The Evidence of Your Own Eyes

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Abstract. The evidence of your own eyes has often been regarded as unproblematic. But we know that people make mistaken observations. This can be looked on as unimportant if there is some class of statements that can serve as evidence for others, or if every statement in our corpus of knowledge is allowed to be no more than probable. Neither of these alternatives is plausible when it comes to machine or robotic observation. Then we must take the possibility of error seriously, and we must be prepared to deal with error quantitatively. The problem of using internal evidence to arrive at error distributions is the main focus of the paper.

Key words. Observation, error, probability, observation statement, observation report, observational judgment, perception, input.

"Part of our knowledge we obtain direct; and part by argument" (Keynes, 1921). This is the opening sentence of Keynes’ Treatise on Probability. Keynes goes on to focus on argument, and although he mentions ‘academic logic’, it is only dismissively; the one form of argument he takes seriously is rational uncertain argument. We shall take this for granted here, though it is certainly controversial, and in fact Keynes can be cited on both sides of the controversy: should one merely revise one’s degrees of rational belief in the light of new evidence, or should one also, in some cases, come to fully accept propositions that are not entailed by the total evidence—that are merely rendered ‘probable’ by that evidence.

Here we shall focus on the “knowledge we obtain direct,” on the evidence that underlies our updating or our acceptance of propositions about which we are uncertain. Presumably, this evidence refers, perhaps among other things such as testimony, to the evidence of our senses. As an instance on which to focus, we will consider the issue of seeing. It is an ‘issue’ because some people think that there is a process of inference that occurs between the retina (?) and the acceptance of certain propositional content about the visual field. Again, we shall leave these complicated matters to one side, and focus on the question of how beliefs (which we will take to be represented by sentences of English) are updated in response to experience, and, specifically, visual experience.

1. Seeing is Believing

Seeing is believing, goes the old saw. But not always. We are alleged to see tiny barns in the distance (if we have been properly socialized), but we do not believe they are tiny. A person sees a stick bent at the interface between water and air, but does not believe it is bent. Mary sees a twig on the ground, and then as it
slithers off, realizes that it was a snake. The beliefs we form in response to visual stimulation, and the ways in which they change in response to further visual stimulation, depend, as we all know, on a whole set of prior beliefs, expectations, habits, and the like, as well as on the visual apparatus (native or artificial) we are employing. (Note that there are wide differences between my native visual apparatus and yours, and between yours and your neighbor's.)

So we must distinguish between veridical and misleading or erroneous seeing. We must modify the old saw: only some seeing is believing.

We will attempt to sort out what seeing is (or ought to be) believing, and what the belief itself amounts to. Does belief involve full acceptance? Or does it come in degrees? Or both? One way to go about sorting out these questions, in addition to consulting our ever undependable intuitions, is to examine the question of how a robot might be constructed to perform, in some limited ways, like a human. For example, a general purpose robot must receive inputs from its environment—actual robots for making cars and handling materials do depend on inputs from sensors. It is generally supposed that except in the case of extreme breakdowns the sensors yield veridical information, just as it is generally supposed by naive epistemologists that, except in the artificial case of hallucination, human sensors yield veridical information.

The possibilities we will consider are these: Is there a class of veridical inputs that we can identify? For example, perhaps some inputs are highly dependable, and we can tell which ones they are. Then the rest of our beliefs can, as Keynes imagined, be based on inference from these items that we obtain 'directly'.

Or, if we eschew full belief completely, and regard all belief as a matter of degree, perhaps we can take the inputs to be, not propositions or sentences, but alterations in the degrees of belief attributed to certain basic judgments.

Nothing says we have to 'begin' with visual judgments; so perhaps the correct reconstruction is one in which we take for granted a whole body of fully accepted beliefs, and infer something about the reliability of our inputs by comparing them with the contents of that body of knowledge.

But if we do that, we must face the problem of basing our bodies of knowledge on experience: can this be done without vicious circularity?

2. Is There an Identifiable Class of Veridical Observational Judgments?

This would fit in with Keynes's picture nicely. In our working example, we would say that there are certain visual judgments that are fully dependable; these judgments yield statements that we can therefore take as evidence for inference; deduction and induction can then be used to fill out our bodies of knowledge. A variant of this would be classical Bayesianism, in which these certified veridical judgments constitute the evidence on the basis of which conditionalization yields updated degrees of belief.

It should be observed that this is a variant of the deductive use of evidence. Let