Course Name: Cyber Security and Privacy
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Institute Name: Indian Institute Of Technology Madras, Chennai
Week: 13
Lecture: 37

Good morning, welcome back to Cybersecurity and Privacy course. So today's topic is Information Privacy, the Economics and Strategy of Information Privacy. So, is there an economic value to privacy and if so, is it important and where it is important? And subsequently, we will explore the strategic value of Information Privacy, if not today but this will move to the session tomorrow where you will appreciate that privacy or Information Privacy is at the core of business models of some organizations. So how you use it strategically or to differentiate your business etc. So that is the topic of discussion today and tomorrow, economics and strategy related to Information Privacy. So from a business perspective, these two are very important.

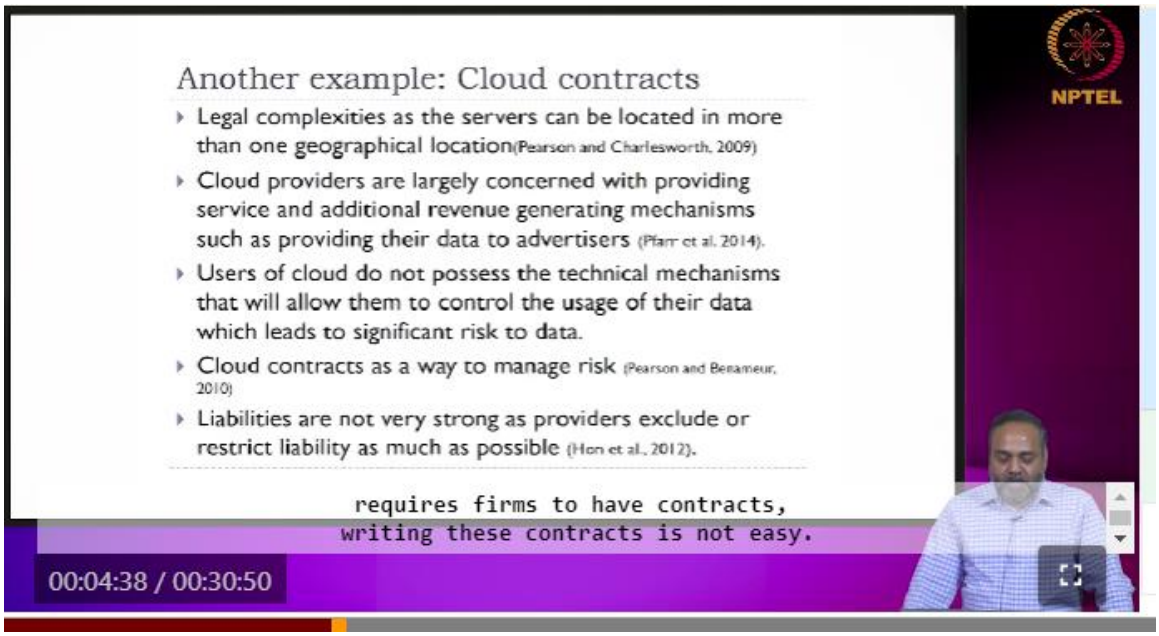
If privacy does not have economic implication, or strategic implication, it is not worth spending much time because business is about these aspects. So let us move on. So you know there are platforms that are built on data or individual's data and we enjoy being there because this is our social life and social presence and this gives us lot of happiness. It can also take away our happiness.

It can actually bring a lot of pain in different forms. So valuation of privacy, so when it comes to privacy as an economic good, so there has to be some value assigned to it. Only then we can, say speak in economic terms. So the value of privacy is practically important because in contracts between organizations which we explored is mandatory in the regulated world. When a data controller and a data processor, they actually exchange data and information, it is important to have a contract between them.

For example, GDPR insists that there be specific contract and also there be penalties or in the case of breaches, the losses be shared between the two partners. So therefore it is important to have a contract and in contract if you have to have a clause on what is the penalty if in case there is a breach. So how do you ascertain that value? So that becomes a topic that is related to the value of privacy because it is about private data. It is the asset or the good that is exchanged or shared here in this case, is the database. So how do you actually attribute a value to a database which is about personally identifiable data of individuals? So this becomes a very important topic.

