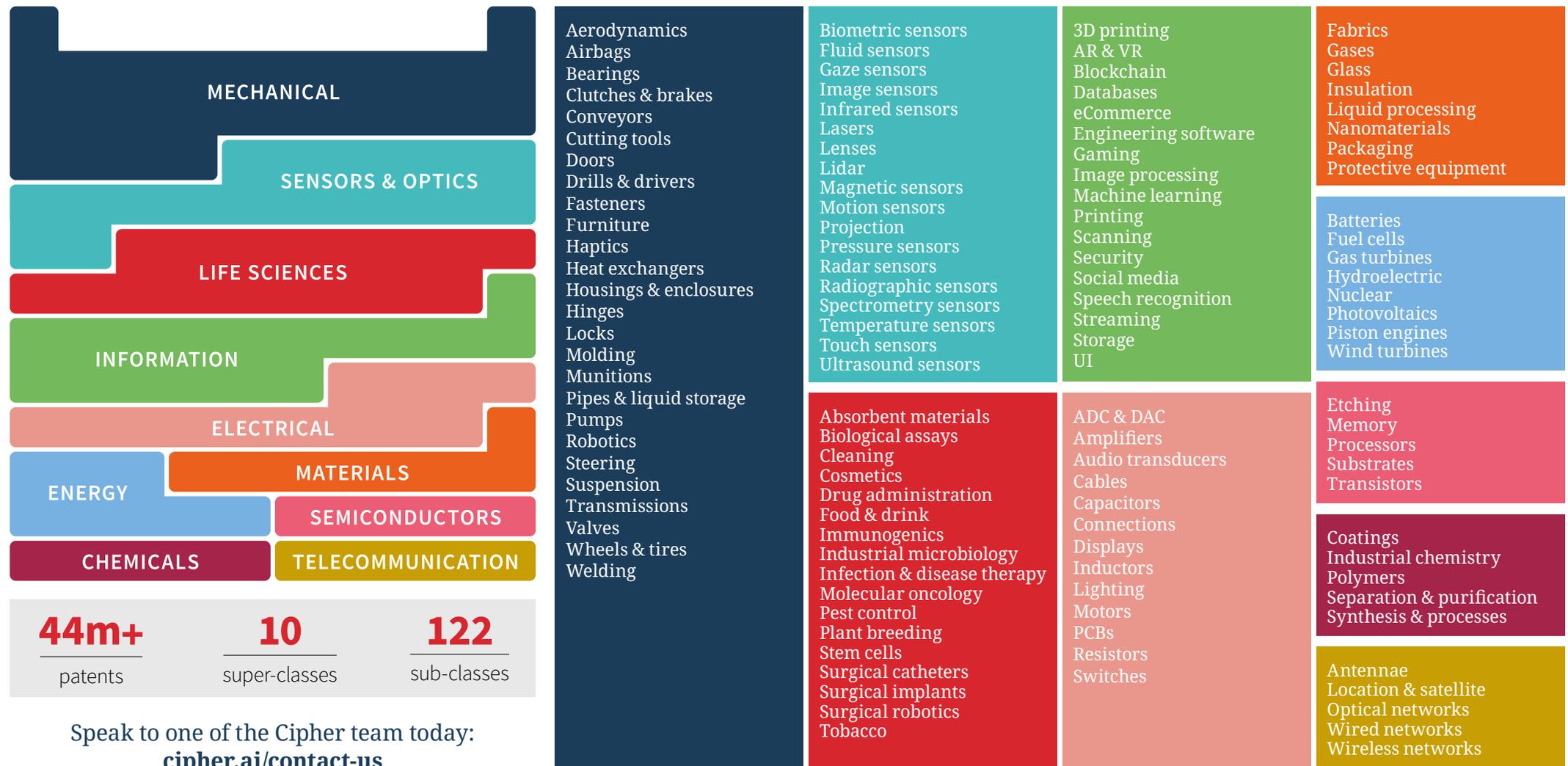


Universal Technology Taxonomy

The first taxonomy to provide consistent and objective analysis of patented technologies owned by all companies globally.



