Social Networks Prof. S. R. S. Iyengar Department of Computer Science Indian Institute of Technology, Ropar

Lecture – 37 Strong and Weak Relationships Visualising Communities using Gephi

(Refer Slide Time: 00:06)



Hey everyone, in this video we are going to see how we can visualize the communities in the Zachary karate network. So, I have this Gephi opened already I am going to open the new project.

(Refer Slide Time: 00:23)

| Appearance × | Graph × | | 4 • • | Context × | | |
|---|---|-------------------------|---|--|-----|---|
| Nodes Edges 🖗 🔊 🛓 🛪 Unique Partition Ranking | Sp Dragging (Configure) | _ | _ | Nodes: 0 Edges: 0 Directed Graph | | |
| #c0c0c0 | Source: karate.gml | | | Statistics × Filters Settings | | |
| | • | | | Network Overview | | f |
| = 🌔 Apply | 🗂 No is | sue found during import | | Average Degree | Run | |
| Layout × | 1 | | | Avg. Weighted Degree | Run | 0 |
| Choose a layout 🔹 👻 | 🛪 Graph Type: Undirected 🔹 | | More options | Network Diameter | Run | 0 |
| • Prun | Ø # of Nodes: 34 | | New graph Append Graph | Graph Density | Run | 0 |
| | Dynamic Graph: no | | | HITS | Run | |
| | Dynamic Attributes: no Multi Graph: no | 13 | | Modularity | Run | 0 |
| <no properties=""></no> | | | | PageRank | Run | |
| | | | OK Cancel | Connected Components | Run | 0 |
| | A | | | Node Overview ■ | | |
| Θ | A. | | | Avg. Clustering Coefficient | Run | |
| Process Deces | | A: A: Arial Bol | | Figeovector Centrality | Rup | |

And in the overview, I am going to open the; I am sorry; I am going to open the file which is containing the karate network. So, I already have this karate dot Gmail file, I am going to open that I know that this is undirected. So, I am going to select that this has 34 nodes and 78 edges.

(Refer Slide Time: 00:50)



This is the graph that we are getting I think we did in the previous it as well let me zoom in, so this is the karate network let me thick in the edges.

(Refer Slide Time: 01:01)

| Workspace 1 × Workspace 2 × | ny pronow | - | • | |
|-----------------------------|--|-------------------------------|----------|---|
| Appearance × | Graph × | Context × | | G |
| Volges 🛛 🖗 🗿 🔺 🕇 | Dragging (Configure) | Nodes: 34 | | |
| Jnique Ranking | | Edges: 78 Undirected Graph | | |
| Size: 20 - | | Statistics × Filters | | 6 |
| | | Settings | | |
| | | Network Overview | | |
| = 🕨 Apply | | Average Degree | Run | |
| ayout × | | Avg. Weighted Degree | Run | 0 |
| Choose a layout 🔹 | | Network Diameter | Run | |
| D Run | | Graph Density | Run | |
| | | HITS | Run | |
| | 🔮 🖬 • 🔳 🕅 🕅 😤 | Modularity | Run | 0 |
| <no properties=""></no> | | PageRank | Run | 0 |
| | Global Edges Labels | Connected Compone | nts Run | |
| | Background color: Zoom Highlight selection 🖉 | Node Overview | | |
| 0 | Autoselect neighbor 🧭 👘 🗸 | Avg. Clustering Coeffi | ient Run | 0 |
| Dracate Dacat | | Eigenvector Centrality | Run | |

Let me increase the node size maybe. So, I will go to nodes and I will change the size of the nodes let me keep it 20; does not look so nice because they are black in color.

(Refer Slide Time: 01:25)

