Marketing Analytics
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Social Network Analysis and Excel Dashboards (Contd.)
Lecture 64

Hello everybody. Welcome to Marketing Analytics course. This is Doctor Swagato Chatterjee from VGSOM IIT Kharagpur who is taking this course. So this video might look a little bit different from the normal NPTEL videos because of this Corona virus that is coming up. I could not go to the studio and I have recorded this particular video from my house.

So we are in week 12, last week and we have been discussing about Social Network Analysis. And in this particular class I will give you a very nice example of social network analysis, how that can be applied in a real life situation. So I do not know whether you have heard about something called Bullwhip Effect in logistics or not.

So if you, if I discuss about what a Bullwhip Effect is, Bullwhip Effect is basically a effect that can be seen in a supply chain context where let us say, I by chance have so some mispredictions.

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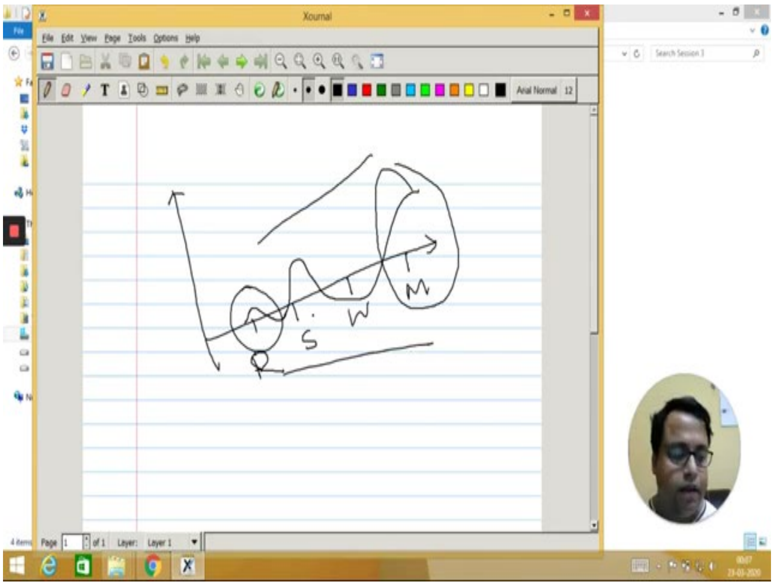

So there is basically the supplier, the retailer and then comes the, let us say the supplier and then comes the, let us say the warehouse guy, then comes the manufacturer. So if this small whip here, which is basically an error in estimation of the demand and this information gets passed to this guy who is the, who is a supplier then this becomes much further higher here it goes further higher.

So it looks like a bullwhip. See you know getting a small whip in this portion, it becomes a big, huge whip in this portion. So that is what we generally try to find out. Now there was a training program that I was taking with an organization on oil and gas and there I was taking this particular program.

And there I have demonstrated a supply chain game in that particular thing, that there is a supplier, there is let us say, in a supply chain of this particular company there are retailers and then the wholesalers and then the manufacturers.

Manufacturer is the organization but this organization also takes into account the dealing part. And in the whole chain there are many a various people who can take a call that how much has to be produced, how much has to be delivered and etc.

So what I found, by taking this particular test was that, we made two groups, and these two groups played and all major goal to this particular groups was, tell that okay you have to reduce the costs of this product, this I would say this estimation, and misprediction. The higher you do misprediction the higher will be your costs. And obviously one group did the less prediction than another group and that group won.

Now till now each group had 4 members or 4 groups. Each group has actually 4 subgroups in them. One subgroup is the retailer, one subgroup is the wholesalers and manufacturers and warehouse persons but I did not let them talk with each other. Means the subgroups will talk within themselves but retailer will not talk with the wholesaler; wholesaler will not talk to the manufacturer and etc.

They will give the, give these orders based on, or make their predictions based on their idea of whatever the order coming up and etc. And that created a Bullwhip effect. Now generally this Bullwhip effect will come down when we allow some sort of data sharing between them because the more information sharing happens, I would say, the uncertainty reduces and when the uncertainty reduces people make better decisions.

So what we found from this kind of an analysis is that, after we broke this particular thing, after we allowed them to talk with each other, the group which was bad in the first round did pretty well and actually they could reduce their cost in second round. But the group that did good in first round, it was very astonishing that they even after data sharing, information sharing they did worse than the first round.

