

Bandit Strategies in Social Search: the case of the DARPA Red Balloon Challenge

Haohui Chen^{1,2}, Iyad Rahwan³, and Manuel Cebrian¹

¹ *Data61 Unit, Commonwealth Scientific and Industrial Research Organization, Melbourne, Victoria, Australia*

² *Faculty of Information Technology, Monash University, Caulfield, Victoria, Australia*

³ *The Media Laboratory, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA*

* Corresponding Author: CaronHaohui.Chen@data61.csiro.au

A. The network graph of teams

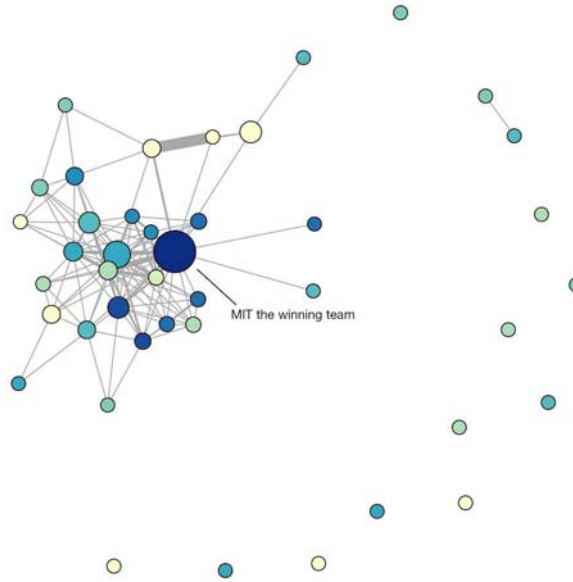


Figure 1 Network graph of teams. The nodes represent teams, and two of these nodes are connected if both teams submit at least one identical cluster. The color of each node indicates the total number of correct clusters that team has submitted. The size of the node indicates the betweenness centrality of that team within the graph.