| Eile Workspace Iools Window Help | | | | | |
|----------------------------------|--|-----------------------------|--|----|-----|
| 😔 Overview 🚺 🗖 Data Laborator | / 💭 Preview | ਮੁ | 1 | n | 4 |
| Workspace 1 × Workspace 2 × | | | • | 00 | 1 |
| Appearance × | Graph × | Context × | | 5 | 1 |
| Nodes Edges 🕐 🗿 🔺 🕇 | S Drugging (Configure) | Nodes: 34 | | | |
| Unique Partition Ranking | R . | Edges: 78 | | | |
| #fc52ff | | Undirected Graph | | | |
| - Prostri | | Statistics × Filters | | 6 | 2 |
| | | Settings | | | |
| | | Network Overview | | F | 1+1 |
| e D Appin | | Average Degree | Run | 0 | |
| | | Aug Weighted Deserve | 0 | | |
| Layout × | | Avg. Weighted Degree | Run | • | |
| Choose a layout 🔹 | | Network Diameter | Run | 0 | |
| 0 Dan | | Graph Density | Run | 0 | - |
| | 4 | | | | |
| | A | HITS | Run | 0 | |
| | | Modularity | Run | 0 | |
| <no properties=""></no> | | PaneRank | Run | | |
| | Global Edges Labels | - ugenoria | There are a second seco | - | |
| | | Connected Components | Run | 0 | |
| | Background color: D Zoom Hignlight selection 🜌 | Sode Overview | | | |
| 0 | Autoselect neighbor 🧭 | Avg. Clustering Coefficient | Run | 0 | |
| Presets Reset | | Eigenvector Centrality | Run | 0 | |
| | | | | | |

So, let me change the color of the nodes let me have something like this may be. So, it has changed the color the edges as well.

(Refer Slide Time: 01:36)

| workspace 1 A Workspace 2 A | | | | |
|-----------------------------|--|---------------------|---------------|--|
| Appearance × G | a Graph × | Context × | | |
| Nodes Edges 🕐 <u>A</u> T | So Dragging (Configure) | Nodes: 34 | | |
| Unique Partition Ranking | R | Edges: 78 | | |
| #6b7eff | | | | |
| | | Statistics × Filter | s | |
| | | Settings | | |
| | ♥ ● | Network Overvi | iew | |
| = 🕨 Apply | | Average Degree | Run | |
| Layout × | | Avg. Weighted Deg | gree Run | |
| Choose a layout | | Network Diameter | r Run | |
| | | | | |
| Run | | Graph Density | Run | |
| | A D D D D | HITS | Run | |
| | 9 🖬 • 🔳 📉 🐨 | Modularity | Run | |
| <no properties=""></no> | | PageRank | Run | |
| | Global Edges Labels | Connected Compo | onents Run | |
| | Background color: 🔲 Zoom Highlight selection 🧭 | Node Overview | | |
| 0 | Autoselect neighbor 🛛 🚽 | Avg. Clustering Co | efficient Run | |
| Connector Descel | | Figenvector Centr | ality Run | |

Let me change the color of the edges maybe with this one let see not so good, I will little little darker decent.

So, I have to show you how to visualize the communities in this network. So, I am going to go to this right hand side panel here we have this modularity feature I am going to run this.

(Refer Slide Time: 02:01)

| workspace1 | | | | • | • |
|--------------------------|--|----------------------|-----------------------------|-----|---|
| Appearance × | Graph × | • • • | Context × | | |
| Nodes Edges 🕐 A 🕇 | G Dragging (Configure) | | Nodes: 34 | | |
| Unique Partition Ranking | k . | | Edges: 78 | | |
| #6b7eff | | | Undirected Graph | | |
| | | | Statistics × Filters | | |
| | Modularity settings | | Settings | | |
| | Modularity Community detection algorithm | | Avg. Weighted Degree | Run | • |
| = Apply | | | Nutrand Diseases | 0 | - |
| mauk V | Randomize Produce a better decomposition but increase | ses computation time | Network Diameter | кun | • |
| .dyout A | Use weights Use edge weight | | Graph Density | Run | 0 |
| Choose a layout | | and and black and be | HITS | Run | |
| D Run | Resolution: Lower to get more communities (smaller or 1.0 to get less communities (bigger ones). | nes) and higher than | Madularita | 0 | |
| | <u>A</u> 1.0 | | modulancy | KUN | |
| | A | | PageRank | Run | 0 |
| | 9 E · · · · · · · · · · · · · · · · · · | | Connected Components | Run | 0 |
| | | | Node Overview | | |
| | Global Edges Labels | | Avg. Clustering Coefficient | Run | • |
| | Background color: Zoom Highlight select | ction 👿 | Fineovector Centrality | Rup | |
| 0 | Autoselect neighbor 🦉 🚽 🖓 | | a siles our deal | Non | - |
| | | | Edge Overview | 0 | |

And here we have this resolution value if the value is less than we get more communities is resolution values higher we get less communities- let see how many communities we get with this value of resolution.

