Social Networks
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How to go Viral on Web
Lecture - 157
Myopic Search comparison to optical search

So, what we are going to do in the first programming screencast is, we are going to take a small world network in 1 dimension which we have discussed already what is that, that is a first of all a ring.

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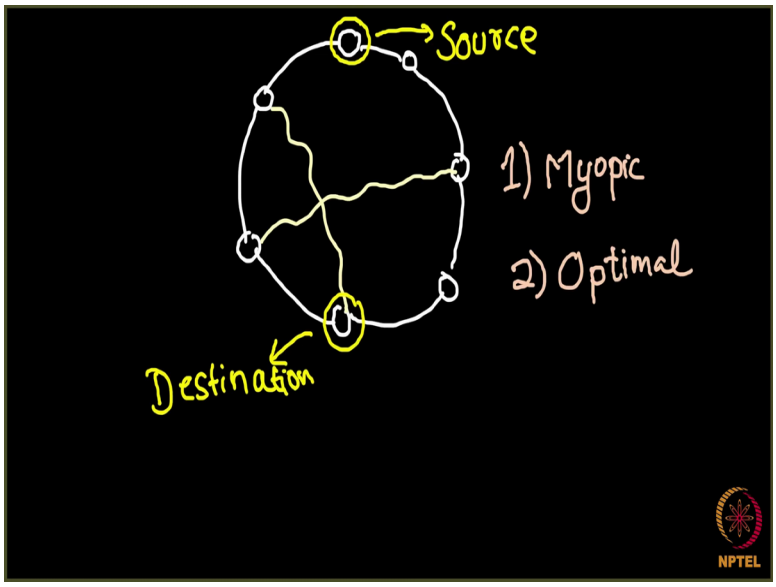

So, I am going to take a simple ring, a simple ring I mean 1 node on this ring for example, this node here is connected to only 1 node toward its left and 1 towards its right. So, I am going to take this simple ring and then what we are going to do is, we are going to perform 2 kind of search on this network. So, first of all by the side of these ties which are homophily base there will be weak ties something like this.

So, let me put 2 weak ties in this network. So, these yellow lines are the weak ties here and these are the homophily base ties. What we are going to do next is we are going to choose 2 nodes. So, I choose here 2 nodes let say this and I call this node as source and then I choose let say this node and then I call this node as destination. So, for going from

source to destination here we have 2 kind of searches which we have discussed before. So, we are going to implement those 2 kind of searches.

The first one is the myopic search and the second one is the optimal search, from our previous discussion we know that myopic search is not always optimal. In this particular case yes the myopic search is optimal. So, here myopic search will also give you the result we go from here and the, you moved here and optimal search is also going to give you the same result. However, there can be cases where their results differ as we have seen an example previously. What we are going to do in this programming screencast is we are going to take a small world network one dimensional ring on 100 nodes.

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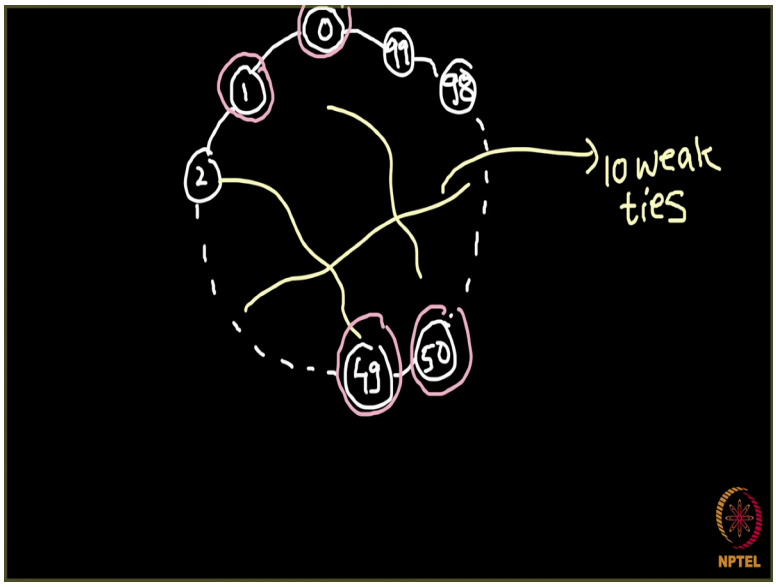

So, let say while label start from 0 so, 0 1 2 so on and something like 49 here and then 50 and then there comes 98 99. So, I am going to take this ring first of all. So, these are my homophily base ties and we are going to put across 10 weak ties here. So, I put 10 weak ties here 10, 10 long range context 10 weak ties. Next what is our aim? Our aim is to compare the myopic search with the optimal search for various different pairs.