B. Inverse Distance Weighting (IDW) analysis of geographical distributions of false clusters

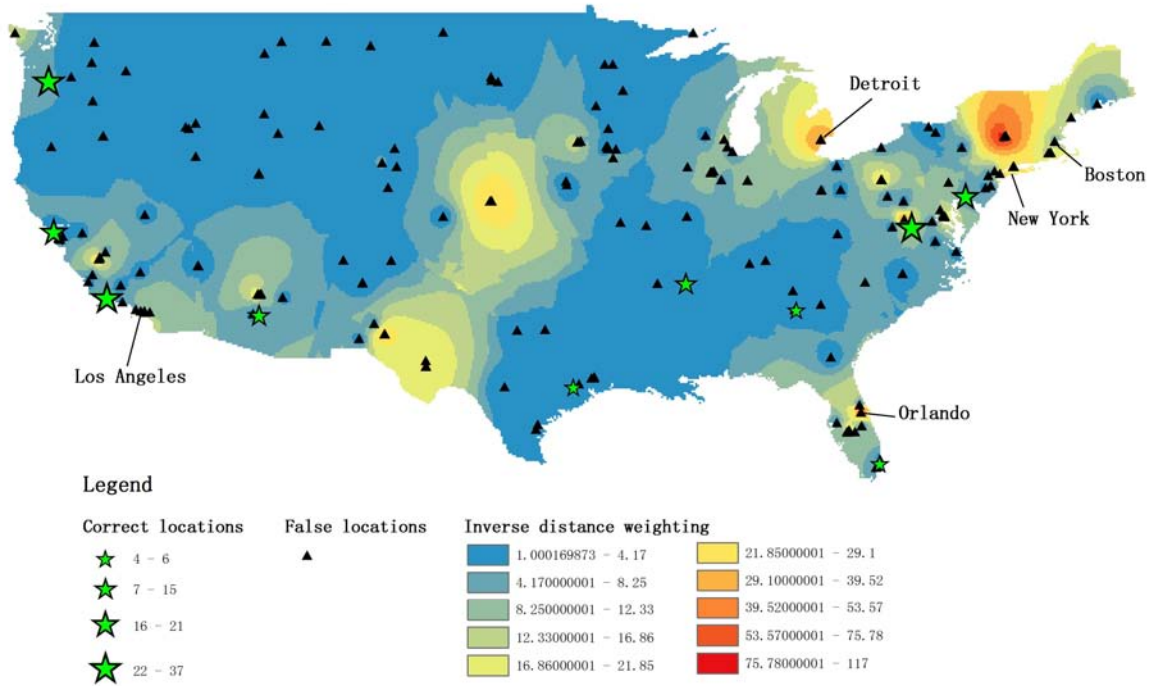


Figure 2 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{\text{submission}}$ as the Z-values of the IDW analysis.

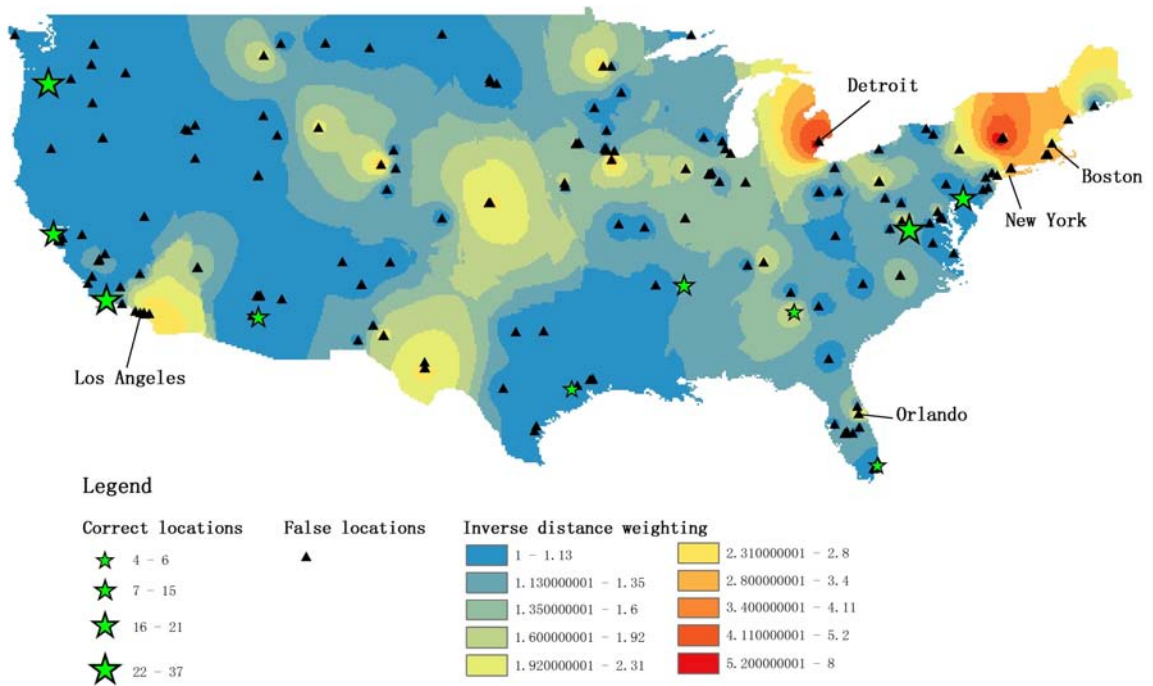


Figure 3 Geographical distributions of correct and false clusters (including anonymous submission). We use a_{balloon} as the Z-values of the IDW analysis.