Not only that they fail in the second round, they did worse than the first round. So then we tried to analyze that what happened, why they failed? And we could probably find out that, these are all the guys are coming from the same company.

Now in the same company though they are in various roles, they have hierarchy. They know that okay this person is General Manager, whatever he is saying I have to follow that. If he is saying that order 10 bottles or 15 bottles I have to order 10, 15 bottles because even outside this training program he is my boss. So that kind of a social pressure, social connection comes into these kinds of games as well.

Now we tried to see that whether things are there in terms of the, so what we collected at the early means even before the game started we started collecting this data and we did a survey with them actually before the games were even started.

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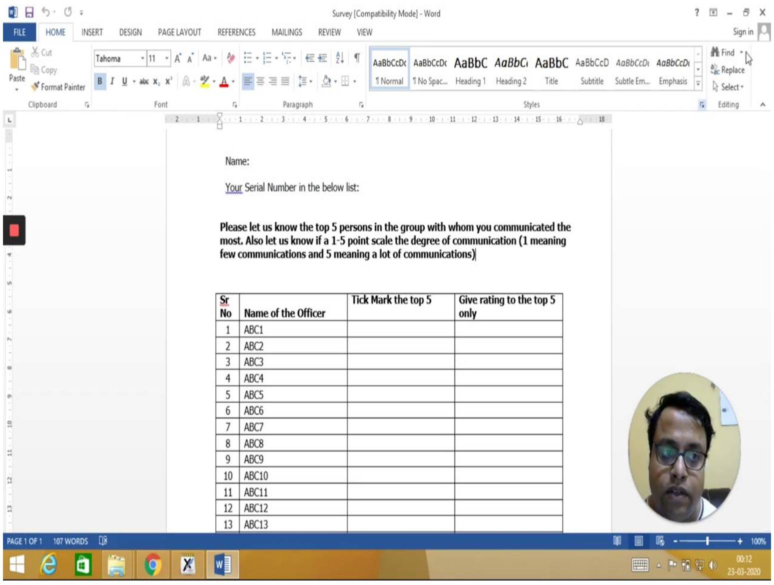

So some name of the officers I will ,and please let us know the top 5 persons in this group with whom you communicated the most. Also let us know in a 1 to 5 point scale how much was that communication? 1 means few communication and 5 means high communication.

So this will be creating something like this kind of a matrix where there will be around. I do not know 24 people here in the row and 24 people there in the column and a matrix will be created. Let it open. `

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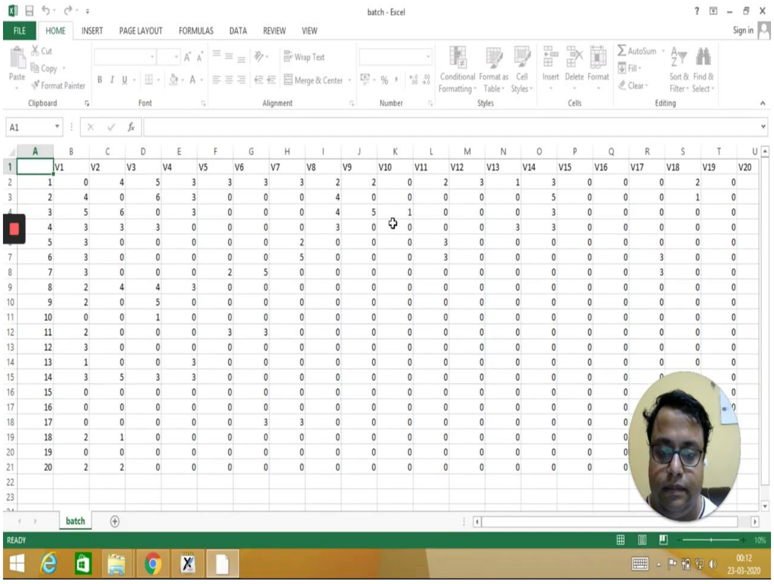

And the matrix will be okay 20, the matrix will get created. 0 means no connections, see diagonal elements is still 0 and then 4 means high connection then 5 means big so on. And we took an average. So just, or the highest, we took the highest. If 1 is saying that I have talked 3 times with 4, and 2 is saying I talked 4 times with 1 then we took the highest of them. This is our choice you can take anything else.

