Social Networks
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Lecture – 50
Strong and Weak Relationships (Continued) and Homophily
Quantifying the Effect of Triadic Closure

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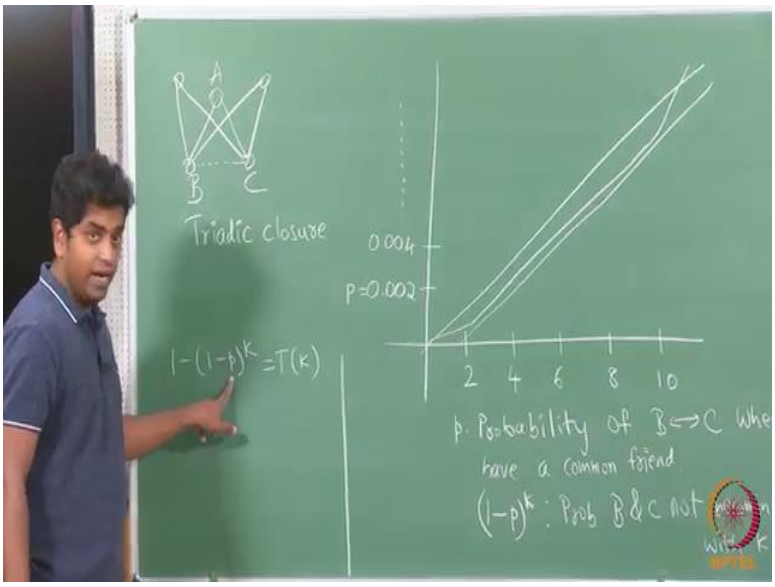

So, we saw about triadic closure where a person A has two friends namely B and C, and there is enormous pressure for B and C to become friends, this is called the Triadic closure perfect. So, now, as you can see if B and C have a common friend there is pressure for them to become friends. As they say a friends friend is a prospective friend right now what if there are many such common friends do you think the pressure increases for B and C to become friends, if there are a lot of common friends you just now watch the video clip which said two people are sitting and then they discussing they should probably become friends, simply because they have a whole lot of common friends.

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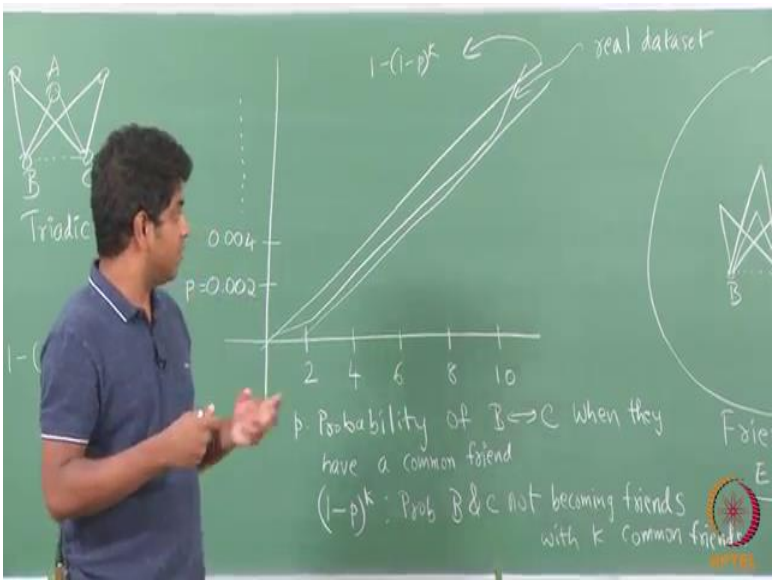

What is this whole lot of common friends mean do you think two people becoming friends has something to do with their common friendship? There is a space of free such that answers this question, people considered the email communication network and then tried plotting the following. They said if there are two common friends 4 common friends, 6 common friends, 8 and 10 common friends let us say and if you look at the probability of them becoming friends let us say 0.002, 0.004 and so, on right you observe it is a very small probability.