| Horkspace I | | | | | 0 | 00 |
|-------------------------------|--|---|-------|-----------------------------|------|----|
| Appearance × G | W HIML Report | | - | Context × | | |
| Nodes Edges Partition Ranking | Modularity Report | | | Nodes: 34 Edges: 78 | | |
| #6b7eff | Parameters: | | | Undirected Graph | | |
| | Randomize: On | | | Statistics × Filters | | |
| | Use edge weights: On Resolution: 1.0 | | | Settings | | |
| | | | | Avg. Weighted Degree | Run | |
| = 🕨 Apply | Results: | | | Network Diameter | Run | |
| Layout × | Modularity with resolution: 0.416 | A | | Graph Density | Run | |
| Choose a layout 🔹 | | | U | LITE | Due | |
| | Size Distributio | n | | HID | KUIT | |
| P RUN | 13 | | | Modularity 0.416 | Run | ۲ |
| | | | | PageRank | Run | 0 |
| | 9 | | | Connected Components | Run | 0 |
| | <u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u> | | | Node Overview ■ | | |
| | | | | Avg. Clustering Coefficient | Run | |
| | Ę | | ĕ | Eigenvector Centrality | Run | |
| 0 | A Print 🖻 Copy 📕 Save | | Close | Edge Overview | | |
| F Durante - Durante | | | - | Avo. Path Length | Run | |

(Refer Slide Time: 02:18)

So, this is what we get we get 4 communities here.

(Refer Slide Time: 02:24)

| Eile Workspace Iools Window Help | | | | |
|----------------------------------|--|-----------------------------|-----|-----|
| Overview Data Laborator | / Preview | Я | 1 | 1 |
| Workspace 1 × Workspace 2 × | 9 HTML Report | Contract of | | |
| Appearance × w | Results: | Nodes: 34 | | lei |
| Holors Doges Packing | Modularity: 0.416 | Edges: 78 | | |
| Unique Partition Kanking | Number of Communities: 4 | Undirected Graph | | |
| #6b7eff | Size Distribution | Statistics x Filters | | |
| | 13 | Settings | | |
| | 12 | Avg. Weighted Degree | Run | |
| = 🚺 Apply | § 10 | Network Diameter | Run | • |
| Layout × | 2 9 | Graph Density | Run | |
| Choose a layout 🔹 | | Lutte | Due | |
| | Ê s | HIIS | Run | |
| KUI | <u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u> | Modularity 0.416 | Run | 9 |
| | | PageRank | Run | 0 |
| | 1 | Connected Components | Run | • |
| <no properties=""></no> | | ■ Node Overview | | |
| | Modularity Class | Avg. Clustering Coefficient | Run | 0 |
| | Brint Dr. Conv. D. Sava | Eigenvector Centrality | Run | |
| | Shine Good Save | ☑ Edge Overview | | |
| Presets Reset | | Avg. Path Length | Run | 8 |
| | | | | |

And these are community 0, 1, 2 and 3, these are you see the small red dots, these are the number of nodes, in these communities, I am going to close it, it is well known that

Zachary karate network had 2 communities. So, I am going to change the value of this resolution so that we get to 2 communities.

YA ory 📕 Preview space 2 × 4 + + Context × Graph × des Edges 🕐 <u>A</u> T Nodes: 34 B Edges: 78 Unique Partition Ranking Undirected Graph #6b7eff Statistics × Filters Settings Ava. Weighted Degree Run ß Appl Run etwork Di 🛃 Ran Granh De Run @ 2 Run (dularity 0.416 Run (Run @ ageRank Cance Run Node Overview Global Edges Lab Avg. Clustering Co Background color: Highlight selection 😽 Run ect neighbor 📓 0 Edge Overview Avg. Path Length

(Refer Slide Time: 02:50)

Let us change this where it 2 and let see how many communities to be get.

(Refer Slide Time: 02:52)