And then with our R programming, we tried to create these kinds of charts, or graphs and let us see what these graphs are. Let the R program open. Yeah it is opening.

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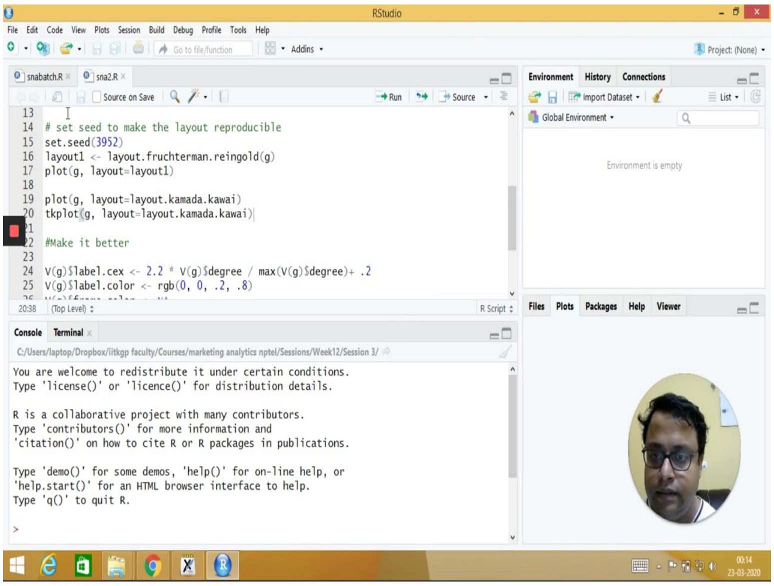

