1163-90-715   **R. W. R. Darling*** (`rwdarli@nsa.gov`) and **Jacob D. Baron** (`jdbaron@nsa.gov`). *K-Nearest Neighbor Approximation Via the Friend-of-a-Friend Principle.*

Suppose V is an n-element set where for each $x \in V$, the elements of $V \setminus \{x\}$ are ranked by their similarity to x. The K-nearest neighbor graph is a directed graph including an arc from each x to the K points of $V \setminus \{x\}$ most similar to x. Constructive approximation to this graph using far fewer than n^2 comparisons is important for the analysis of large high-dimensional data sets. *K-Nearest Neighbor Descent* is a parameter-free heuristic where a sequence of graph approximations is constructed, in which second neighbors in one approximation are proposed as neighbors in the next. Run times in a test case fit an $O(nK^2 \log n)$ pattern. This bound is rigorously justified for a similar algorithm, using range queries, when applied to a homogeneous Poisson process in suitable dimension. However the basic algorithm fails to achieve subquadratic complexity on sets whose similarity rankings arise from a "generic" linear order on the $\binom{n}{2}$ inter-point distances in a metric space. (Received September 14, 2020)