Some illustrations of research results

Frank Nielsen

Sony Computer Science Laboratories Inc.
Tokyo, Japan

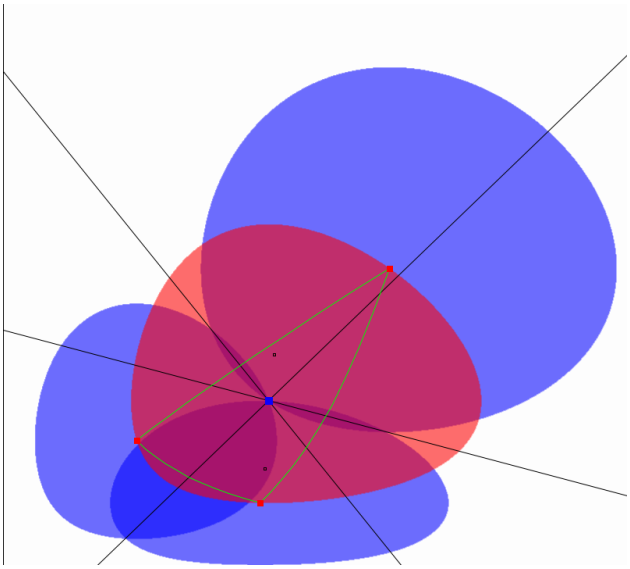

Figure 1: Exact smallest enclosing Bregman ball $\beta_F(\theta^*, r^*)$ (red, extended KL divergence $F(\theta) = \sum_{i=1}^{2} \theta_i \log \theta_i$) of 5 points showing 3 basis points θ'_1, θ'_2 and θ'_3 (red points) on the boundary $\sigma_F(\theta^*, r^*) = \partial\beta_F(\theta^*, r^*)$. The circumcenter θ^* (red square) is the intersection of the dual balls centered at the basis points of same radius (blue balls): $\theta^* = \cap_{i=1}^{3} \beta_F^{(}\theta_i, r^*)$.

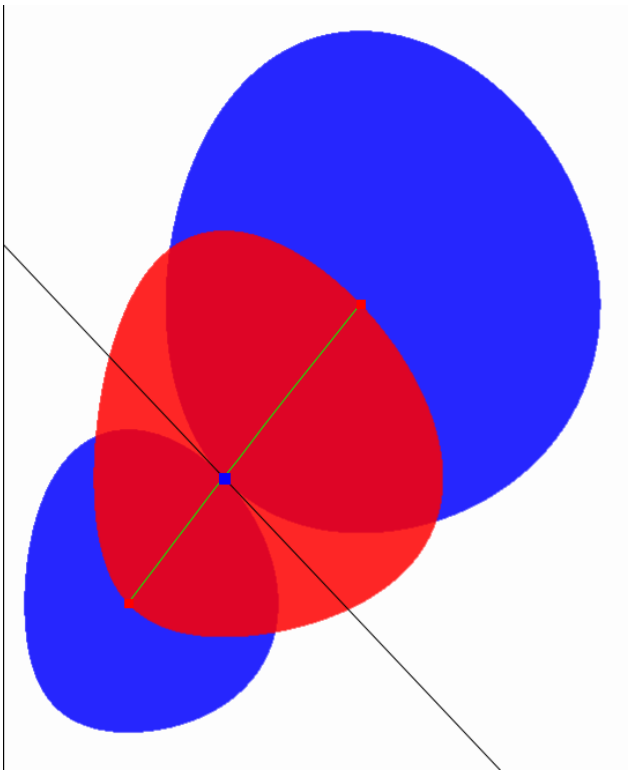

Figure 2: The Chernoff information between two categorical distributions p_{θ_1} and p_{θ_2} ("trinoullis") is the radius of the smallest enclosing ball with respect to the Bregman divergence induced by $F(\theta) = \sum_{i=1}^{2} \theta_i \log \theta_i$ (extended Shannon neg-entropy). The circumcenter of the smallest enclosing Bregman ball is called the Chernoff point and is characterized as the intersection of the e-geodesic with the m-bisector.