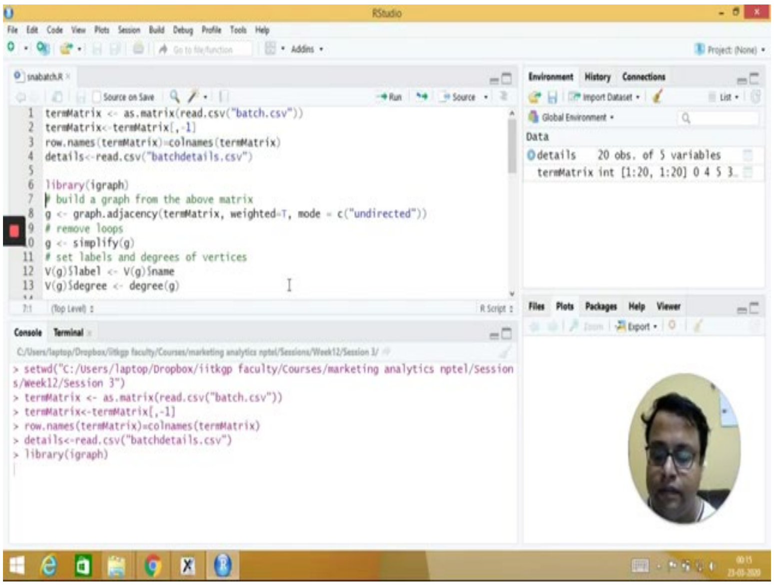

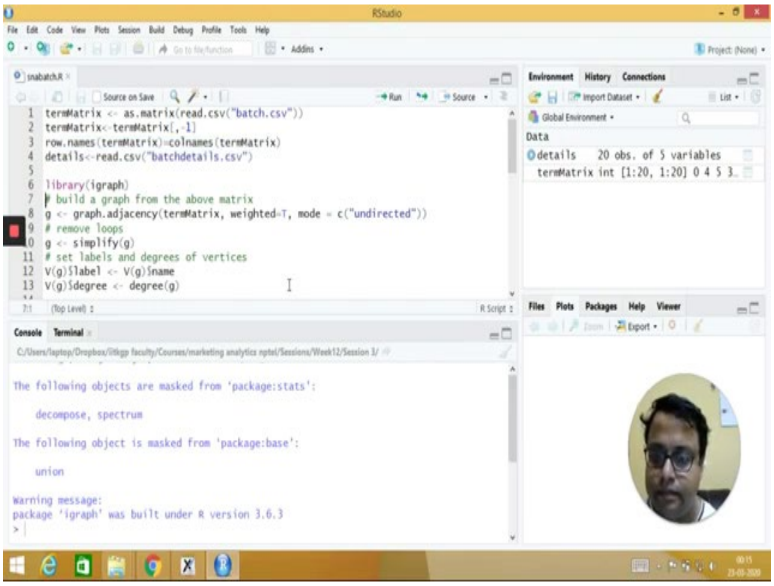

Okay so it has opened and if you see here, sna patch dot R, the first thing that I do is I set working directory to source file location then I read this data. As usual remove the first row and read the batch details as well. Now the library that I will call is igraph and then I will make the graph, simplify the graph.

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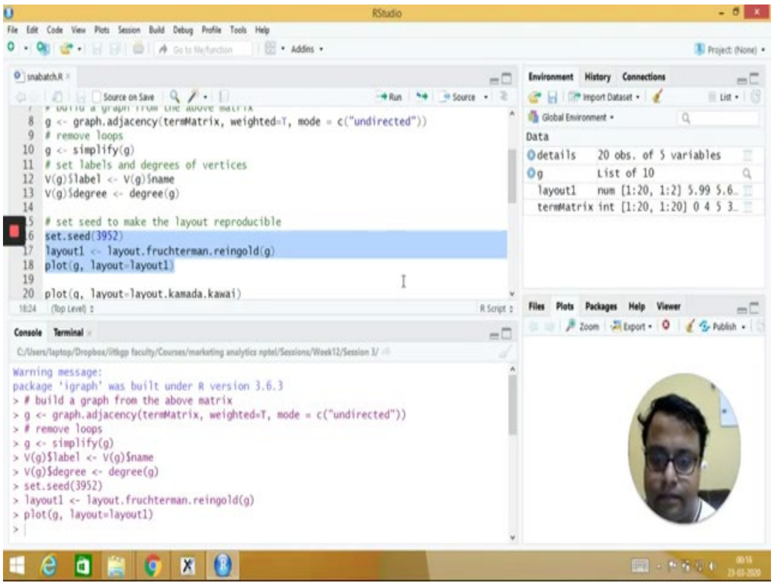

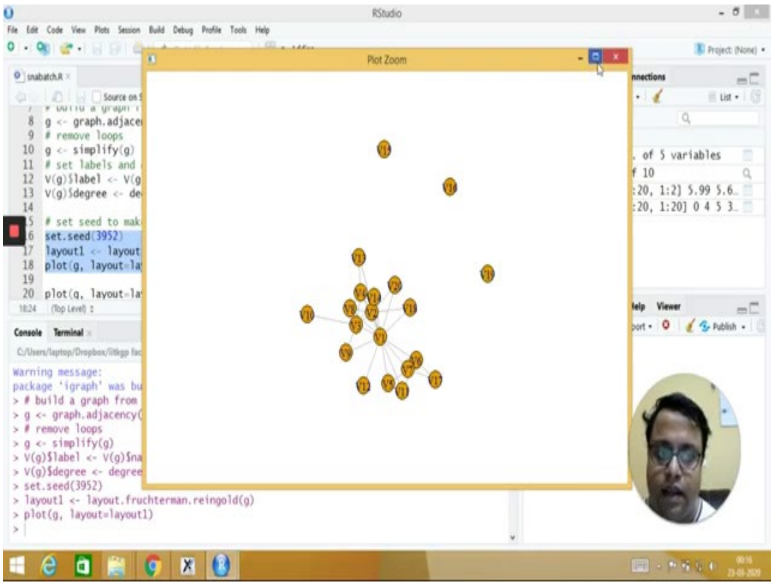

And then I will put the label names and then I will plot it. Once I plot it the plot has come up here. Then just zoom the plot and you can see carefully that there are V2 and V1, these are one of the most important ones and these three guys have not talked with anybody.