| ppearance × | 🕞 🚳 💿 HTML Report | | Context × | _ | |
|-------------------------------|---|-------|-----------------------------|------|---|
| lodes Edges Partition Ranking | Modularity Report | | Nodes: 34 Edges: 78 | | |
| #6b7eff | Parameters: | | Undirected or apri | | |
| | Randomize: On | | Statistics × Filters | | |
| | Use edge weights: On Resolution: 2.0 | | Settings | | |
| | | | Avg. Weighted Degree | Run | |
| = 🕨 Appl | Results: | | Nahuark Dismator | Dup | |
| would v | Modularity: 0.372 Modularity: with resolution: 1.244 | | Network Diameter | KUIT | |
| syour * | Number of Communities: 2 | | Graph Density | Run | 0 |
| Choose a layout | Size Distribution | 9 | HITS | Run | 0 |
| Rut | | | Modularity 0.372 | Run | 0 |
| | 15.0 | | PageRank | Run | |
| | <u>و</u> 12.5 | | Connected Components | Run | 0 |
| <no properties=""></no> | 2 100 | | E Node Overview | | |
| | | | Avg. Clustering Coefficient | Run | |
| | Ê 7.5 | | | | |
| | Print 🔄 Copy 📕 Save | Close | Eigenvector Centrality | Run | • |
| | | | Edge Overview | | |

We are getting 2 communities here the 2 most prominent communities that existed the time of some kind of fight that happened there by be knowing the history behind this network.

(Refer Slide Time: 02:59)

| Overview Data Laborate | ory 📕 Preview | | Ч | 1 | Λ |
|-----------------------------|--|----------|-----------------------------|------|---|
| Workspace 1 × Workspace 2 × | | | | • | • |
| Appearance × | 8 HTML Report | | Context × | | G |
| Nodes Edges 🕐 <u>A</u> T | | <u> </u> | Nodes: 34 | | |
| Unique Partition Ranking | Results: | | Edges: 78 | | |
| #6b7eff | Modularity: 0.372 Modularity: 0.372 | | Undirected Graph | | |
| | Number of Communities: 2 | Ω | Statistics × Filters | | 6 |
| | Size Distribution | | Settings | | |
| | | | Avg. Weighted Degree | Run | 0 |
| = 🕨 Apply | 15.0 | | Network Diameter | Run | |
| ayout × | S 12.5 | 2 | Granh Density | Run | |
| Choose a layout 👻 | Pou | | o opro cristy | THOM | |
| | E 10.0 | | HITS | Run | 0 |
|) Run | 9 7.5 - | | Modularity 0.372 | Run | ۲ |
| | E 50 | V | PageRank | Run | 0 |
| | size | | Connected Components | Run | 0 |
| <no properties=""></no> | 2.5 | | Node Overview ■ | | |
| | 0.0 | | Avg. Clustering Coefficient | Run | |
| | -1 0 1 | 2 . | Eigenvector Centrality | Run | 0 |
| 0 | A Print 🖻 Copy 📕 Save | Close | Edge Overview | | |
| Dracate Dacat | | | Avg. Path Length | Run | 0 |

Let us close this and let us try to visualize the communities I am going to nodes and we basically want to partition the nodes into 2 communities. So, communities I have already been found we just want to display them accordingly. So, we want to change the colors color of the nodes based on the partitioning that has happened because of communities.

So, nodes just selected colors is selected partition we will click and here we have this modularity class.

(Refer Slide Time: 03:43)

| Appearance × 🛛 🖬 Gra | h x · | Context × | | |
|----------------------|---|-----------------------------|-----|---|
| Nodes Edges () A T | agsing (Configure) | Nodes: 34 Edges: 78 | | |
| Modularity Class 🔹 | | ondirected draph | | |
| 0 (50%) | | Statistics × Filters | | |
| 1 (50%) | | Settings | | |
| Palette | • | Avg. Weighted Degree | Run | 0 |
| = Apply | | Network Diameter | Run | 0 |
| ayout × | | Graph Density | Run | 0 |
| Choose a layout | • | HITS | Run | 0 |
| P Run A | | Modularity 0.372 | Run | 0 |
| A | | PageRank | Run | 0 |
| Ala Dran astian | 🖬 • 🛛 T 🔄 🕅 🖀 🚽 🔶 🖌 🗛 Arial Bold, 32 | Connected Components | Run | 0 |
| | | Sode Overview | | |
| Glo | al Edges Lapels | Avg. Clustering Coefficient | Run | 0 |
| Ba | kground color: D Zoom Highlight selection 🖉 | Eigenvector Centrality | Run | 0 |
| Au | oselect neighbor 🧭 — V | Edge Overview | | |
| | | Ava Path Length | Rup | |

You see there are 2 communities. So, we are getting 2 different colors here when I apply. So, you see the nodes have changed color based on the communities that they belong to.



(Refer Slide Time: 04:07)

So, this is nice; we can see the nodes which belong to different communities and in case you want to display the labels so that you get to know which no which node belongs to which community you can do that. So, I am going to click this. So, you see the labels of the nodes are also visible.