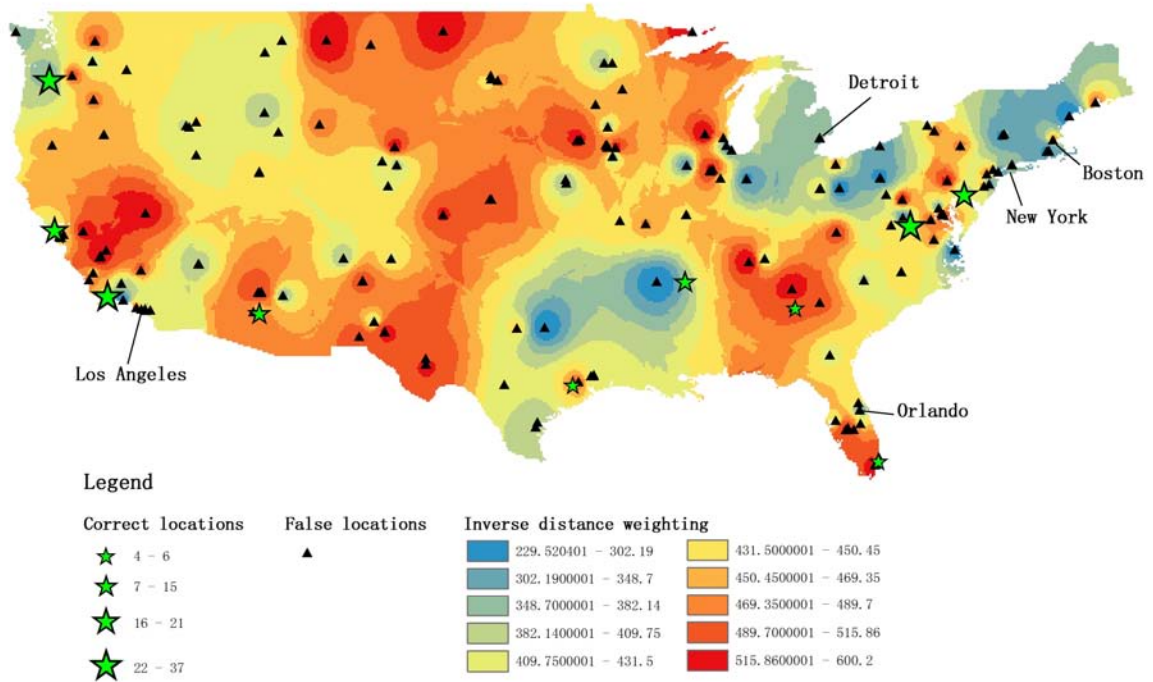


Figure 4 Geographical distributions of correct and false clusters (including anonymous submission). We use a_{appear} as the Z-values of the IDW analysis.