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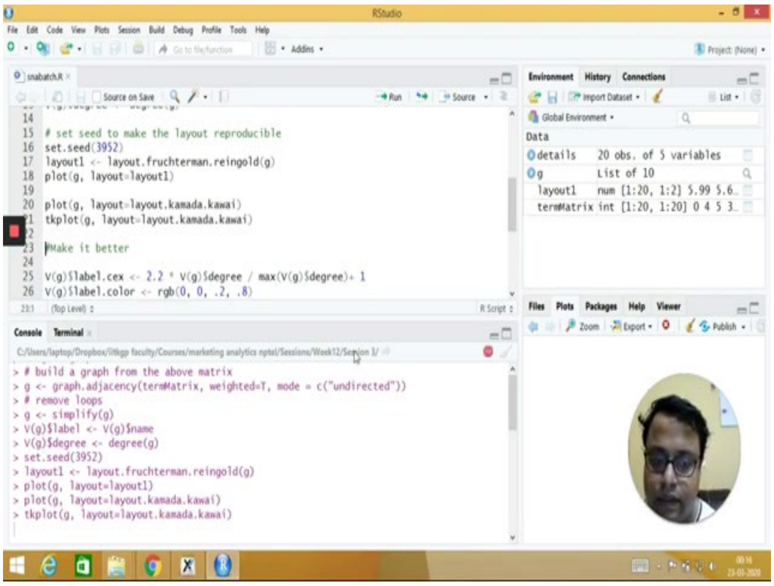

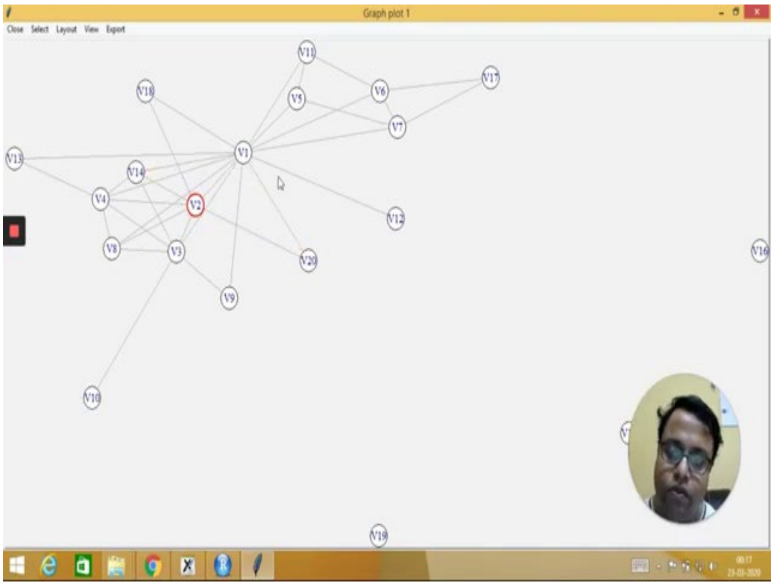

Now if I want to plot in a better way and that is this one which we are playing with in the last class, I do not get the popup, let the popup come up, yeah. So and now if I just zoom it then select all vertices and then make the color white okay and then the layout is let us say, this one I can see that V1 is the middle one, not even V14. V14 is not connected there only, 4 connections but V1 is the most important person who is probably the head of all of these guys.

And then probably V14 has some connections. V2 also have quite a few connections and here probably, not else so V14, V1 and V2 were the major connections that we have got out of this kind of analysis.

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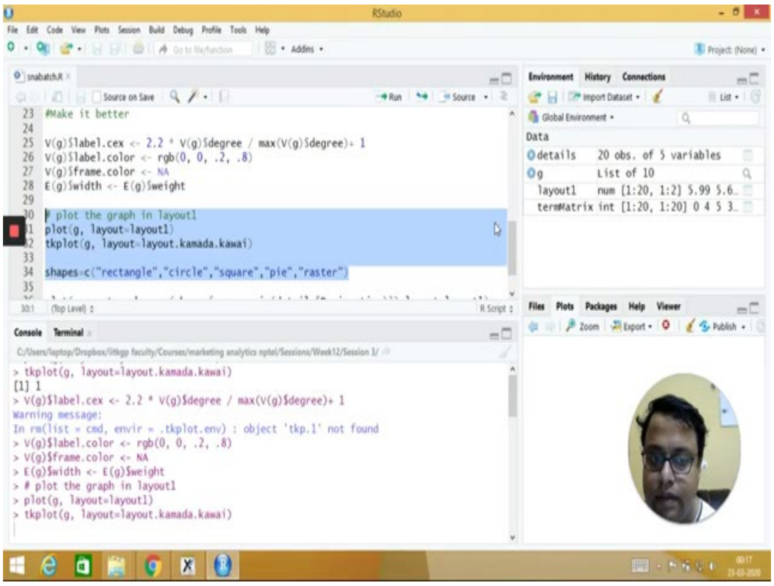