Although it is an important topic, is there a method, well established method for valuation

of privacy, still remains a question or an open topic for researchers to jump in. So I see some publications coming in that line but valuation of privacy is by and large an open topic for research. So in contracts, particularly involving cloud contracts, although regulation requires firms to have contracts, writing these contracts is not easy. The first difficulty is in ascertaining the value of privacy. So since this topic is important but research is very limited, one of my MS scholars worked on this topic, on the valuation of privacy and we did an exploratory study to understand how organizations in different domains are actually managing their contracts.



So what does their contract document say? What is the value of privacy or how they do it? So we interviewed CIOs of certain leading organizations into this research. I do not mention the name but say, one example is where I was also present because I was curious to know. So this was a leading healthcare provider in our country and the CIO said, well we do store healthcare data in the cloud and the cloud service is provided by an IT service provider and then that data is actually healthcare data in Indian, of Indian customers. Then we asked how do you determine or how do you specify the clauses on data breach. He said, of course there are standard legal terms related to data breach but ascertaining the value is not easy, we do not do any valuation.

The typical clause is 5 percent, the penalty is 5 percent of the contract value. So that is like a thumb rule, so there is no actual valuation done if they go by a thumb rule and actual cost can be much more than the 5 percent, it could be less than the 5 percent but at the moment they agreed that there is no model available to determine what should be the

value and then actually contract based on that specific model, there is not clear model. So in the absence of that, they go by thumb rules. That is how the industry is working now. So 5 percent of the contract value.

So you can see that this can actually lead to major losses for a client or service provider if the valuation of privacy or the actual losses due to the data breach is very high and you can also see that what the DPDP or GDPR does is to give certain specific guidelines as to, you know you just saw that in DPDP which is proposed now in India, the cap for penalty is 500 crores. So you know there is a specific number out there based on which you can actually take a decision. So in the absence of a model, there are certain guidelines available. So that is the latest that we see post regulation but these are all related to the data privacy issue. Now when, if as a researcher you start exploring this field, well I am going to develop a model to determine the value of a database and suppose the database has, say a million records and I am going to determine how much this is worth, what privacy is worth as economists ask.

Then you will actually see difficulties because the issue of privacy is not very straightforward. If you ask an individual about how much an individual values one's privacy, that is a question I am going to ask you now. But so, you will find that it is not a very straightforward question to answer because say privacy scholars have seen or have written is context specific, it depends on context. So what do you feel today about privacy in a particular setting may not be what you feel about privacy in a different context. So I have a small quiz for you.

So and this is a small number, so if I will get the right response, I do not know, that is a disclaimer. But nevertheless we will do that. So you have to take your cell phones, get your cell phones and be ready to take the quiz. Now, so you can see there is a code, you have to go to menti.com and the code is 33966832.

33966832, 3396 yeah, now I am going to present it, not presented yet. So let me actually give you the background. All of you know that, all of you use emails, it is there on the board the top one, 33966832, yeah it is on the top. Do not respond now. Let me actually give you the background.

