Give three concrete examples of assumptions used by a cognitive system in some aspect of its operation.

Word Count: 413

Our perceptual systems use hypotheses to model reality. Since we rely on the limited information we get from the senses, our cognitive processes must make assumptions to understand what we catch and what we miss. The visual, and language perception systems make these assumptions to fill in missing information, or to make predictions based on context. Gestalt psychology analyzes the visual system’s shortcuts with focus illusions, and filling-in illusions. Language perception also makes assumptions in comprehending jumbled words, or predicting likely words to follow. These assumptions are not only reasonable, but seem necessary given our imperfect sensory systems.

Optical illusions such as Kanizsa images are composed of fragments of shapes that are spatially aligned to form an illusory contour of a greater shape (Kanizsa 1976). The visual system will try to make sense of the missing parts and form an image. This is a reasonable deduction for the visual system to make, since it is important to distinguish partially hidden or obscure objects in the natural world. It is necessary in searching for something particular, or looking out for danger. Another illusion that involves “filling-in” has to do with apparent motion, or the phi phenomenon. When a series of lights blink in sequence, it seems as though it is one light moving in the direction of flashes. (Hugo 1916) This trick is also due to a reasonable assumption based on our understanding of physics in our natural environment. Objects and animals are always moving in and out of sight, whether because of foliage or because of our own blinking.

In learning language, we are accumulating words and rules as we test and update our understanding of the grammar. In this process, we are able to predict what is likely to be said, fill in the blanks, (Kutas 1979) and also correct jumbled words (Rayner 2006). When we see a half of a common phrase, we remember and expect to see the rest. In Kutas’ study, participants who would read “cream and ___” would be satisfied to see “sugar” to fill in the blank, but the brain would react with an event-related brain potential if an unexpected word was read instead. This is because the language system is making assumptions in frequency based knowledge to quickly understand meaning of words and context. This is also seen when we are able to comprehend misheard or mistyped words with relative ease. (Rayner 2006) Understanding these assumptions in our systems can lead to developments such as autocorrect software that use the same principle in learning with context.

References:


