**Case Study 2 – Real-Time Location System Analysis**

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**Introduction**

Business’s today often need to know where items/people/machinery at any given point in time, in a specified area. Tracking items indoors provides an interesting challenge as conventional methods (GPS) for establishing location don’t work well indoors. Nolan and Lang propose an innovative solution to this problem by combining machine learning techniques (K-Nearest Neighbors), and wifi signals in order to create an indoor map that can locate and estimate where a given object/person/thing by assessing its signal strength at various access points (wifi routers) placed throughout that area. This information proves vital to optimizing workflows for how objects move throughout a space, and how improve upon their future handling to best accommodate the business’s needs.

**Data**

Initially researchers mapped the static signal strengths of of 7 access points throughout the desired space. These routers communicate with a scanning device that was methodically placed at known intervals around the desired space. This collection of data makes up the offline data. Which can be found at <http://rdatasciencecases.org/Data/offline.final.trace.txt>. The raw data is arranged by router, and each of the variables are described below.

Variable Description

|  |  |
| --- | --- |
| t | Time stamp (Milliseconds) since 12:00am, January 1, 1970 |
| Id | MAC address of the router |
| Pos | Actual location of router |
| Degree | The direction the scanning device was carried by the researcher measured in degree’s |
| MAC | MAC address of either the access router, or scanning device combined with corresponding values for signal strength (dBm), the mode in which it was operating(adhoc scanner = 1, access router = 3), and its corresponding channel frequency. |