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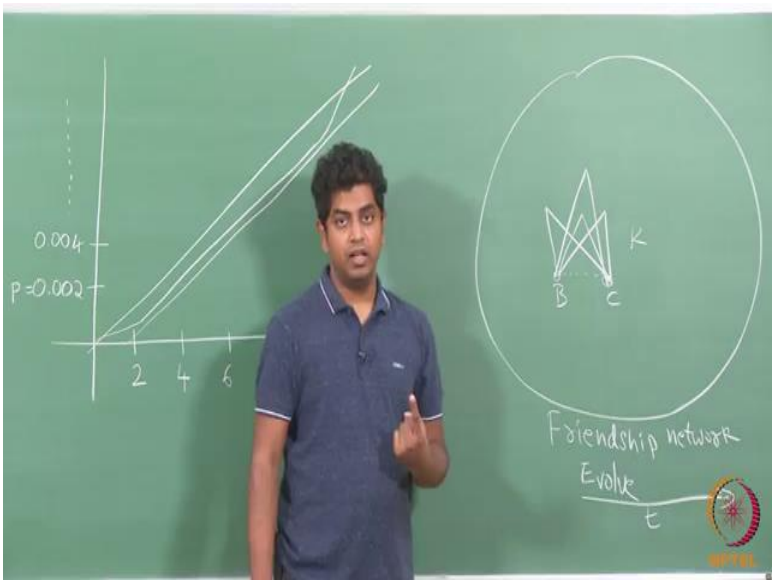

So, what we do is we look at our friendship network over a timeline; friendship network you look at it evolve with time T, and then we observe that two people who have K number of friends K number of common friends

Let us say what is the probability of them becoming friends in the next time step? For example, today I look at this friendship network this B and C are not friends, but they have K common friends with them, tomorrow I will observe are they still friends may be not I keep going like this and I observe that eventually they become friends. So, now, I will consider the following, given two people B and C if they have K number of common friends and if they become friends right tomorrow then I will make a note of that and across this timeline which is sort of this friendship network which is evolving across this timeline I will try to draw this plot of what is the probability with this data I can write a plot here what is the probability of we having our closure between B and C, when the number of common friends are 2, the number of common friends are 4, the number of common friends are 6 so on and so forth.

They observe that the plot looks something like this very linear which means increase in the number of common friends results in the increase in the probability of them becoming friends. Although as you can observe the probability is actually on the very small side its very small 0.0002 and we probably we can go up to 0.008 or 0.010 or something right and this looks linear what does it signify they tried looking at the fact if this can be fitted over some linear curve and they were successful. How did they do this? This, simply it the following they tried looking at the fact that if there are K number of friends with a probability of me becoming friends with someone if I have if the probability of B and C becoming friends if they have one common friend let us call that p.

If p is the probability.

If p is the probability of B and C becoming friendship when they have a common friend 1 - p is the probability of them becoming not becoming friends. If p is the probability of them becoming friends when they have a common friend 1 - p is the probability of them becoming them not becoming friends right and assume you have K such common friends as we know 1 - p whole to the case the probability of you having K common friends, at B

and C are not friends this is the probability let me write this down, this is the probability of B and C not becoming friends despite the fact that they have K common friends.

Now, what I will conclude here, what will 1 minus 1 minus p whole to the K denote this will be denote the probability of this not happening, because I am considering 1 minus of that. So, what this signify this signifies probability of B and C becoming friends with K common friends, let me denote this as T of K. I repeat T of K signifies the probability of two people becoming friends when they have K common friends provided p is the probability of B and C becoming friends when they have a common friend, they observed that for an appropriate p you will basically get this straight line and this straight line and this curve that you observed that I wrote here sort of agree.

This is the curve that they observed and real-world data set real data set and this straight line is the curve $(1 – (1 – p))^K$. As you can see it is a pretty straight forward analysis they observe its linear and there then try to see what could be this p they observe that the p is very small whatever B it was observed the moral of the story is that it was observed that the probability of two people becoming friends goes higher and higher, as the number of common friends go higher and higher.