Evaluation of Human Knowledge Validation

Kalev Hannes Leetaru

November 20th, 2000

"Knowledge, which is the highest degree of the speculative faculties, consists in the perception of the truth of affirmative or negative propositions." This was John Locke's definition of human knowledge in his *Essay Concerning Human Understanding*, and is the predominating view of the philosophical doctrine of empiricism. Locke was the founder of the empirical school of thought, which holds that all knowledge is derived from experience, whether of the mind or of the five senses. With his further assertion, "Since the mind, in all its thoughts and reasonings, hath no other immediate object but its own ideas, which it alone does or can contemplate, it is evident that our knowledge is only conversant about them," Locke emphasizes the empirical distinction between human reasoning and the object of that reasoning, or "knowledge."

The Theory of Scientific Reason is based soundly in just such an empirical foundation, as it holds that any given hypothesis is "fact" merely until it is disproved by another hypothesis. A hypothesis, by definition, is simply a model that fits the currently available data, which are comprised ultimately of physical observations. These physical observations are descriptions of the surrounding environment produced by the body's sensory organs. They are thus not subject to the human reasoning facilities until they become associated with other experiences and are abstracted into "ideas," otherwise known as hypotheses. Hypotheses therefore stand as fact until a new set of models are constructed, perhaps with the assistance of additional sensory experiences, which partially or completely contradict existing hypotheses that are based on them. At this point, new hypotheses must be made which fit the newly-available data. Consequently, human knowledge may be defined as a reflection of the currently predominate hypotheses, each of which is accepted as "fact" until replaced by a contradictory

hypothesis, based on newly available sensory experiences or a better model of existing experiences.

The Scientific Method is a practical application of the Theory of Scientific Reason and is the set of procedures and assumptions that must be undertaken by any entrepreneuring scientist in search of new scientific "knowledge." Essentially, it urges a scientist to review the fundamental data that their hypothesis will be built upon, by personally examining any physical evidence that may be available. This ensures that any personal bias which may have subconsciously crept into previous observations will not skew future models based on the phenomena those observation attempt to describe. Sometimes, however, a hypothesis' data is composed purely of other hypotheses, in that it is a secondary hypothesis. In such a case, that hypothesis may be "proven" true by showing that it perfectly fits the existing hypotheses that it is based upon. However, the prudent scientist would be wise to verify the validity of those supporting hypotheses, which may, in turn, be based upon further hypotheses. Thus, an almost endless recursion of validation must occur for any given scientific hypothesis to be proven "true." If, at a later time, one of those supporting hypotheses is invalidated, then any hypotheses which based themselves upon its authenticity are invalidated as well.

This is a common occurrence in the so-called "pure theoretical" fields of science, where very little physical evidence exists to support the myriad of hypotheses proposed. Fields like quantum mechanics are perfect examples of this, where almost every theory is based on every other theory, and only a handful of rather vague physical data exist to support all of these hypotheses. These fields are called "pure theoretical" fields because of the fact that most of their models are based on complex associations with very little

physical evidence to support them. In such fields, complete upheavals of the accepted corpus of knowledge are commonplace, where a single new discovery can throw the entire existing body of knowledge for that field into disarray. In such an environment, a hypothesis is formulated with the assumption that it will be invalidated in short order, but that it will serve as the basis for the creation of better hypotheses, which more precisely explain the data.

There is, however, one exception to the Scientific Method's assertion of data validation. That exception deals with the only knowledge type that is directly human-derived: our corpus of human language and the linguistic attributes of human reasoning. The component entities of this knowledge class are unique in that they are not based on the human sensory systems, but rather are a means of defining the environmental descriptions produced by those senses and communicating them to others. In essence, the knowledge of language was created by humans to enable them to convey all other types of knowledge to others.