44m+

patents

10

super-classes

122

sub-classes

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Superclass | MECHANICAL

Subclass	Scope
Aerodynamics	Technologies and processes of moving air and the interaction between the air and solid bodies moving through it. Excludes Munition and Wind Turbine related technologies which are captured by their own classes, but does include hydromatic technologies.
Airbags	Inflatable safety devices providing cushioning by automatically inflating in the event of collision.
Bearings	Mechanical assemblies consisting of rolling elements, usually with inner and outer races used for rotating or linear shaft applications.
Clutches & brakes	Devices and apparatus for engaging and disengaging power transmissions by mechanically connecting and disconnecting two rotating shafts. Included are devices and apparatus for slowing or stopping a vehicle or other moving mechanism by the absorption or transfer of the energy of momentum.
Conveyors	Mechanical handling equipment which moves goods and materials from one location to another. Includes screw (auger), aero-mechanical, bucket elevators, pneumatic, belt, chain and cable conveyors as well as elevators and lifts.
Cutting tools	Tools employed to remove material from a work piece by means of shear deformation. This class includes grinding, milling and cutting tools.
Doors	Movable, usually solid, barriers for opening and closing an entranceway, cupboard, cabinet or other spaces and turning on hinges or sliding in grooves.
Drills & drivers	Captures all devices, methods and apparatus used to create holes, usually by revolving or hammering a drill bit into the hole.
Fasteners	Mechanical devices that join or affix two or more objects together, to create non-permanent joints that can be removed or dismantled without damaging the joining components.
Furniture	Movable objects intended to support various human activities such as seating tables, beds and also to hold objects at a convenient height for work. This class also includes medical furniture.
Haptics	Technologies which stimulate the senses of touch and motion, especially used in remote operation or computer simulation environments to reproduce the sensations that would be experienced by a user interacting directly with physical objects.
Heat exchangers	Energy transfer devices which facilitate the transmission of heat from one medium to another, including liquids, gases or metals. Includes all HVAC (heating, ventilation and air conditioning) technologies, heat pumps (which transfer thermal energy from a cooler to warmer areas using the refrigeration principle), refrigeration processes and heat sinks.
Housings & enclosures	A broad class capturing all mechanical enclosures and housings across a wide range of technologies. Excluded are pet, livestock, child and building enclosures.

Subclass	Scope
Hinges	Mechanical bearings which connect two solid objects and typically allow only a limited angle of rotation, usually comprising flexible material or moving components.
Locks	Devices for securing doors, gates, lids, drawers and other devices in position, usually when closed and using bolts or system of bolts propelled and withdrawn by a mechanism operated by a key, dial, or other apparatus.
Molding	Fixed frame or hollow cavity receptacles into which malleable raw materials are poured to create a particular shape or structure. Raw materials may include liquid plastic, metal, ceramic or glass.
Munitions	Materials used in war and other military or security situations, which include weapons and ammunition. This class also captures all unmanned aerial vehicle (UAV) technologies.
Pipes & liquid storage	Hollow-bodied structures designed for the conveyance and storage of liquids, gases or finely divided solids. Includes liquid storage and pipes employed in structural applications.
Pumps	Mechanical devices used to force a fluid (liquid or a gas) to move inside a pipeline or hose, or to produce pressure by the creation of a suction (partial vacuum) which causes a fluid to rise to a higher altitude. This class also includes compressors.
Robotics	Engineering or operation of machines with the ability to autonomously or semi-autonomously perform physical tasks on behalf of a human.
Steering	Structures of mechanical linkages and other components that direct vehicles to follow a desired path.
Suspension	Systems of components which allow a machine to move smoothly across an uneven surface with reduced shock.
Transmissions	Devices interposed between a source of power and a specific application for the purpose of adapting one to the other, often functioning as rotary speed changers.
Valves	Mechanical devices for controlling the flow of fluids (liquids, gases or slurries) in a pipe or other enclosure and controlled by means of movable elements that open, shut, or partially obstruct an opening in a passageway.
Wheels & tires	Circular objects that revolve on an axle and fixed below a vehicle or other object to enable it to move easily over ground. Included are ring-shaped components which surround the wheel, constructed from a rubber compound or other material and may be pneumatically inflated structures.
Welding	Fabrication processes whereby two or more parts are fused together by means of heat, pressure or both forming a join as the parts cool.

