Subject: (6) What are the limits on I(X;Y)?
From: Dawer Jamshed <dawerj@gmail.com>
Date: 2/1/17, 6:16 AM
To: "temple-engineering-ece8526: TU ECE 8526 Information Theory" <temple-engineering-ece8526@googlegroups.com>

(6) What are the limits on I(X;Y)?

Intuitively:
1) no mutual information should give you a lower bound of 0 units.
2) max mutual information would mean they are the same random variable ie X=Y. This is the so-called "self-information" or really just the entropy of X.

a little more formally

1) I(X;Y)=H(X)-H(X|Y).

if X and Y are completely independent, H(X|Y) = H(X)
implies: H(X) - H(X) = 0

2) I(X;X) = H(X) -H(X|X) = H(X) - 0 = H(X)

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Subject: Re: (6) What are the limits on I(X;Y)?
From: Dawer Jamshed <dawerj@gmail.com>
Date: 2/1/17, 6:29 AM
To: "temple-engineering-ece8526: TU ECE 8526 Information Theory" <temple-engineering-ece8526@googlegroups.com>

a quick add to why it makes sense that the max mutual info would be the entropy.

The idea of mutual info is, how much information are we gaining about this unknown. So it stands to reason that we cannot gain more information than what is unknown. The currently unknown being H(X).

More concretely, if my entropy says there are 3 binary questions required to determine where in a parking lot my car is parked (ie 8 car parking lot with binary search), then the most information I can gain about my car's location is 3 binary question's worth. anything else would be superfluous.

On Wednesday, February 1, 2017 at 6:16:14 AM UTC-5, Dawer Jamshed wrote:

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