

Bioimage Biomedical imaging has revolutionized medicine and biology by allowing us to see inside the body and to visualize biological structure and function at microscopic levels. Telemedicine can be thought of as the tasks that the clinician carries out (such as observing, consulting, interpreting, and providing opinions), assisted by information and communication technologies, in circumstances where there is distance between the patient and the provider. MR: structural magnetic resonance imaging MRE functional magnetic resonance imaging: SPECT single photon emission computed tomography: PET: positron emission tomography, MRS: magnetic resonance spectroscopy: 3D; the dimensional Recent development in digital technologies is paving the way for ever-increasing use of information technology and data-driven systems in medical and healthcare practices. Images can provide exquisitely detailed information about biological structures; the most powerful imaging modalities provide functional information as well, allowing the recording of molecular or cellular processes, or physical properties (such as elasticity or temperature). Recent developments in sensors, wearable computing, and ubiquitous communications have provided medical experts and users with frameworks for gathering physiological data on a real-time basis over extended periods of time. For example, a simple remotely located base unit can continually collect and locally integrate many incoming signals such as electrocardiography, oxygen saturation, heart rate, noninvasive blood pressure, temperature, and respiration, and provide the information required for detecting any possible emergency cases for the patients. The medical center can then accommodate all complementary and bulky systems, including telemedicine-enabled equipment such as intensive care units, intelligent analyzers, and automatic recorders plus a professionally managed database system supported by a professional service provider. Notes: This is a summary of some of the key features of the imaging modalities discussed in this chapter related to spatial and temporal resolution, type of spatial imaging, and the type of measurements made.