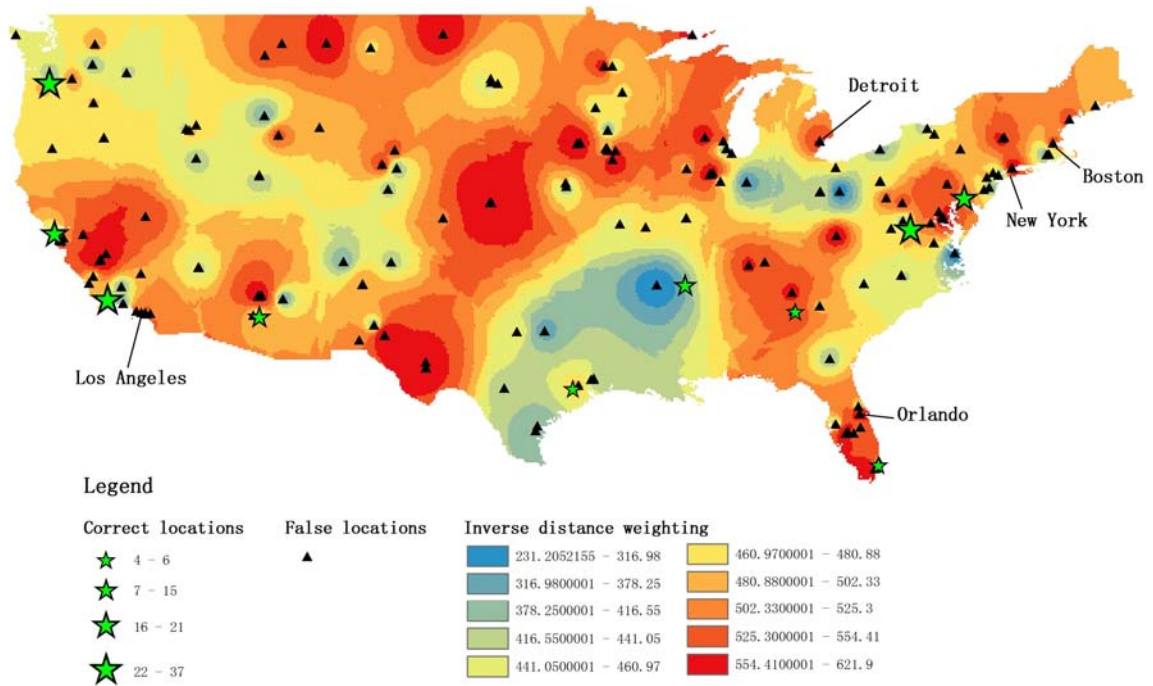


Figure 5 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{\text{disappear}}$ as the Z-values of the IDW analysis.

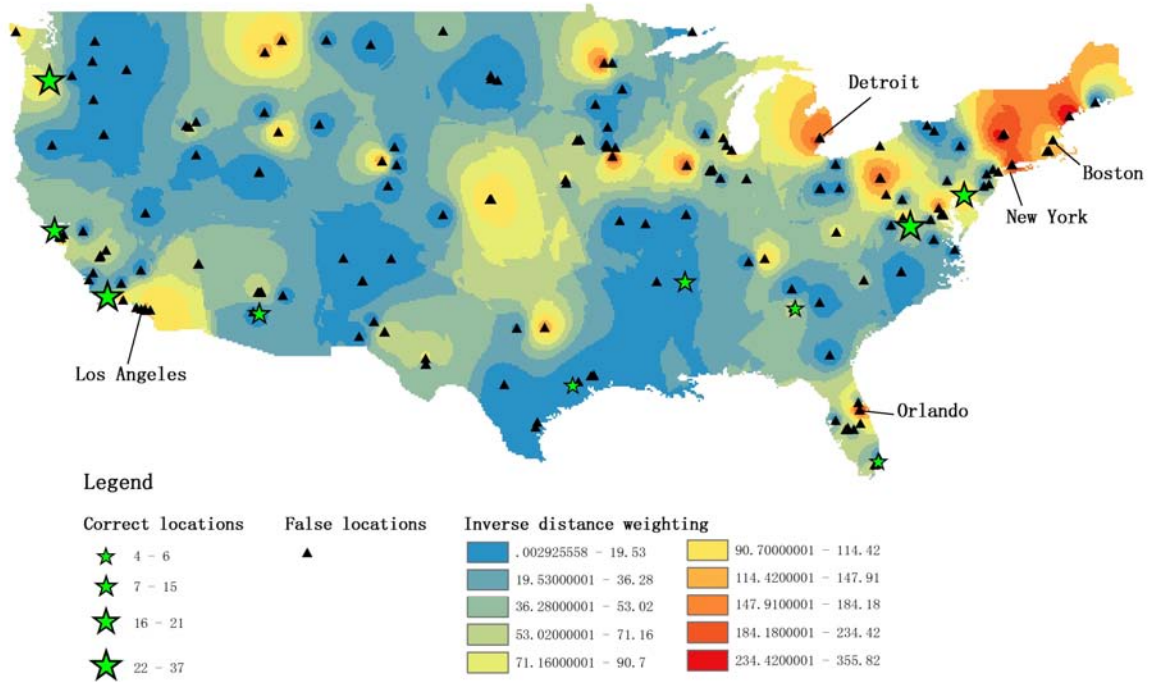


Figure 6 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{lasting}$ as the Z-values of the IDW analysis.