Let me show you some layouts that might be useful maybe in this situation let me show you this force atlas layout. So, what this layout does is it forces the nodes in the given community to be displayed together.

(Refer Slide Time: 04:38)

| Eile Workspace Iools Window Help | | | | | | |
|---|--|------------------------|------------|---|-----|---|
| Workspace 1 × Workspace 2 × | ory 📲 Preview | | | я | | |
| Appearance × Nodes Edges • • • • • • • • • • • • • • • • • • • | P Graph X Sp Drasping (Configure) R | | • • • | Context × Nodes: 34 Edges: 78 Undirected Graph | | |
| 0 (50%) 1 (50%) | | | | Statistics × Filters Settings | | |
| Palette | | Auto | | Avg. Weighted Degree Network Diameter | Run | • |
| Layout × Force Atlas | | Give | | Graph Density | Run | 0 |
| Stop | | | | HITS Modularity 0.372 | Run | • |
| Inertia 0.1 Repulsion strength 200.0 | | - A. A. Arial Bold. 32 | ł 🛡 | PageRank Connected Components | Run | 0 |
| Maximum displacer 10.0 Auto stabilize funct | Global Edges Labels | _ | | Node Overview Ava. Clustering Coefficient | Run | |
| Autostab sensibility 0.2 | Node V Fo Arial Bold, 32 Color: | Edge | Size: So | Eigenvector Centrality | Run | 0 |
| Presets Reset | Size: | Size: | Hide non-s | e Edge Overview Avg. Path Length | Run | |
| | | | Ford | e Atlas | | |

So, let us run this, it is not looking so nice and going to stop it. So, I am going to increase this value of repulsion strength. So, as of now the nodes I have gotten clustered together based on the communities you see all the green nodes are on one side and all the pink nodes are on the other side, but it is difficult to see them because the repulsion is less. So, let me increase the value of repulsion may be to this value you can just do it and try.

(Refer Slide Time: 05:03)



So, this is a little better. So, I am going to stop it. So, green nodes are in the left hand side and pink nodes are in the right hand side. So, this is a little better visualization let me increase the size of nodes. So, that the labels are visible better. So, I am going to nodes unique and color partitioning we have done size basically we have to change size. So, let me make it 30.



(Refer Slide Time: 05:41)

Little better; so this is one thing another thing that we can do here is that we can change the size of the nodes based on degree. So, I mean nodes I will change the size basically I am going to run the nodes based on decrease. So, I am going to click on ranking and the attribute that I will choose will be degree.

So, I think this is good enough hundred go should be the maximum size.

(Refer Slide Time: 06:06)



So this is what I see. So, you can quickly see which are the nodes that are having the high degree and you can; obviously, see the community is that they belong to let me also you should one more layout here which is force atlas 2 there is one particular nice feature that I will like about it and let me show you that let me click prevent overlap because I see some of the nodes overlapping. So, I do not want that to happen I think this we can go ahead.

(Refer Slide Time: 06:37)

| Eile Workspace Iools Window Help | | | | | _ | |
|--|--------------------------|--------------------------------|-------|-----------------------------|------|---|
| Overview Data Laborato | y 📕 Preview | | | Ä | 1 | Π |
| Workspace1 × Workspace2 × | | | | | | |
| Appearance × | Graph × | • | • | Context × | | |
| Nodes Edges 🏽 🏶 🗿 🔺 T | Dragging (Configure) | | | Nodes: 34 | | |
| Unique Ranking | R. | | | Edges: 78 | | |
| Degree | | | | Undirected Graph | | |
| | | | | Statistics × Filters | | |
| Min size: 1 C Max size: 101 C | 1 | | | Settings | | |
| | 2 89.6 | | | | | 6 |
| Spline | | | | Avg. Weighted Degree | Run | 0 |
| = 🕨 Apply | м (н) | | | Network Diameter | Run | • |
| Layout × | 7 8 m | 0 2 2 0 W | | Graph Density | Run | |
| ForceAtlas 2 👻 | () () | | | LITE | Due | - |
| | | | | HIIS | KUIT | |
| Stop | A | | | Modularity 0.372 | Run | 0 |
| | A | | | DageDapk | Dup | |
| Threads number 3 ⊠Rehavior Alternatives | | | | rayeralik | NUIT | - |
| Dissuade Hubs | 9 🖬 · 🔳 🗋 🖉 🗂 🔶 – | A- A- Arial Bold, 32 — 🖓 — 🔳 🖻 | Ŧ | Connected Components | Run | 0 |
| LinLog mode | | | | Node Overview | | |
| Prevent Overlap | Global Edges Labels | | | Avg. Clustering Coefficient | Run | |
| Tuning | Node 🧭 | Edge 🗌 Size: | Sc | | | |
| Example 2 | Fo Arial Bold, 32 Color: | Fo., Arial Bold. 32 Color: | | Eigenvector Centrality | Run | 0 |
| ForceAdds 2 | Sizei | E Colo | i: Te | Edge Overview | | |
| Presets Reset | JILC. | Size: Hide | non-s | Avg. Path Length | Run | |
| 1 | | | Force | Atlas 2 | | |