So, which pair do you choose? So, we want many pairs for source and destination and we are going to check for all these pairs; what is the difference between the path taken by the myopic search and the path taken by the optimal search. We think that the best pairs for doing this are the pairs which are diametrically opposite. Why? Because, along this

ring they are at the highest distance from each other; so, we can take 0 and 49 and then 1 and 50. So, these kind of pairs we are going to take. So, what we will be doing.

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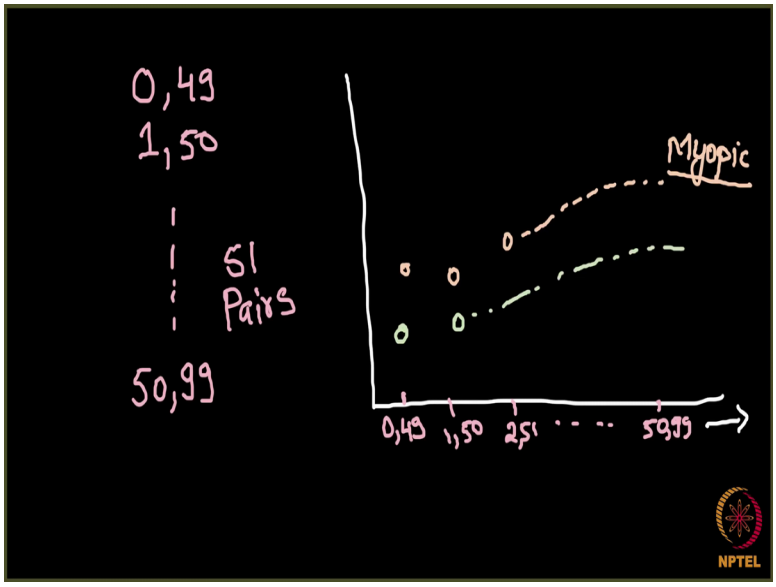

We will be taking the pairs 0 comma 49 1 comma 50 so on and so forth up to 50 comma 99. So, these are going to be I guess 51 pairs. So, we are going to take this 51 pairs and then what we are going to do is we are going to draw a plot. What is this plot? On the x axis here are my pairs. So, this point here can correspond to my pairs 0 comma 49, this point can be 1 comma 50, 2 comma 51 so on and so forth, 50 comma 99.

So, the x axis denotes these pairs and across the y axis we are going to draw 2 results. So, the first is corresponding to the myopic search. So, we will take this pairs 0 and 49 and on this ring we will calculate what will be the length of the path taken by myopic search. So, it be myopic search goes from 0 to 1, 1 to 2 and 2 to 49; in this case the length of the path will be 3 right. So, we will see: what is the length of the path taken by myopic search and plot that some where here and then 1 comma 50, 2 comma 51 so on and so forth.

So, we are going to see what answer a myopic search gives us and we are also going to draw a plot corresponding to the optima search on the same plot. So, for 0 comma 0 comma 49, what was the path of the length given by optimal search for 1 comma 50 so on and so forth. And, we will be observing how this plot looks like in reality ok.

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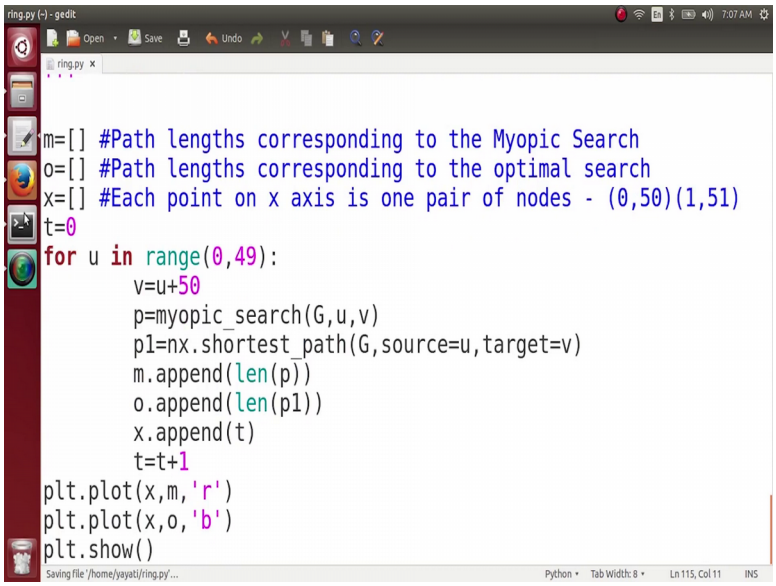

So, what I am going to do now is I will be taking 1 array. So, this array is for my path length for a corresponding to the myopic searching, path lengths corresponding to the myopic search. And, I will be having an array o and this array o is for the path lengths path lengths corresponding to the optimal search, corresponding to the optimal search. And, then I will be having an array x and this x array simply for the x axis.