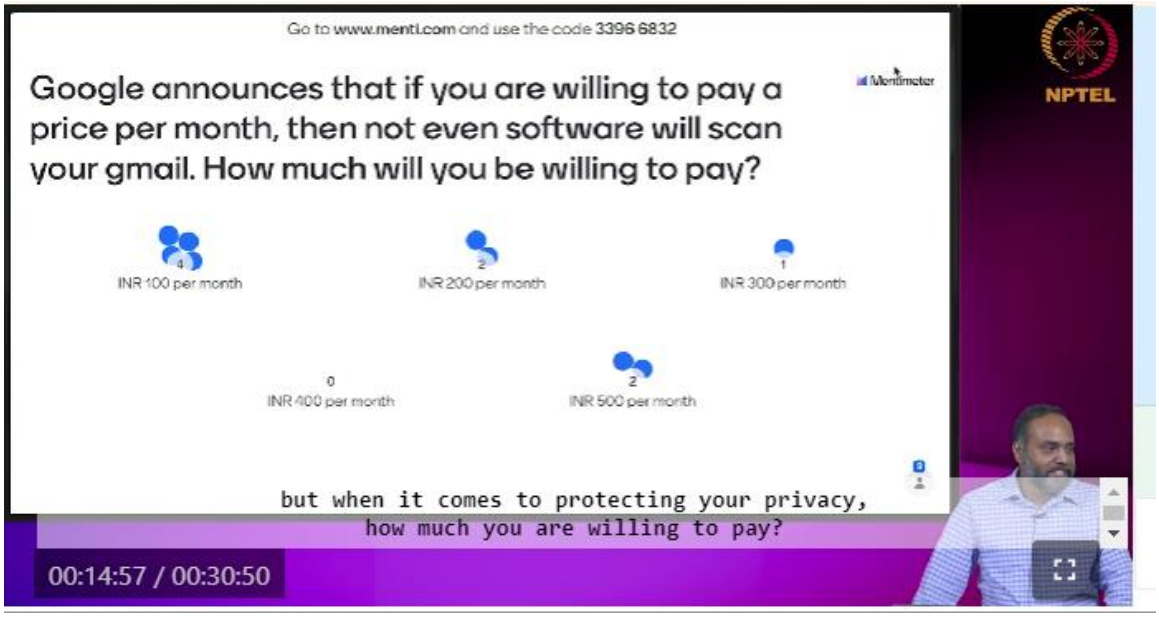
See all of us use or most of us use Gmail or an email online and you do not pay for it, you do not pay for a Gmail account. There is no subscription there, right. It is free. And you also know that your Gmail's are read, your emails are read, Google says that it is not read by a human being but it is read by a software and they use it for advertising and that is their revenue model and we accept that. Now we are, as users we are also concerned about our privacy.

So our emails are read by someone. Sometimes it can be humans too. Google admins that. So it is a matter of concern for us as far as we as individuals are concerned. So here is a proposal.

Suppose this is a hypothetical proposal from Google. Google announces that if you are willing to pay a price per month, then not even software will scan your Gmail. How much will you be willing to pay per month for availing this service? This is a premium service. The first question, this is the first question you are getting.

Really? No, no, no. This is the question that, you did not get this question yet? Are all of you getting the same question? Yes. Are you getting this question now? Yes. Now I have gone to the same. All of you get the same question? Yes.

Okay thank you. Just respond to this question. Yeah, yeah all of you. Hello, so you can sign into menti and the code is 33966832. Okay, I think most responses have come. So now I am changing the question.



So what does it show? So I would say you are going one side, so you have seen. Let us move to the next question. Now Google makes an order. Next announcement, announcement is that if you let humans read your Gmail, they will pay you. How much will you be willing to accept? Say Google says, well we want to scan your mail and since we are scanning your private mail, we will give you some money per month.

They are willing to pay you. How much will you be willing to accept? To scan. No but

you give, no, no. These are the options out of which you have to choose. So I was a bit concerned if the class will follow this expected pattern but you have, you have followed that pattern.

Yeah, yeah. So this is known as privacy paradox. What do you have actually, your response is what privacy paradox is. We all talk about privacy and we want to protect our privacy. We are, you know, so we are advocates of privacy but when it comes to protecting your privacy, how much you are willing to pay? You see 100 rupees or you want a 0 option, probably it is not there.

Right, right. Yeah, yeah and if you are going to get some money out of it, you want to get the maximum money. The maximum that you can make out of your privacy, you want to make but if you have to protect it, how much are you willing to pay? Sorry there is no 0 option. Correct. So this dichotomy or this difference between what you know, what you call the willingness to pay and the willingness to accept in economic literature, WTA and WTP. This is nothing but willingness to pay.

How much are you willing to pay to protect privacy? It tends towards the lowest value. If you take the average, the average of WTA is lower than the average of WTP. How much, sorry WTA, this is willingness to accept. I am sorry, maybe I said it differently.

This is WTA, willingness to accept. The willingness to accept is higher than the willingness to pay or willingness to pay is lower than the willingness to accept. That is human behavior. So this claim for a very high value of privacy and you will protect it any cost etc is actually a talk but when it comes to the economic man in you, you are actually differentiating between the willingness to pay and the willingness to accept. And there is a sort of paradox there, among humans which is quite obvious. Even in a small sample you can see that is reflected and there has been several experiments conducted by economists to study the privacy behavior of individuals.