So, you see what it is doing it is sort of moving the graph.

So, whenever you like it you get this stop maybe I like the green nodes to be in this selection I will stop it.

(Refer Slide Time: 06:47)



(Refer Slide Time: 06:57)

| ile Workspace Iools <u>W</u> indow <u>H</u> elp | | | | | | |
|---|--------------------------|---|------------|-----------------------------|------|-----|
| Overview Data Laborator | y 🐺 Preview | | | <u> </u> | 1 | Π |
| Workspace 1 × Workspace 2 × | | | | | 4 | • • |
| Appearance × | Graph × | | | Context × | | |
| Nodes Edges 🖗 🔕 A 🕂 | Conferent | | | Nodes: 34 | | |
| | Of constant conduct | | | Edges: 78 | | |
| Unique Ranking | R | X | | Undirected Graph | | |
| Degree 🔹 | | | | enter etter or opri | | |
| | | | | Statistics × Filters | | |
| Min size: 1 C Max size: 101 C | 16 16 | | | Settings | | |
| | 2 29 (33 (34) | -1/ | | Secongs | | 1. |
| Soline | 2 11 | 10 | | Avg. Weighted Degree | Run | |
| = D Apply | 21 | | | | | - |
| - Vrippy | 1 | | | Network Diameter | Run | 0 |
| Layout × | | | | Cranh Density | Rup | |
| Force Atlas | 2 | | | Graph Density | Null | |
| | P | | | HITS | Run | 0 |
| Stop | • | | | | | |
| | <u>A</u> | n a a a a a a a a a a a a a a a a a a a | | Modularity 0.372 | Run | • |
| *Force Atlas | A | 16 22 AL | | PagePapk | Pup | |
| Inertia 0.1 | | X X | | rogenarik | NUIT | |
| Attraction strength 10.0 | 9 H. T NN T | A· A· Arial Bold, 32 | | Connected Components | Run | |
| Maximum displacer 10.0 | | | | and another | | |
| Auto stabilize funct 🧭 | Global Edges Labels | | | Node Overview | | |
| Autostab Strength 80.0 | dood Lages | | | Avg. Clustering Coefficient | Run | • |
| Autostab sensibility 0.2 | Node 🧭 | Edge 🗌 | Size: So | Eigenvector Controlity | Dup | |
| Eorce Atlas | Fo Arial Bold, 32 Color: | Fo Arial Bold, 32 Color: | Colors Te | Eigenvector centratity | NULL | |
| Torce Audo | 5 m | | | Edge Overview | | |
| Presets Reset | Size: | Size: | Hide non-s | Avg. Path Length | Run | 0 |
| | | | For | re Atlas | | |
| | | | TUIC | C PARTY | | |

So, that is one thing and since they; the repulsion has reduced. So, I can go back to this force atlas and then run it and then again I get the nodes you know for a part from each other so that I can nicely see them.

(Refer Slide Time: 07:06)