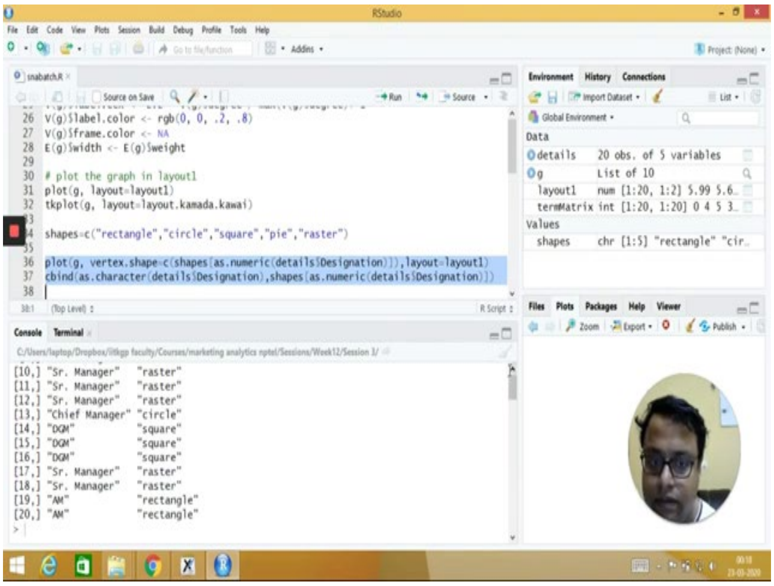

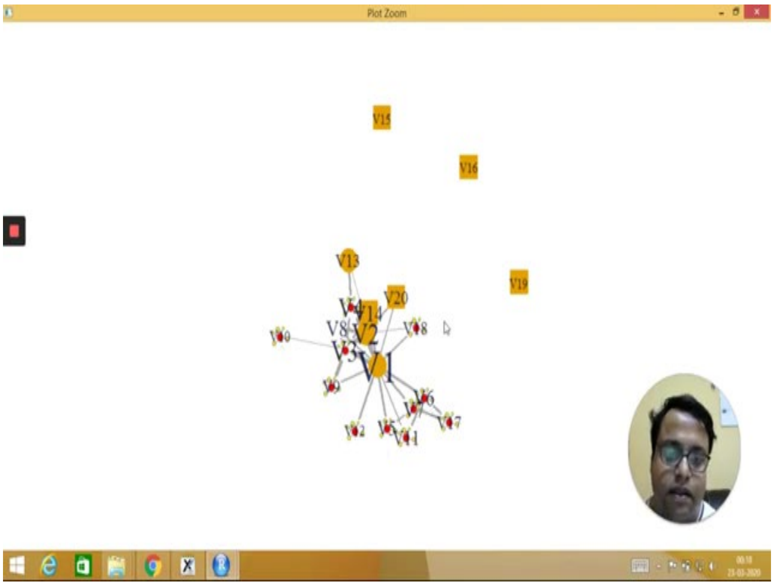

And then if I just plot it in a better way, to plot I would say the paths also according to the weightages if I try to do, and then I am putting the shapes as rectangle, circle, square and pie based on their position and then, based on the position I have done that, and then I try to plot this.

So see shapes are like this, the four shapes and this was the details Designation and this thing, I am drawing it. So if you just try to see this one, you will know that this V1 is a big circle and then V2 and, so V2 and V14 were also major and then V13. So most important is V1 then comes V2, V14 and V13 somewhat similar and these guys are not connected with anybody.

So that gives me an idea that who is connected and these positions which are like different shapes, star shape are basically peripheral, they are not central in any of these things. So who are these raster shape?

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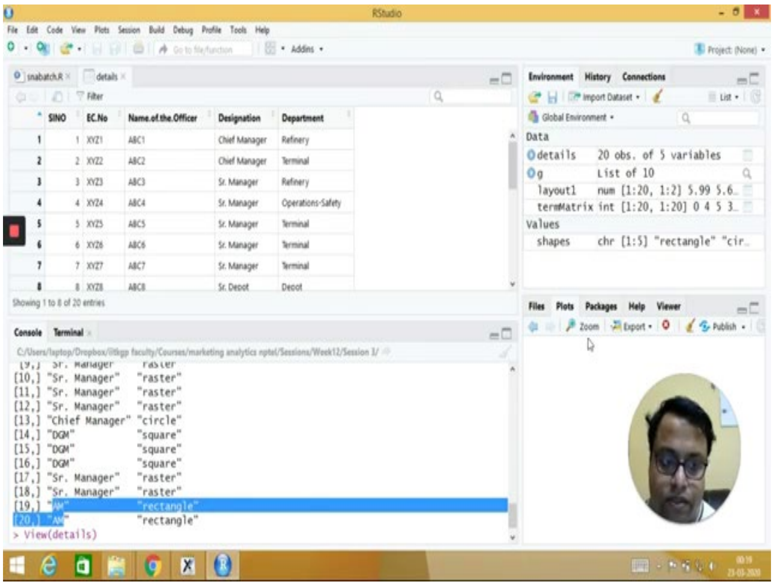

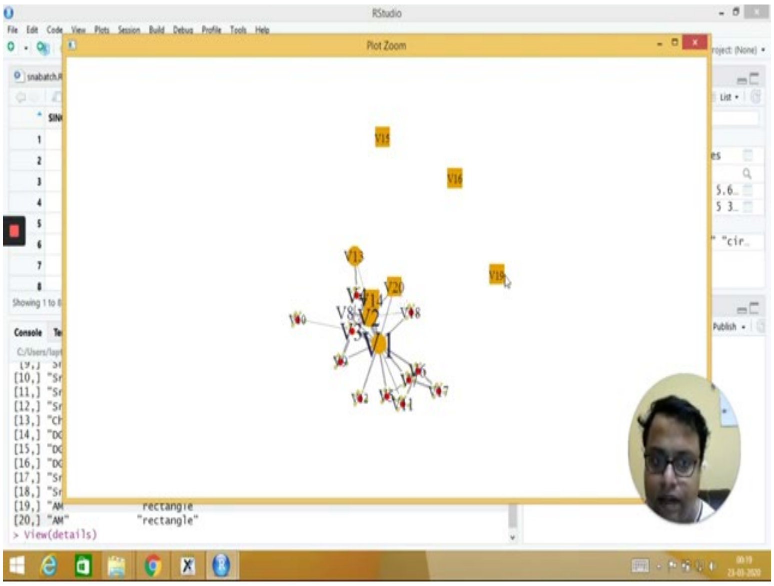

So we have to check that who are these raster shape. Basically it would come from details. So you see that this is a raster, the rasters are senior managers basically and then V1 who is the most important one is a circle.

So Chief Manager is a circle, Senior Managers are rasters and then Senior Depot is pie who is not even there and then probably rectangles are Assistant Managers AMs, who if we check it here were the last guys, were the outside guys, this guy, this guy, this guy. They have, V19, V20 is still central but V19, V15 and V16 nobody knows. They are basically the GM and Assistant Manager.

So based on the designations we have given this particular, so obviously the Chief Manager is the central.

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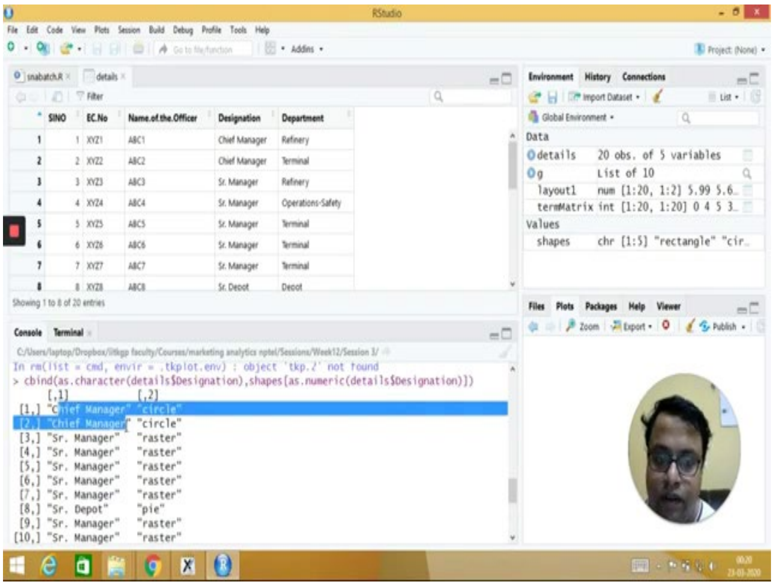