I just designed this experiment and this has been working. So now the important question is, what explains this? What is the theory that explains this? See when behaviour is explained by certain theories, can you imagine why are you not attaching a very high value to protection but when it comes to acceptance you are asking for higher value? There is no other choice. Actually you are just going for the best choice. No. Why that preference? What explains that preference? In the first context if you see it all depends upon how much value you are assigning to that particular medium.

You spoke specifically about Gmail. Now Gmail or email communication in the context of our country, in the context of the domain we are in, might be totally different from, in

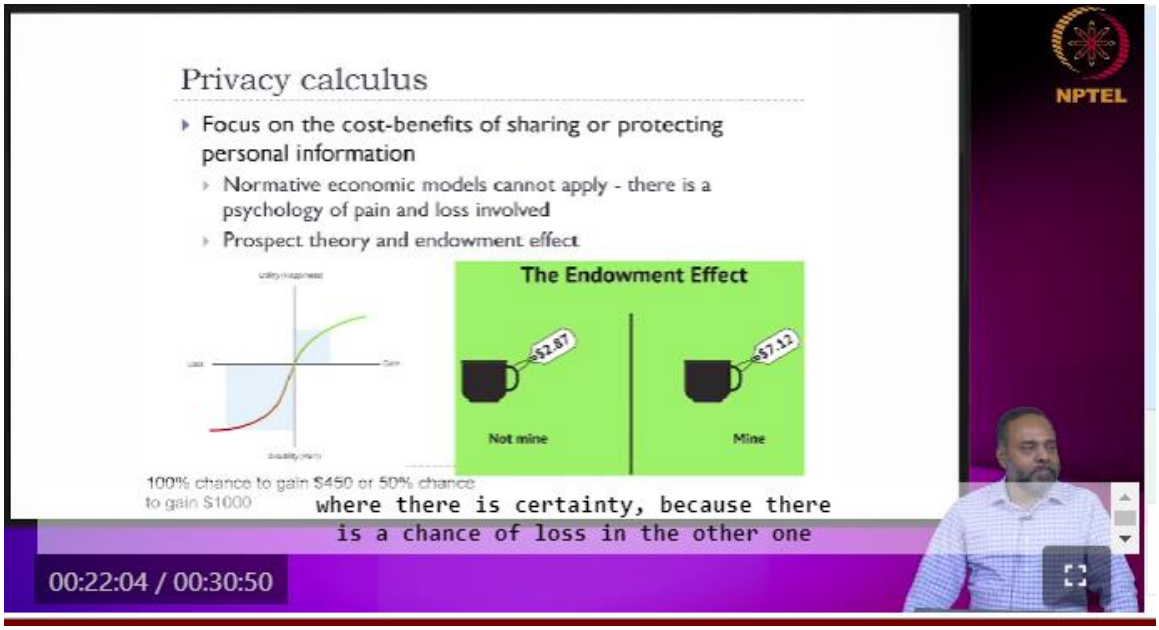
the context of say somewhere in, where we are in our country. No, no, no. As an individual, the question is to you as an individual. What explains your behaviour, that is the point. Sir, as an individual only I am saying, if Gmail would have been my primary mode of communication, whatever my work or all my things, what I have assigned would, I have assigned even 100 rupees I would have said this is nothing is acceptable, I do not want to share it.

It is just that I am willing to take that gamble because probably I do not assign that much of priority to it. Value to the privacy and. If I assigned it, I would have said 500 rupees I will give. Nothing should scan my this thing because I have that kind of, I assign that kind of value. Yeah, but Gmail is for private communications and there is private information there but when it comes to paying for it, you do not actually feel like it is worth that much.

Right. Yeah. Sir, actually it depends as an individual how much priority I am giving to you know my cyber digital privacy and it also depends on the kind of data, whether that is email or normal chat or of a confidential something and it also depends on culture to culture. Yeah, of course, of course. Depending on the awareness. Yeah, yeah, the question is yeah, culture to culture definitely but here the question is about individual behavior and of course we live in a particular culture which is sort of homogeneous for all of us. So within that culture yeah, yeah, yeah, yeah, yeah, yeah.