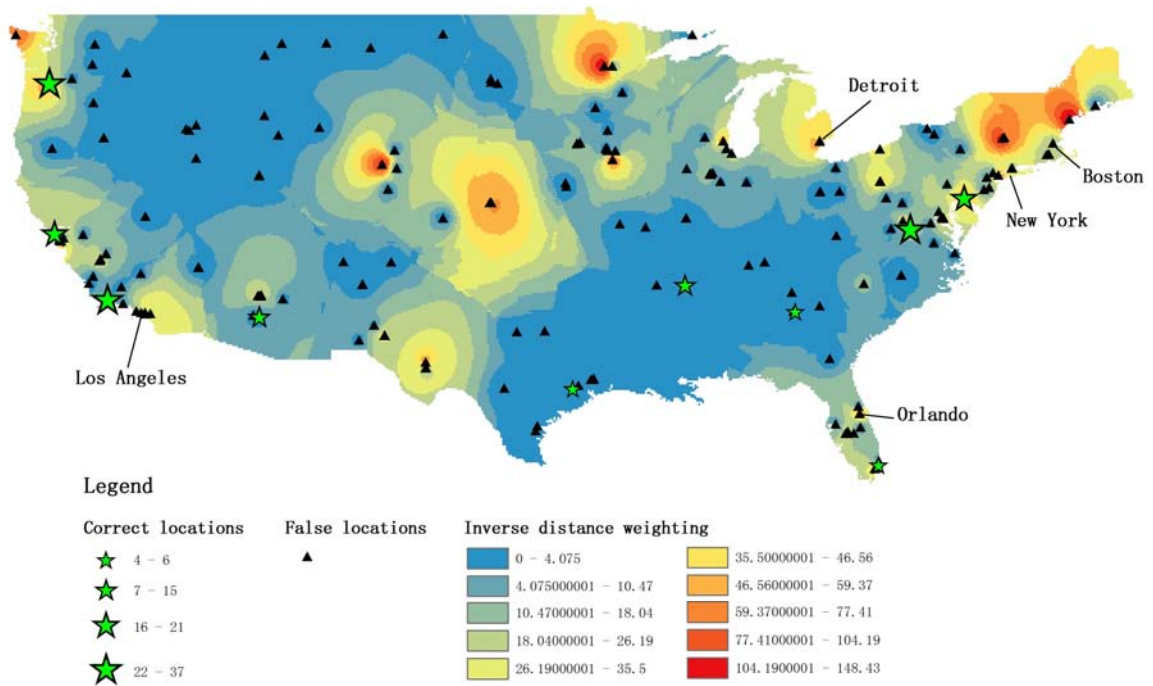


Figure 7 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{half-submission}$ as the Z-values of the IDW analysis.

