Re: conditional probability

Source: http://sci.tech−archive.net/Archive/sci.math/2005−07/msg03466.html

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- *From*: "Stephen J. Herschkorn" <sjherschko@xxxxxxxxxxxx>
- *Date*: Thu, 21 Jul 2005 15:57:39 −0400

Tino wrote:

> "Stephen J. Herschkorn" <sjherschko@xxxxxxxxxxxx> wrote in message
> news:42DFE889.9080301@xxxxxxxxxxxxxxx
>
> > Tino wrote:
> >
> > > <>If the only information I know is that P(A), P(B), P(C), P(A and B), P(A and C) and P(B and C), (A, B and C are not independent) is there a way tocompute P(A and B and C)?
> >
> > No. You need seven parameters to specify the probabilities of all the atoms (i.e., there are seven degrees of freedom), yet you give only six parameters above. You should be able to determine bounds on P(ABC).
>
> Some pointers on how to generate an upper bound would be useful.

With binary indices, let p_ijk denote the probabilities of the atoms.

I.e., letting ' denote complement, p111 = P(ABC), p110 = P(ABC'), p101 = P(AB'C), etc. You have seven linear equations in eight variables; here are three of them:

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sum(j,k; p_1jk) = PA
sum(k; p_11k) = P(AB)
sum(i,j,k; p_ijk) = 1.
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Solve for all the other p_ijk's in terms of p111. Each of these values must be between 0 and 1, inclusive. This gives you seven inequalities that p111 must satisfy.

Numerically, you can also do this by linear programming.

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Stephen J. Herschkorn sjherschko@xxxxxxxxxxxx
Math Tutor in Central New Jersey and Manhattan

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