And, as we have see previously each point on x axis is represent each point on x axis is nothing, but 1 pair of nodes and this 1 pair of nodes is something like it will be 0 and 49 or it will be 1 and 50 so on and so forth. So, it will be a pair of diametrically opposite nodes. So, that is my x axis, what I will do next is I will take a new array 0, sorry not array appoint t here; t is initially equal to 0.

And, next what I am going to do is the use of t array come to now soon, what I will do next is I know my first node here. So, we are going to change. So, previously we have what we have done was, we have looked at the distance from 0 to 40. Now, we have to looked the distance between all the diametrically opposite nodes.

So, I will say my first node is u, for u in range and this range is on 0 to 49, 0 to 49 and for this, what I am going to do is my second which is a target node. So, u is the source node and target node is the diametrically opposite node and we can find it out by adding 50 to this u. So, how the pair will look like corresponding to 0 it will be 50. So, little bit change here corresponding to 0 it will be 50, corresponding to 1 it will be 51 so on and

so forth. And, next what I will be doing is first I will perform a myopic search here, myopic search node from 0 to 40, but from u to v. And, next I am going to do an optimal search here which is again going to be from u to v. So, I am got the path according to my myopic search and I get path according to me optimal search and we do not need all these lines here; so, I delete them ok.

Next what I will do in my array m, which was corresponding to the myopic search I will append the length of the path which I got from myopic search. And, in my array o I will append the length of the path which I got from my optimal search which is length of p 1 and across the x axis I will simply append the t because, we need some numbers across the x axis and I increment this t by 1 and next what I have to do is at the simply plot this.

So, I will first I plot upload plt dot plot I plot myopic search the path length corresponding to the myopic search on the x axis. So, x m and let say it should appear in red color. So, my myopic search of pl is in red color on this plot and plt dot plot and then x. And, optimal the path length corresponding to the optimal search occurs in blue color. And, then I simply visualize this plot; let us run this code and see ring of py.

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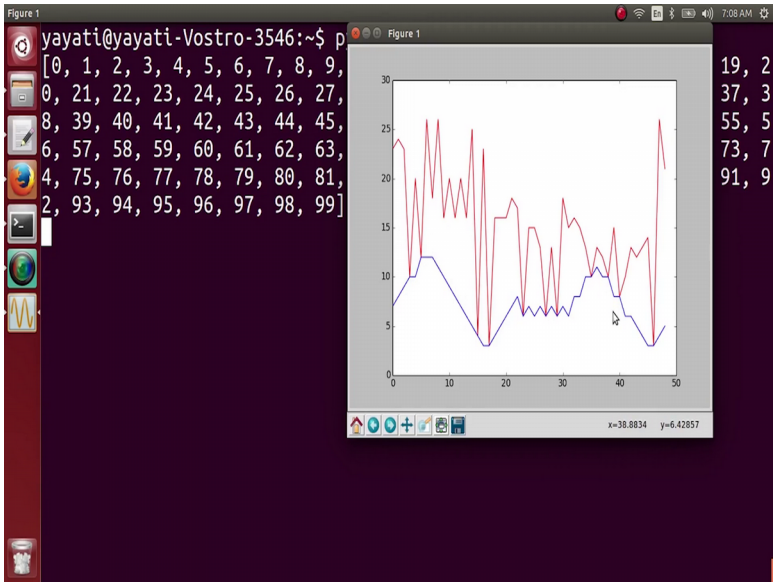

So, you can see here, here red colors are corresponding to the myopic search. So, there are we have taken 50 around 50 pairs of diametrically opposite nodes and we can always see that most of the times the myopic search takes quiet large number of steps as compared to the optimal algorithm.

However, there are many points where myopic search actually performs optimally. So, out of these 50 points there are 11 points on which are myopic search it also performs optimally. So, this was the plot we wanted looked at.