

## Chapter 2

# How Do We Communicate

### ABSTRACT

*This chapter examines our modes of imparting or exchanging facts and opinions. After discussion of the role of electromagnetic waves in our sensory perception, further text describes the ways we and other living beings gain information through the senses, especially when enhanced with technology. Finally, communication between people, with computers, and with other living things is described, especially when animal communication involves senses unavailable to human beings. Emphasis is put on visual communication, some basic notions about semantics, and also visualization techniques and domains. Basic art concepts, elements of design in art, and principles of design in art serve as background information, followed by learning projects.*

### INTRODUCTION

First of all, electromagnetic waves of different wavelengths serve as a medium and thus make a worthwhile contribution to our perception and means of communication. Many kinds of human and animal senses operate as a source of gathering information, and then cognitive abilities support our sensing of numbers and spoken or written language. The following text discusses a notion of semantics as it tells about visual communication through images, art, and signs of different kinds. Visualization with its techniques and domains, along with some other ways of sharing data support these actions. Technologies that enhance our senses and means of communication involve our communication with computers. Humans have been exposed to encounters

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with threats of different kinds from the very beginnings of history. Knowledge about acute abilities of animals enhances our communication, defense, and attack capabilities related to many spheres of life. In some of these cases, communication happens to be unilateral.

## **2.1. MODES OF GATHERING INFORMATION**

### **Wavelengths: Sources for Our Perception**

Describing senses in separate groups may be seen improper because senses are interconnected in many ways. Communication may mean an exchange of sensory information from different kinds of perception. Signals coming from the senses are often combined to convey a clear message. For example, we can receive information about numbers from various senses, looking at patterns, listening to sounds, feeling vibrations, or reading numbers.

In general terms, senses provide input to an organism due to their physiological capacities. Our senses can identify distinctive electromagnetic wavelengths. The electromagnetic spectrum might best characterize our world (Table 1). It includes, from longest wavelength to shortest: radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. We can detect only a small fragment of the electromagnetic spectrum as sounds, heat, or light. A lot of applications and tools serve for light transmission, amplification, signal processing, and other kinds of manipulation. These interacting electric and magnetic currents or fields have distinctive wavelengths, energy, and frequency. Living beings gather information and communicate by responding to electromagnetic waves, cymatics (wave phenomena, vibration of matter that makes sound visible), the pitch response, the senses of vision, smell, touch, and taste, and more.

Signals become stimuli that cause physical or physiological reflex responses, which may be performed without our consciousness or as intentional reactions; they also cause psychological reactions. Our communication may involve many internal and external senses: a sense of temperature, kinesthetic sense that gives us balance, a sense of motion, a sense of acceleration and velocity changes (e.g., pressure caused by the wind), proprioception that allows sensing the relative position and movement of parts of the body, a feel of direction, responsiveness to pheromones, and sensitivity to pain. We are constantly

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