| Overview Data Laborator Workspace 1 × Workspace 2 × | y 📮 Preview | | | Ч | | Λ, |
|--|------------------------------------|------------------------|-----------|--|-----|----|
| Appearance × | Graph × | | ••• | Context × | | |
| Nodes Edges 🏾 🏶 🔊 🛓 🕇 T Unique Ranking | Configure) | | | Nodes: 34 Edges: 78 Undirected Graph | | |
| Degree v Min size: 1 \$\$ Max size: 101 \$\$ | | 2 | | Statistics × Filters Settings | | |
| Spline | | 10 | | Avg. Weighted Degree | Run | |
| Layout × | 1 | 8 8 6 | | Graph Density | Run | 0 |
| Force Atlas | ₽ ■ | 20 | | HITS | Run | 0 |
| ▼Force Atlas | A | NX N | | Modularity 0.372 PageRapk | Run | • |
| Repulsion strength 20000.0 Attraction strength 10.0 | ? = · T T | - A· A· Arial Bold, 32 | ÷ | Connected Components | Run | 0 |
| Maximum displacer 10.0 | | | | Node Overview ■ | | |
| Auto stabilize runct | Global Edges Labels | | | Avg. Clustering Coefficient | Run | |
| Autostab sensibility 0.2 | Node 🗹 Fo Arial Bold, 32 Color: | Edge | Size: So | Eigenvector Centrality | Run | |
| Force Atlas | | | Color: Te | Edge Overview | | |
| Presets Reset | Size: | Size: | Hide non- | Avg. Path Length | Run | |

So when you see, they kind of high lighting that is happening when you when you how are your mouse on one node all the nodes in that community are visible and so on.

Let me reduce this size. So, that I can this is the labeling let me go back here let me.

Y • • • Context × Graph × 6 A τĪ Nodes: 34 G Edges: 78 Undirected Graph Statistics × Filter 10(Settings Avg. Weighted Degr Run etwork Diam Run (avout > Run @ ranh De orce Atlas Run @ ITS Rur odularity 0.372 Run Run ageRank 9 🖬 • 🔳 🗋 🖉 🖀 Run A. A. Arial Bold, 32 Node Overviev to stabilize funct 🗹 Global Edges Labels Avg. Clustering Coef tostab Strength 80.0 ostab sensibility 0.2 Background color: Highlight selection 🗹 Zoor Run tor Centrality Autoselect neighbor 👿 orce Atlas 0 Edge Overview Run Avg. Path Length

(Refer Slide Time: 07:27)

So, this is the network that you can see.

(Refer Slide Time: 07:36)

| Ove Worksp | rview ace 1 × | Data Labo Workspace 2 × | ratory 📮 | Preview | | | | | Ч. | // |
|---|------------------|----------------------------|--------------|-------------------|-----------------------------|------------------|--------------|--------------------------|----------------------------|-----------|
| 🔳 Data Ta | able × | | | | | | | | | • • |
| Nodes E | dges | Configuration | 🔂 Add node 🤅 | Add edge | M Search/Replace | e 🔮 Import Sprea | adsheet 📱 E> | ort table 🐐 More actions | - Filten | ld |
| Id | | | Label | | | Interval | | Modularity | Class | |
| | | | 7 | | | | | 0 | | |
| 1 | | | 8 | | | | | 0 | | |
| | | | 9 | | | | | 1 | | |
| 0 | | | 10 | | | | | 0 N | | |
| 1 | | | 11 | | | | | 0 10 | | |
| 2 | | | 12 | | | | | 0 | | |
| 3 | | | 13 | | | | | 0 | | |
| 4 | | | 14 | | | | | 0 | | |
| 5 | | | 15 | | | | | 1 | | |
| 6 | | | 16 | | | | | 1 | | |
| 7 | | | 17 | | | | | 0 | | |
| 8 | | | 18 | | | | | 0 | | |
| 9 | | | 19 | | | | | 1 | | |
| 0 | | | 20 | | | | | 0 | | |
| 1 | | | 21 | | | | | 1 | | |
| 2 | | | 22 | | | | | 0 | | |
| 3 | | | 23 | | | | | 1 | | |
| 4 | | | 24 | | | | | 1 | | |
| 5 | | | 25 | | | | | 1 | | |
| 6 | | | 26 | | | | | 1 | | |
| 7 | | | 27 | | | | | 1 | | |
| 8 | | | 28 | | | | | 1 | | |
| | I | | I | II. | II. | II. | II. | | 11 | |
| | Add | Merge | Delete | Clear column ~ | Copy data to other column ~ | Fill column | Duplicate | Create a boolean column | Create column with list of | |

And you can also go to data laboratory. So, here you see modularity class for every node is given you can just export this table. So, that you can use it to the way you want in any other tool as well. So, there are 2 modality classes; class is 0 and 1 because there are 2 communities here and you can also go to preview and let me refresh; refresh you are that was about how we can visualize communities in Gephi.

So, that was a brief introduction to a few a features of Gephi with respect to visualising the communities in the graph.