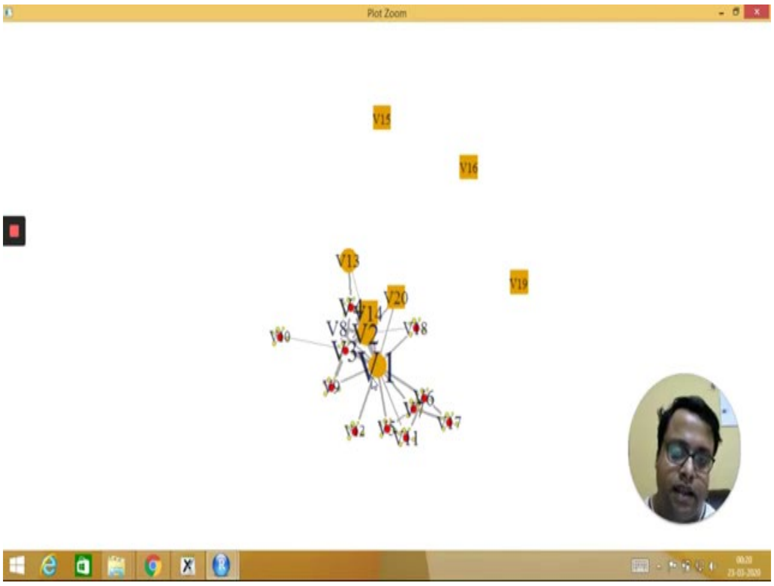

If you want to see that carefully the V1 Chief Manager is central and not the V2 which is also a important thing you have to understand. That V1 is more central. Actually V2 is also central but V2 is relatively less connected than V1 and actually it could be, it will be so that the bad performing one was because of this V1.

This guy was talking, taking too much effort or too much I would not say effort, he was influencing too much to this group and which was a wrong influence unluckily and that is why his influence actually worked a lot. So people did not take decisions based on the data, people take decisions based on whatever V1 is saying and that impacted the results ultimately.

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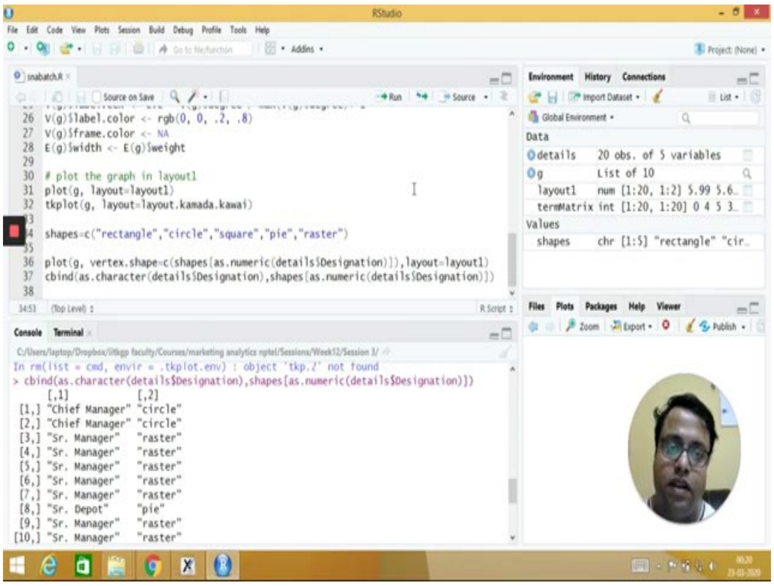

So this is how even in organization culture the social network analysis comes into the picture. This was a nice case study that time I wanted to present. So thank you very much. I will see you in the next video with a absolutely new topic. Thank you.