Superclass | SENSORS & OPTICS

Subclass	Scope
Biometric sensors	Sensors devised to collect measurable biological characteristics (biometric signals) from a human being, which can be used in conjunction with biometric recognition algorithms to perform automated person identification. Includes gait, facial and iris recognition sensors.
Fluid sensors	Devices to monitor Liquids and gases. This class also includes flow meters.
Gaze sensors	Sensor technology that enables a computer or other device to detect where an individual is looking and may detect the presence, attention and focus of the user.
Image sensors	Electronic devices that convert optical images into electronic signals. Includes all visible light sensor technologies.
Infrared sensors	Radiation-sensitive optoelectronic devices with a spectral sensitivity in the infrared wavelength range. This class captures all infrared sensors together with motion referenced passive infrared sensors (PIRs) and other infrared motion sensors. It excludes fluid, spectrometry and temperature sensors which have their own individual classes.
Lasers	Devices that emit a beam of coherent light through an optical amplification process. Includes gas, fiber, solid state, dye, diode and excimer lasers. Excludes laser sintering which is captured by Information/3D printing, laser scanning captured by Information/Scanning, laser projection captured by Information/Projection and laser welding which is captured by Mechanical/Welding.
Lenses	Structures of glass or other transparent material with curved sides or modified surfaces for concentrating or dispersing light rays.
Lidar	Optical technology used to sense the shape, motion and makeup of objects in the environment by pulsing laser signals using all light ranges (ultraviolet, visible, infrared) and amplifying the light that is scattered back through an optical telescope and photomultiplier tube.
Magnetic sensors	Sensors which detect the magnitude of magnetism and geomagnetism generated by the proximity of a magnet or current. This class Includes magnetic field sensors, Hall effect sensors, magnetometers, magnetic position and distance sensors, magnetic proximity switches, magnetic force and torque sensors, magnetic flowmeters and current sensors.
Motion sensors	Devices that can detect physical movement on an object or within an environment. This class includes inertia sensors, accelerometers and gyroscopes. It excludes motion referenced passive infrared sensors (PIRs) together with all infrared motion sensors and magnetic sensors which are covered by their own infrared and magnetic sensor classes.

Subclass	Scope
Projection	Devices, processes or apparatus which recreates an image onto a surface by directing rays of light.
Pressure sensors	Devices consisting of a pressure sensitive element to determine the actual pressure applied to the sensor together with components to convert this information into an output signal. This class includes piezoelectric pressure sensor devices but excludes accelerometers, gyroscopes and inertia devices which are captured by motion sensors.
Radar sensors	Sensors which convert microwave echo signals into electrical signals and interpreting the position, shape and motion characteristics of an object.
Radiographic sensors	Devices used to measure the flux, spatial distribution, spectrum, and/or other properties of x-rays.
Spectrometry sensors	Sensors used to measure light intensity in the ultraviolet (UV), visible (VIS), near-infrared (NIR) and infrared (IR) range of the electromagnetic spectrum.
Temperature sensors	Sensors which measure the amount of heat energy generated by an object or system, detecting any physical change to that temperature and producing either an analog or digital output. Includes heat flow sensors.
Touch sensors	An element of a touch screen or other device which takes an input from a display screen and translates it into a suitable output action, layered on top of electronic visual displays and allow direct interaction with the information displayed. Includes capacitive touch sensors and resistive touch sensors but excludes piezoelectric sensors which are covered by their own class (Pressure sensors). It may also include display devices where the functionality is linked to touch sensors.
Ultrasound sensors	Sensors and devices operating at frequencies around 20 kHz, used to detect objects and measure distances with applications in ultrasound imaging or sonography for medicine and the non-destructive testing of products and structures to detect invisible flaws. Includes Ultrasound Identification (USID), Real-Time Locating Systems (RTLs) and Indoor Positioning System (IPS) technology, used to automatically track and identify the location of objects in real time.

