Review of: "Notes on the Implications of Ignoring Bayes' Rule in Search and Rescue Practice in the UK"

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Report on the Qeios short article "Notes on the Implications of Ignoring Bayes' Rule in Search and Rescue Practice in the UK".

The paper deals with an interesting theme: the optimization of the strategy for the search for a missing person and suggests the use of Bayes' rule to recompute the probabilities of the "misper" location on the basis of additional information. The idea is sound; however, the presentation is rather negligent.

First, in the beginning, it makes sense to recall the basic form of Bayes' rule. Then, on p. 2, there is an example where it should be used. My comments:

1. First, the example needs better notation to be able to distinguish the symbols' meanings. For instance, like this:

Let $Po(W)=0.2$, $Po(E)=0.1$ be the initial (prior) probabilities of the misper being in region W or E,

$POD(W)$, $POD(E)$ the probabilities of detection, provided the misper is in the given region; both are 0.5. New evidence is that W was searched in vain. It has the probability

$Pw(W)=Po(W)*(1-POD(W))+(1-Po(W))=1-Po(W)*POD(W)$. It is then the denominator in both A. and B. OK.

2. Then expression A shows the posterior probability of being in W provided a vain search in W.

It equals $P1(W)=...$ here the details of Bayes' rule application should be..=

$= (1-POD(W)*Po(W)/Pw(W)$. It is seen that in the paper, there is a mistake in the brackets.

3. B. then shows the posterior probability of the misper being in E provided W was searched in vain; it is correct, however, with unclear notation. It should be

$P1(E)= ... = Po(E)/ Pw(W)$. Both A and B yield 1/9, hence such a use of Bayes' rule does not help!

4. Moreover, even in several lines above expression A, there is also an error, as, when the remaining $Po(W)$ is taken as 0.1, then all probabilities $Po(..)$ must be divided by 0.9 to ensure that their sum equals 1. Hence also here, the new $Po(W)=1/9=$adjusted $Po(E)$.

It is seen that the effective use of Bayes' rule needs some other information (for instance, about the mutual probabilities of the type P(misper is in X| is not in Y)..??

However, mainly, when one wishes to share his ideas, he has to be much more precise and careful, both in argumentation and not to make trivial mistakes.

I did not read the rest of the Notes, as I expect that the level is of similar quality to the first two pages.