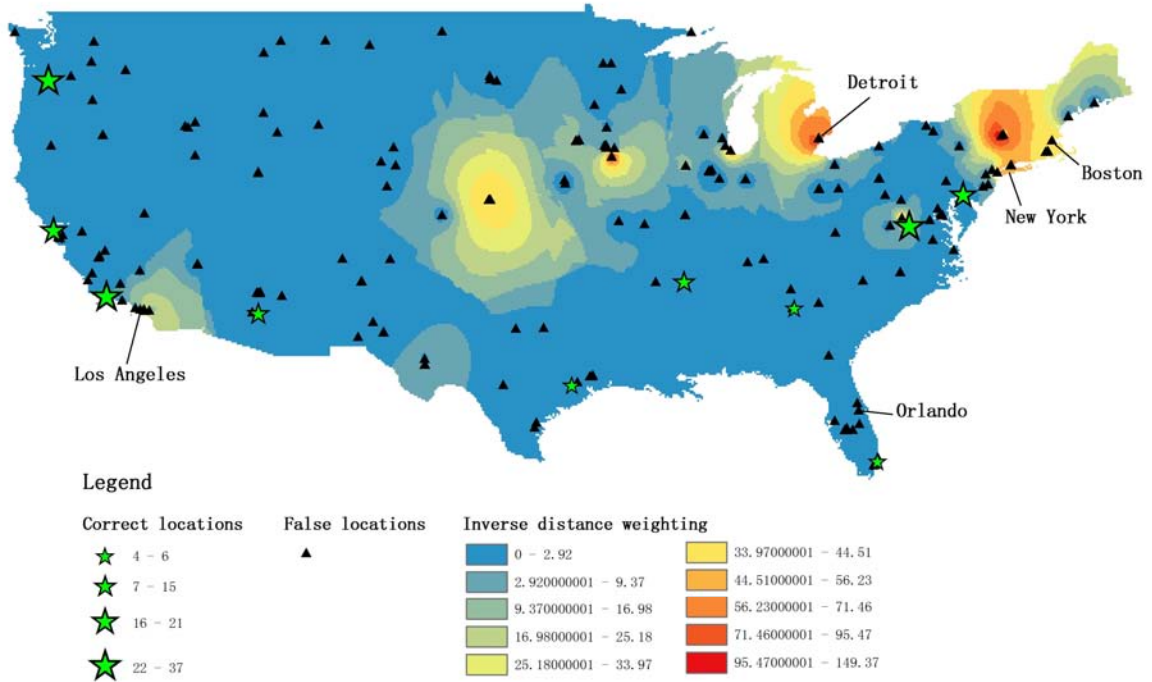


Figure 8 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{\text{half-balloon}}$ as the Z-values of the IDW analysis.