So yeah, actually theoretically this behaviour is a bit of irrational behavior, okay. Because in economic man is considered to be very rational, you know maximizing profit, okay. And so also not carried away by emotions but here actually emotions play a role. So which shows that it does not go with the neoclassical economics and it falls under the purview of behavioural economics. And behavioral economics would say that economic man is not very rational and decisions are also carried away by whether there is a pain or a loss and human beings are loss averse, okay.

Or the pain gets a higher priority than gain, okay. For a same decision if there are, there is an option of both pain and gain, the focus will be on gain, sorry on pain. You do not want a pain, okay. So if you read Daniel Kahneman and others, you will get more understanding about these concepts. So in privacy calculus or the calculus that runs in your mind, when you take decisions about privacy, you apply certain principles or certain things are running in your mind.



So which can be drawn as two concepts here, one is loss aversion and the second is endowment effect. Both are actually from behavioural economics. And the loss aversion is something that you can understand from the graph. How much, how the loss is more significant than gain? So a typical example they gave in their literature is 100 percent chance to gain a 450 dollars, 50 percent chance to gain 1000 dollars, which one would you, which one would you opt for? So, the expected value is higher for the second option, right. But it is a gamble, right, it is a chance but there is a definite or there is certainty in the first one.

So people prefer typically that. I am not putting it as a experiment but people prefer where there is certainty. Because there is a chance of loss in the other one which you want to avoid, although the expected value is higher. And that is known as loss aversion. So we are very averse towards loss because loss is a pain, essentially it is psychology. It involves a pain, embarrassment is a pain as I used to assert.

So we always try to avoid that. And that is known as loss aversion in prospect theory. The next is endowment effect. Endowment effect is a subtle idea that we all carry. Let me give a different example, this is Google example which I have given on the slide. Suppose you have a trophy which you got for some performance when we are in the fourth standard.

It is a small trophy and it is kept in your living room and you often see it. And somebody comes and says, well that may be made of steel or silver or a mixed some alloy. Somebody

says I like this trophy, how much do you want for this? So he will try to weigh, so suppose it is an akri guy, so he comes and weighs it. So this is say 300 grams, so I pay you 500 rupees. So are you willing to take a money proportional to the cost of that metal? No, it is not a metal, it is not a metal, there is something else in it and that is the endowment.

This is your trophy. Even if you give instead of 500 rupees you get 50,000, you may not sometimes part with it. So there is a parting pain. The parting pain is a part of many products and services or it is created like that. And then it is not, the price is not the cost of the material or cost of production or margin, that is not the way to determine the price of certain products and services because endowment effect is built in. So when something is yours, that is what is shown in the slide and you have to part with it, there is a parting pain and there is a cost to it and that cost is difficult to assert.

Now in the small experiment that we did now, both the effects are involved in to some extent. For example, if you are a Gmail user, if you are a Gmail user and take my case, I have been using Gmail say for the last 15 years, a lot of my information and I do enjoy certain amount of, say certain service, certain benefit from it. And if you are taking that away from me or I do expect that my privacy is protected to some extent and if you take away that privacy from me, you know, it is like something I enjoyed and you are taking it away. So I feel a pain and that pain is what is involved in the willingness to accept sort of a thing. So you want a higher price because you are taking away something which I already own and there is a loss involved in it because it is your private data.