For example, the unaided human eye is capable of detecting electromagnetic radiation with a wavelength between $6x10^{-7}$ meters and $7x10^{-7}$ meters. All human beings with full use of their optic facilities are capable of receiving this environmental stimulus through their eyes and the resulting information is transferred to their brain. Due to the associative nature of the brain's neuronal complex, this information must be associated with some other piece of information before it can be processed and stored by the brain. In the absence of language, this information is simply associated with a particular time and place, information that is presented to the brain outside of human consciousness through the extended human preceptory senses. As human development progresses from

birth, the ability of the brain to use this extended sensory information to create internal data associations is used in the development of language. When a child is shown an entity which radiates with a wavelength between $6x10^{-7}$ meters and $7x10^{-7}$ meters, that child is told that the radiation should be described as "red." Several different instances of this radiation must be demonstrated to eliminate any possible role that the other senses might play in the description, so that the child realizes that it is only the stimulus they are receiving through their eyes when perceiving such an entity that constitutes something "red".

Once linguistic associations are taught to a child, that child begins to use those associations to convey its needs and wants to others. Although it has already embarked upon its journey for knowledge, this child is now able to convey that knowledge to others, to the limits that its linguistic knowledge will permit it. Instead of crying or pointing towards things, the child may use simple sentences to convey its wants and needs. Each word in a language is given a specific definition that is based on the human sensory systems. The five primary senses, those of sight, smell, hearing, touch, and taste, are the only ones immediately available to the human consciousness, and thus are ones most commonly used in word definitions. This is most readily apparent in the definitions of tangible entities, which interact with humans solely on the physical level. Thus, if a child tastes an apple for the first time and is told that what it has just eaten is an apple, it associates the word apple with the stimulus that it received from each of their five primary sensory systems. It may then later describe other entities as "apple-like" in appearance or taste or smell, or other existential form.

Language is thus merely a human-derived methodology of conveying "knowledge" to other humans. However, in the interests of propagation, language must be kept relatively simple. If a word was created to describe every single concept in existence, the corpus of available words would be infinite, as new words would have to be created for every new concept ever derived. Thus, only a small subset of concepts are granted linguistic representations. For complex instances of knowledge to be conveyed, they must be reduced recursively until they reach a point where they may be described in terms of the relationships between concepts with linguistic representations.

Consequently, human knowledge may be defined as a reflection of the currently predominate hypotheses, each of which is accepted as "fact" until replaced by a contradictory hypothesis, based on newly available sensory experiences or a better model of existing experiences. The Scientific Method provides practical justification of this, in its guidance to scientific endeavors. The only true exception to this is human language, which was created by humans as a means of representing and communicating these hypotheses to others. This is becoming more and more apparent as the capabilities of advanced technology continually improve. The ability to fool the human sensory systems has reached a point, where in certain cases, the artificial becomes indistinguishable from the "real" and artificial "knowledge" may be produced.

For example, during the 1999 World Series in baseball, a myriad of alternate realities were presented to those who watched the game. To those physically present in the stadium, the advertisements along the walls of the field were nothing out of the ordinary, just simple billboards representing the various advertisers that had paid to have their products and services in the view of millions of fans. However, to those watching

the game live from their televisions at home, the advertisements had an entirely different reality. The World Series of 1999 represented the first time in public broadcast history that a live show was digitally altered in real-time to provide a scene to television viewers that differed from the real event. During the World Series, demographic data was used to provide each region of the United States with a different set of billboard advertisements that catered to the particular interests of that area.

Targeted advertisements are nothing new to broadcast television, but this marked the first time that it was used during a live event, with the advertisements located within the event itself. Specialized video editing software was used to digitally replace the billboards in the video feed of the stadium with the targeted digital billboards for each region, all in real-time. To a fan watching the game from home, there was nothing unusual about the appearance of the billboards.

The technology used in the 1999 World Series has evolved tremendously in the last two years and we are now at the verge of a revolution in digital imagery. Within six months, specialized computer hardware will be on the market that is capable of generating photo-realistic imagery that is indistinguishable from real life. The editing process that brought JFK to life in Forest Gump took almost a year when the movie was produced. Within six months, such effects could be done during live television, enabling news broadcasters to digitally insert people into live broadcast feeds and have them interact with other characters in the scene. Such abilities will mean that it will soon be impossible to verify the validity of most “knowledge” without physical investigation. With research being actively conducted on direct neurological input devices, the question of what is real and what is not and what is true and what is false, will soon be in

considerable jeopardy. The fine line between what is “real” and what is “artificial” knowledge will gradually become blurred and the ability of a particular person to determine what he or she really “knows” may eventually cease to exist altogether.