**APPENDIX**

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**LIST OF REFERENCES**

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**GLOSSARY**

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**Accelerometer** Accelerometers are devices that measure [acceleration](http://en.wikipedia.org/wiki/Acceleration), which is the rate of change of the velocity of an object. They measure in meters per second squared (m/s2) or in G-forces (g). Accelerometers are useful for sensing vibrations in systems or for orientation applications.

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**Actigraphy** Actigraphy is a non-invasive method of monitoring human rest/activity cycles. A small actigraph unit, also called an actimetry sensor, is worn for a week or more to measure gross motor activity.

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**Activity tracker** An activity tracker, also known as a fitness tracker, is a device or application for monitoring and tracking fitness-related metrics such as distance walked or run, calorie consumption, and in some cases heartbeat. It is a type of wearable computer.

**Aperture** In optics, an aperture is a hole or an opening through which light travels. More specifically, the aperture and focal length of an optical system determine the cone angle of a bundle of rays that come to a [focus](https://en.wikipedia.org/wiki/Focus_(optics)) in the image plane.

**Atmospheric pressure sensor** An atmospheric sensor or a barometric pressure sensor is a sensor that detects atmospheric pressure.

**Cadence sensor** Cadence sensors allow cyclists to measure energy output in the form of rotations per minute (RPM), akin to a speedometer or pedometer. Many users have attempted to use the pedometer as a way of measuring distance, speed or even effort when cycling, but such a sensor proves inadequate in gauging data during cycling training.

**Chipset** In a computer system, a chipset is a set of electronic components in an integrated circuit known as a "Data Flow Management System" that manages the data flow between the processor, memory and peripherals. It is usually found on the motherboard.

**CMOS** CMOS is the acronym for Complementary Metal Oxide Semiconductor. It is a technology to produce integrated circuits including microprocessors, microcontrollers, memory chips and other digital logic circuits. CMOS has several applications in analog circuits too.

**Digital Micromirror Device** A Digital Micromirror Device (DMD) is an optical micro-electrical-mechanical system (MEMS) that contains an array of highly reflective aluminium micromirrors. It is the core of the trademarked DLP projection technology from Texas Instruments (TI).

**Digitizer** A digitizer is a device that receives analog information, such as sound or light, and records it digitally. Usually, the information is stored in a file on a computing device. This process is called digitization.

**Electrocardiography** Electrocardiography is the process of producing an electrocardiogram (ECG or EKG). An electrocardiogram records the electrical signals in your heart. It's a common and painless test used to quickly detect heart problems and monitor your heart's health.

**Focal length** The focal length of an optical system is a measure of how strongly the system converges or diverges light. For a thin lens in air, the focal length is the distance from the centre of the lens to the principal foci (or focal points) of the lens.

**Galvanic skin response** The galvanic skin response (GSR), also known as Skin Conductance (SC), refers to changes in sweat gland activity, which reflect the intensity of participants’ emotional state – or ‘emotional arousal’. GSR provides an additional source of insight into the level of emotional arousal, to validate self-reports, surveys, or interviews of participants within a study.

**Geomagnetic sensor** Earth’s magnetic field is also known as the geomagnetic field. Geomagnetic sensors are sensors that detect the magnetic field of the Earth, and are commonly referred to as electronic compasses. Geomagnetic sensors can determine direction by detecting the geomagnetic field.

**Global Positioning System** The Global Positioning System (GPS) is a navigation system using satellites, a receiver and algorithms to synchronize location, velocity and time data for air, sea and land travel.

**Graphics Processing Unit** A Graphics Processing Unit (GPU) is a programmable processor specialized for rendering all images on the computer's screen. The graphics processing unit (GPU) is arguably the creative side of a computer’s silicon brain, helping render graphical user interfaces into visually attractive icons and designs rather than reams of black and white lines.

**Gyroscope** A gyroscope is a device that uses Earth's gravity to help determine orientation. Its design consists of a freely-rotating disk called a rotor, mounted onto a spinning axis in the centre of a larger and more stable wheel.

**Kalman filter tracking** Kalman filtering (KF) is widely used to track moving objects, with which we can estimate the velocity and even acceleration of an object with the measurement of its locations. However, the accuracy of KF is dependent on the assumption of linear motion for any object to be tracked.

**Logic board** A logic board (alternatively referred to as a motherboard) is the main printed circuit board in general-purpose computers and other expandable systems. It holds and allows communication between many of the crucial electronic components of a system, such as the central processing unit and memory, and provides connectors for other peripherals.

**Milliamp Hour (mAh)** Milliamp Hour is a unit that measures (electric) power over time. It is commonly used to measure the energy capacity of a battery. In general, the more mAh and the longer the battery capacity or battery life.

