Social Networks
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Lecture – 31
Strong and Weak Relationships
Validation of Granovetter's experiment using cell phone data

Back then when Granovetter observed, it was in the 60s, he did not have any means to get the friendship network of people he observed the following he said people who get a new job or get it get the information through weak ties and that is it and he made up the story of possible network like thing with weak tie thing and things like that, but he had no clue whether this was this can actually be validated in real life.

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But then in some 10 years back, in 2007, we had data of cell phone usage between people and let see how can this be use to validate the Granovetter's strength of weak ties all you need to show is this so called local bridges actually are weak ties remember what we have been discussing all this 5 strength of weak ties means there are weak ties which are useful which are helpful what I am going to tell you right now is the fact that the local bridges turn out to be weak ties that Granovetter could not show back them how does he; for example, if he made an attempt to show how would he do that probably any scientist would look at the entire big network of friends and then go ask what is the

strength of your friendship with this person what is the strengths of your friendship with this person this person this person.

How would I do that I am in that is not a very nice way to do it may be your survey results might have noise may be people may not give the right answer for your questions when you are surveying in 2007, we had this data set of whose speaks to who on cell phone. So, the huge network and an edge this put between 2 people if they have conversed on cell phone and we would record the total number of minutes that they have spent on cell phone to the past let say 2 to 3 weeks. So, to be precise 18 weeks not 2 to 3 weeks, 18 weeks is what they have observed 18 weeks is roughly what? Four and half months.

They observed people for 4 and half months and then they saw whose speaks to whom how many minutes if I call you over cell phone then there is an edge between me and you we both are friends and they saw this big network the network was connected. In fact, around 85 percent of the nodes were belong to one big component the rest were another component you remember I discussion from first chapter that there is it is generally a connected network. Network is always connected or at least there is a big component of connected this a big, connected component in the network the rest is a small component if its disconnected. So, that a part. So, my point is when you look at this cell phone network it is a connected graph. So, what we will look at the local bridges here source a local bridge we just now saw that a proxy for local bridge better definition would be neighborhood overlap.

So, we look at the neighborhood overlap of an edge if it is higher than it is local bridge if it is lower than it is not a local bridge.

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So, we saw the definition of neighborhood overlap if the neighborhoods overlap is very small then it comes close to being a local bridge. So, it was observed on this cell phone data that for those edges with very less neighborhood overlap which means it is close to being a local bridge it was observed that the cell phone talking that happened across this friendship was also very less which means higher the cell phone conversation between 2 friends higher it is local bridge properties smaller lesser the duration of the phone call more closer it is towards the local bridge.

So, what does this tell us he just tells us that see local bridge is a very binary definition is it a local branch or not correct the neighborhood overlap definition tells you as I told you in the previous video tells you nice grey scale values it gives you between 0 and one 0 means local bridge one means not a local bridge there could be values between and that is what neighborhood overlap captures and what happens in this data of cell phone usage you observe that if 2 people are talking a whole lot.
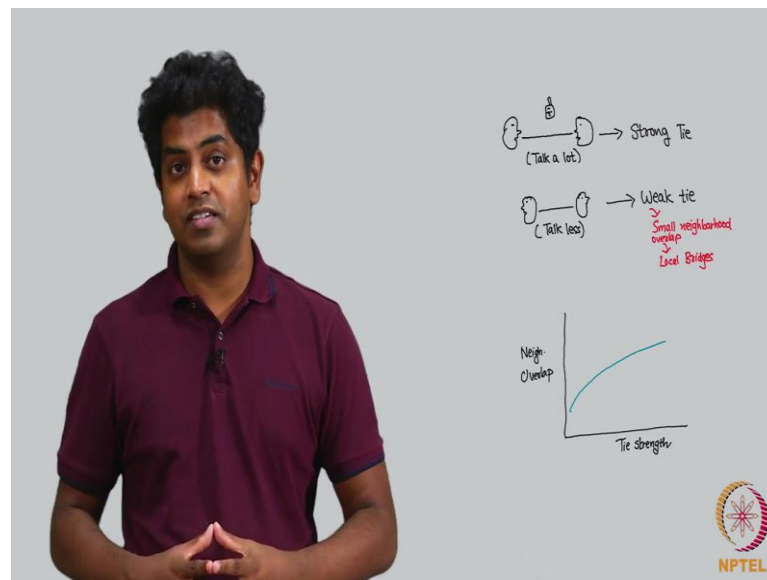
Then they are not weak tie they are strong tie if they are talking very less then there are they are weak tie and you observe that in the graph the graph structure when you observe the edges that correspond to smaller neighborhood overlap which means edges that are close to being local bridges.

We observe that the cell phone usage between these two people is of lesser duration which means it is actually a weak tie think about it a very I opening research you need which is possibly doable only in this era because not only do we have data we even have sophisticated programming possibilities that we can check such a big data.