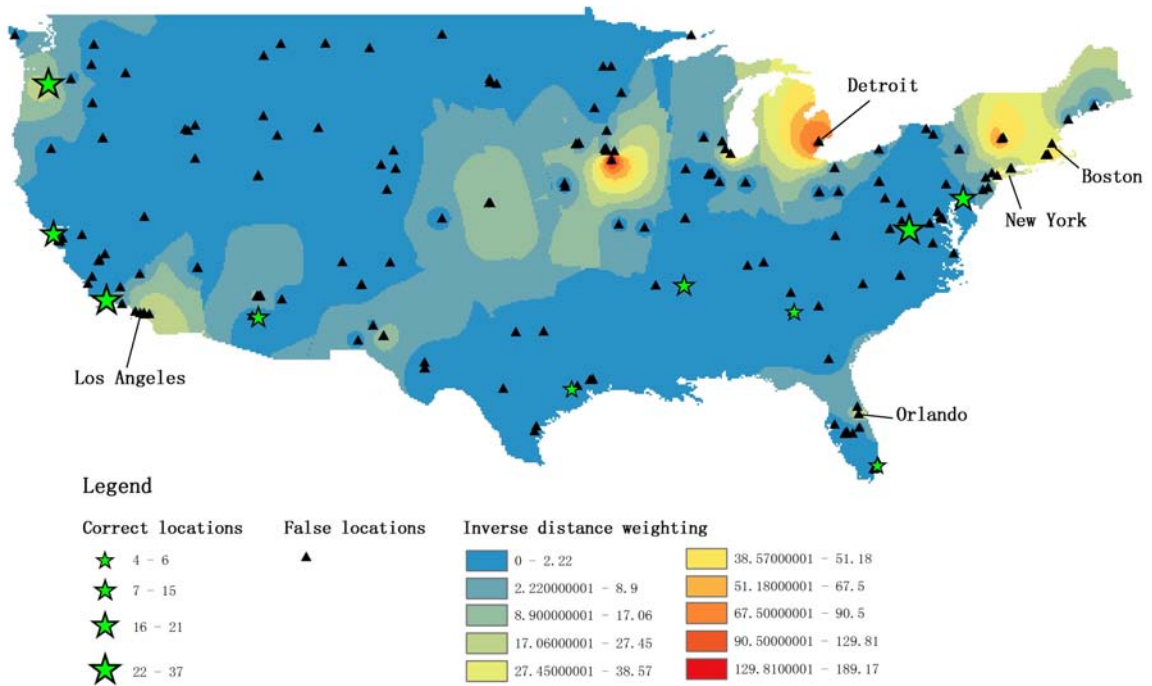


Figure 9 Geographical distributions of correct and false clusters (including anonymous submission). We use $a_{\text{half-team}}$ as the Z-values of the IDW analysis.

C. Additional simulation result

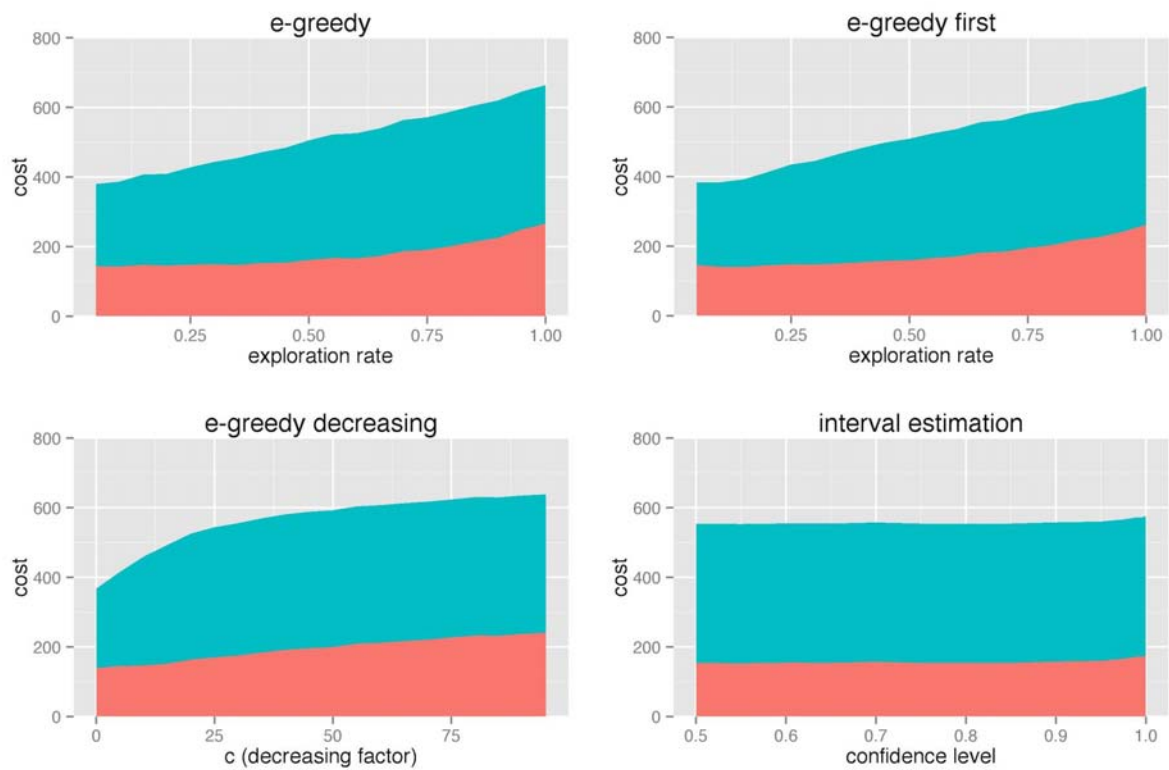


Figure 10 Comparisons between different MAB problem strategies over setting III, where correct clusters are set to contain the same number of locations (10 locations of each) and normally distributed in k sources. The blue area indicates the switching cost on average, and the red area indicates the submission cost on average. The overall search time is the sum of those two areas.