**Memory cell** Memory cell is the fundamental building block of computer memory. The memory cell is an electronic circuit that stores one bit of binary information. Its value is maintained/stored until it is changed by the set/reset process. The value in the memory cell can be accessed by reading it.

**MEMS** A MEMS (micro-electromechanical system) is a miniature machine that has both mechanical and electronic components. The physical dimension of a MEMS can range from several millimetres to less than one micrometre, a dimension many times smaller than the width of a human hair.

**Microprocessor chips (MPU)** Microprocessor chips (MPU) are silicon devices that serve as the central processing unit (CPU) in computers. They contain thousands of electronic components and use a collection of machine instructions to perform mathematical operations and move data from one memory location to another.

**Network protocols** Network Protocols are a set of rules governing exchange of information in an easy, reliable and secure way. They incorporate all the processes requirement and constraints of initiating and accomplishing communication between computers, routers, servers and other network enabled devices.

**Operating System (OS)** An Operating System (OS) is an interface between a computer user and computer hardware. An operating system is a software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.

**Optical axis** An optical axis is a line along which there is some degree of rotational symmetry in an optical system such as a camera lens or microscope. The optical axis is an imaginary line that defines the path along which light propagates through the system, up to first approximation.

**Optical diffraction** Diffraction refers to various phenomena that occur when a wave encounters an obstacle or a slit. It is defined as the bending of waves around the corners of an obstacle or through an aperture.

**Parallax** Parallax is a displacement or difference in the apparent position of an object viewed along two different lines of sight, and is measured by the angle or semi-angle of inclination between those two lines.

**Photoplethysmogram (PPG)** Photoplethysmography (PPG) is a simple optical technique used to detect volumetric changes in blood in peripheral circulation. It is a low cost and non-invasive method that makes measurements at the surface of the skin. The technique provides valuable information related to our cardiovascular system.

**Photodetectors** Photodetectors are devices used for the detection of light – in most cases of optical powers. More specifically, photodetectors are usually understood as photon detectors, which utilize the photo-excitation of electric carriers.

**Polysomnography** Polysomnography, a type of sleep study, is a multi-parametric test used in the study of sleep and as a diagnostic tool in sleep medicine. The test result is called a polysomnogram, also abbreviated PSG.

**Proximity sensor** A proximity sensor is a non-contact [sensor](https://www.fierceelectronics.com/sensors/what-a-sensor) that detects the presence of an object when the object enters the sensor’s field. Depending on the type of proximity sensor, sound, light, infrared radiation (IR), or electromagnetic fields may be utilized by the sensor to detect a target.

**Pulse oximetry** Pulse oximetry is a non-invasive and painless test that measures your oxygen saturation level, or the oxygen levels in your blood. It can rapidly detect even small changes in how efficiently oxygen is being carried to the extremities furthest from the heart, including the legs and the arms. The device used for this purpose is called a pulse oximeter.

**Quad-core** A quad-core CPU has four processing cores in a single chip. It has four separate processors which can process instructions at the same time. By including multiple cores in a single CPU, chip manufacturers can generate higher performance

**RGB laser** An RGB source is a light source which emits at the same time red, green and blue light. Such sources are required mainly for colour display applications, for example for large-screen video shows. A wide range of colours can be obtained by mixing different amounts of red, green and blue light (additive colour mixing). The laser capable of performing this task is called an RGB laser.

**Smart wearable** A smart wearable is an electronic device with a micro-controller that is worn close to and/or on the surface of the skin, where it detects, analyses, and transmits the concerning information e.g. body signals such as vital signs, and/or ambient data and which allow in some cases immediate biofeedback to the wearer.

**Touch projector** Touch projector is a technology that allows user to operate the content of a device on any surface at a distance. This allows interaction of humans with the digital world. Touch projectors vary in size and the projection quality depends on resolution and space of display.

**Time of Flight camera** A Time of Flight (ToF) camera uses infrared light (lasers invisible to human eyes) to determine depth information - a bit like how a bat senses it surroundings. The sensor emits a light signal, which hits the subject and returns to the sensor. The time it takes to bounce back is then measured and provides depth-mapping capabilities. This provides a huge advantage over other technologies, as it can accurately measure distances.

**Ultra High Frequency (UHF)** Ultra high frequency (UHF) is the ITU designation for radio frequencies in the range between 300 megahertz (MHz) and 3 gigahertz (GHz). They are used for television broadcasting, cell phones, satellite communication including GPS, personal radio services including Wi-Fi and Bluetooth, walkie-talkies, cordless phones, and numerous other applications.