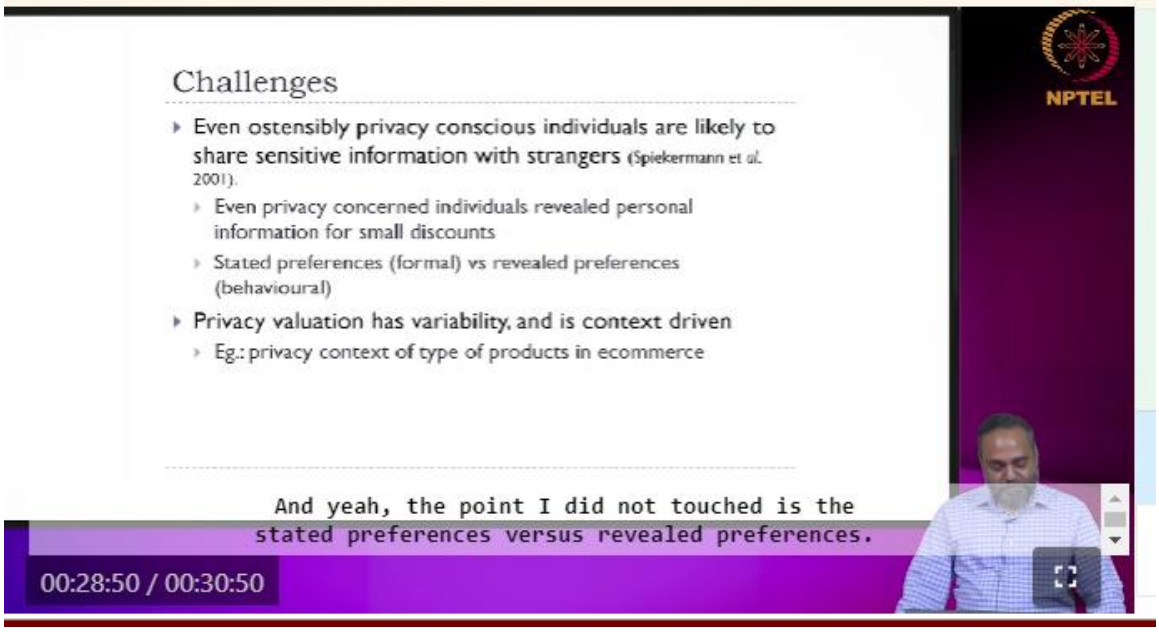
So all these are playing up and it is also could be opportunism in this case, I did not know because it is a small sample, you are going to get some money, get the maximum money. But subtle elements could be, if you are enjoying certain benefit from something and if it has to be parted with, then always the endowment effect comes in and if there is loss involved and potential, loss in the form of potential embarrassment or potential social cost etc, loss of face in front of society etc, these are pains. And when you imagine that, you know, your, the perception of cost or the perception of value would go up. So what I try to outline here is that privacy is a very personal product.

It is a very personal, personal area. So anything that is related to such a, it is not a physical tangible product. It is about you and what you feel about yourself, what you feel about your data. So since it is closely tied to yourself and that is where the behavioural aspect and pricing based on the behavioural aspect comes in. So therefore valuing such goods, private goods or a private data becomes a challenge because WTA and WTP itself will be good. So you will actually assign different values to it depending on what is the question, whether you want to protect it or whether you want to sell it.

So how do you actually value it ultimately? So valuation is, therefore that makes it hard for assigning one value to privacy at all times independent of context. So privacy is context specific. Nevertheless there has been attempts in literature or by scholars to determine the value of privacy in terms of WTA and WTP and using other method, that you know some people use survey but all this may be subject to variations depending on the context. So that is the end of the discussion on economics of privacy because economics is an economic value of privacy, particularly databases and that is important and its valuation is also important and models are still evolving but some fundamental concepts or theories that can guide this valuation is the behavioural economics theories, particularly concepts like WTA and WTP which we just explored. And yeah, the point I did not touched is the stated preferences versus revealed preferences.

Economists use a tool known as contingent evaluation technique for privacy and related evaluations. So there are two concepts there. One is stated preference and the other is revealed preference. Stated preference is what you would state in public. So if you, if I ask a general question in a survey, like I administer a survey and the question is, how important is privacy to you? It is 1 to 5.

Answer is 5, right. It is very important. That is your stated preference. Then when it comes to revealed preference, you cannot actually administer a survey and get it. You actually try to observe or you change the questions and give games like this and find out how you actually really value privacy and then you find that although the 1 to 5 option was available, you went for option 1 instead of opting for 5, that is the revealed preference. So there is a difference between stated preference and revealed preference or actually what people think and what people actually behave are different when it comes to privacy and privacy evaluation.



So with that I close. So we take up the next case for discussion which is related to Information Privacy, but the discussion is at the organizational level, at the aggregate level and we will see what are the factors that influence the trade of private data.