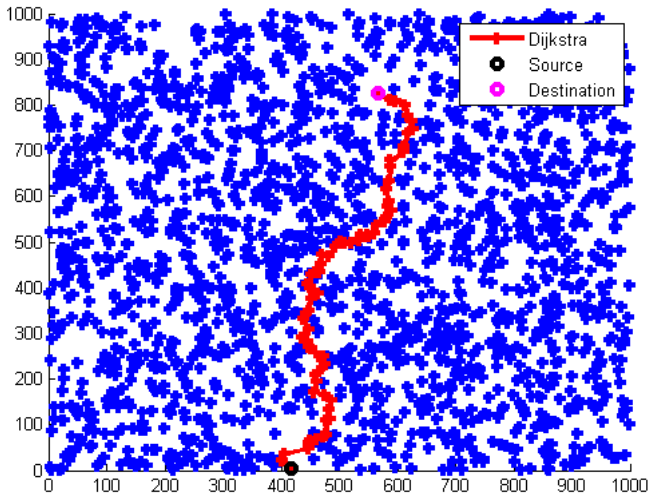
Contents


```
%  Implementation of Dijkstra's method using a Matlab sparse matrix
%  as an adjacency matrix.  Zero entries represent non-existent edges.
%  Uses linear search for simplicity
%
%  Usage
%  -----
%
%   [path , pathcost]  = dijkstra(A , s , d);
%
%  Inputs
%  ------
%
%    A           Sparse adjacency matrix (N x N)
%    s           Source node index in [1,...,N]
%    d           Destination node index in [1,...,N]
%
%  Outputs
%  -------
%
%    path       Distance vector from Dijkstra (1 x m)
%    pathcost   Cost of the path
%
```

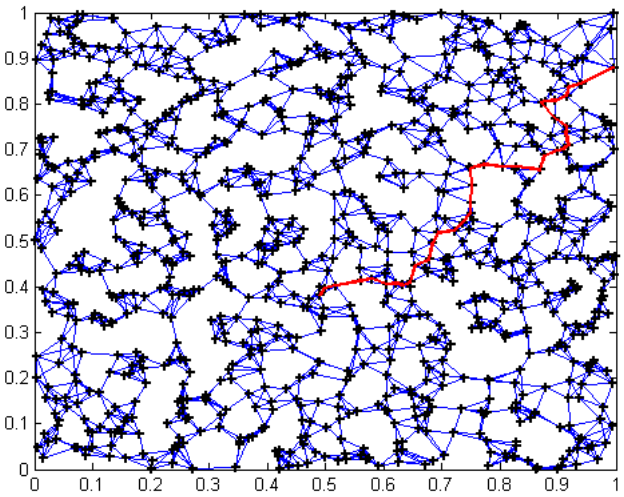
Example 1 : Adjacency matrix build R-radius neightbours

```
clear, close all hidden
close all

N                           = 2000;
L                           = 1000;
R                           = 2*L/sqrt(N);
s                           = 1;          %starting node
d                           = 10;         %end node
X                           = L*rand(2 , N);

A                           = Radjacency(X  , R);
[path , pathcost]           = dijkstra(A , s , d);

figure(1)
hold on,h=plot(X(1 , :) , X(2 , :) , '+' , X(1 , path) , X(2 , path) , 'r-+', X(1 , s) , X(2 , s) , 'ko' , X(1 , d) , X(2 , d) , 'mo' , 'linewidth' , 3

legend(h(2:4) , 'Dijkstra' , 'Source' , 'Destination')
```



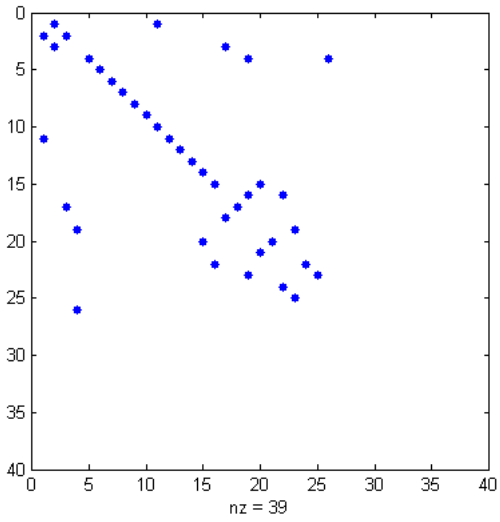
Example 2 : Adjacency matrix build K-neightbourg

```
s                           = 1;        %starting node
d                           = 3;        %end node
N                           = 1000;
K                           = 5;
X                           = rand(2 , N);
A                           = Kadjacency(X , K);
[path , pathcost]           = dijkstra(A , s , d);

figure(2)
gplot(A , X');hold on,plot(X(1 , :) , X(2 , :) , 'k+',X(1 , path) , X(2 , path) , 'r' , 'markersize' , 5 , 'linewidth' , 2), hold off
```



Example 3 : User problem

```
s  = 2;
d  = 12;
I=[2, 11, 1, 3, 2, 17, 19, 26, 4, 5, 6, ...
    7, 8, 9, 1, 10, 11, 12, 13, 14, 20, 15, ...
    22, 3, 18, 17, 4, 16, 23, 15, 21, 20, ...
    16, 24, 19, 25, 22, 23, 4];
J=[1, 1, 2, 2, 3, 3, 4, 4, 5, 6, 7, 8, 9, ...
    10, 11, 11, 12, 13, 14, 15, 15, ...
    16, 16, 17, 17, 18, 19, 19, 19, 20, ...
    20, 21, 22, 22, 23, 23, 24, 25, 26];
V=[1.6000, 6.0000, 2.6667, 1.6000, ...
    2.6667, 1.2000, 7.2240, 4.2000, ...
    3.6000, 3.2000, 3.2000, 2.6000, ...
    2.8000, 2.6000, 3.6000, 7.2240, ...
    2.4000, 3.2000, 2.6000, 3.0000, ...
    2.9120, 2.0000, 2.7120, 2.0000, ...
    1.2000, 2.0000, 7.2240, 4.8000, ...
    2.7120, 4.8533, 0.4000, 0.6667, ...
    4.5200, 0.4000, 4.5200, 0.4000, ...
    0.6667, 0.6667, 7.0000];

pcost = sparse(I,J,V,length(I),length(I));

[path cost] = dijkstra(pcost,s,d)

figure(3)
spy(pcost)


path =

    12
    13
    14
    15
    16
    19
     4
     5
     6
     7
     8
     9
    10
    11
     1
     2


cost =

   56.7147
```



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