\mathcal{D}$ is ℓ-diverse iff, for all entries $d \in \mathcal{D}$ and for all subsets of column names $Q \subseteq \mathcal{C}$, there exist a subset $S \subseteq \mathcal{D}$ of size at least k such that $\Pi_Q s = \Pi_Q d$ for all $s \in S$, and for some other columns $Q' \subseteq \mathcal{C} - Q$, $|\Pi_c S|$ is at least ℓ for all $c \in Q'$.*

Definition 5 (Confidence Bounding). *Probabilistic property.*

Definition 6 ((α, k)-Anonymity).

Definition 7 ((X, Y)-Privacy). *$X, Y \subseteq C$ are subsets of column names. A database $\mathcal{D}$ is (X, Y)-anonymous for some integer k iff, for all entries $d \in \mathcal{D}$ and all columns $x \in X$, there is $S \subseteq \mathcal{D}$ such that $\Pi_x d = \Pi_x s$ for all $s \in S$, and $|\Pi_y S|$ is at least k for all $y \in Y$.*

Definition 8 ((k, e)-Anonymity).

Definition 9 ((ϵ, m)-Anonymity).

Definition 10 (Personalized Privacy).

Definition 11 (t**-closeness).**

Definition 12 (δ**-Presence).**

Definition 13 ((c, t)**-Isolation).**

Definition 14 (ϵ**-Differential Privacy).**

Definition 15 ((d, γ)**-Privacy).**

Definition 16 (Distributional Privacy).