Subclass	Scope
Absorbent materials	Materials or a mixture of materials which are insoluble in nature and are used to absorb liquids by soaking up and holding them within the material.
Biological assays	Includes a wide range of assays important in biological sciences such as polymerase chain reaction (PCR), enzyme-linked immunosorbent assay (ELISA) and western blot. No specific applications or use cases are excluded.
Cleaning	Removal of foreign matter from objects and materials. This class includes all technologies relevant to cleaning processes. It excludes all robotic cleaning technologies which are captured by the robotics class.
Cosmetics	Substances or mixtures intended to be placed in contact with the various external parts of the human body with the intention to clean, perfume or change appearance, alter body odours, protect or keep in good condition.
Drug administration	Methods and devices for administering medicament, fluids, drugs or similar. These include syringes, infusion pumps and injection devices.
Food & drink	Proteins, carbohydrates, fats and other nutrients used in the body of an organism to sustain growth and vital processes and to furnish energy. Includes liquids that can be swallowed as refreshment or nourishment.
Immunogenics	Immunogenic compositions and regimens (e.g. vaccines and anti-inflammatory immunogenics).
Industrial microbiology	Includes microorganisms (e.g. yeast or bacteria) for use in the production of compounds or materials, or other industrial purposes as well as associated inventions such as culture mediums.
Infection & disease therapy	Includes any solutions for treating, diagnosing or in other ways managing any type of infection or disease.
Molecular oncology	Treatment, diagnosis and therapies relating to cancer. Imaging based diagnosis (e.g. CT scan, X-ray) is not included.

Subclass	Scope
Pest control	Pesticides and other crop/plant pest control products which prevents or treat infection by fungi, bacteria, nematode, viral or other types of infections on crops or plants. Includes both compositions as well as associated equipment.
Plant breeding	The purposeful manipulation of plant species in order to create desired genotypes and phenotypes for specific purposes. This manipulation involves either controlled pollination, genetic engineering, or both, followed by artificial selection of progeny. Plant breeding often, but not always, leads to plant domestication.
Stem cells	Technologies relating to undifferentiated or partially differentiated cells.
Surgical catheters	Thin tubes made from medical grade materials and serve a broad range of functions, which can be inserted in the body to treat diseases or perform surgical procedures. Includes cardiovascular, urological, gastrointestinal, neurovascular and ophthalmic applications.
Surgical implants	Implants and implantable devices, including implantable prosthetics, dental implants, implantable sensors, neurostimulators and implantable hearing aids, as well as other types of implants.
Surgical robotics	Types of surgical procedures that are performed using robotic systems to overcome the limitations of pre-existing minimally-invasive surgical procedures and to enhance the capabilities of surgeons performing open surgery.
Tobacco	All technologies relating to the manufacture of products and processes in the tobacco industry, including reduced-risk tobacco products.

Superclass | INFORMATION

Subclass	Scope
3D printing	Additive processes for 3D printed objects. Includes Sintering (the process of fusing particles) and DMLS (Direct Metal Laser Sintering) and SLM (Selective Laser Melting).
AR & VR	Computer-generated simulations in which a person can interact within an artificial three-dimensional environment or Virtual Reality (VR) using electronic devices, such as special goggles with a screen or gloves fitted with sensors. Included are enhanced real world environments or Augmented Reality (AR), with graphical overlays and which do not create a fully immersive experience.
Blockchain	Shared, immutable ledgers facilitating the process of recording transactions and tracking assets in a business network.
Databases	Database technologies and database management systems pertaining to collections of structured information or data which are typically stored electronically on computer systems.
eCommerce	Buying and selling of goods or services using the internet and the transfer of money and data to execute these transactions.
Engineering software	Purpose-built computer code to design and document a product. This class includes electronic design automation (EDA, ECAD) for semiconductor design, Logic simulation, In-circuit emulation (ICE), Software compilers and Computational fluid dynamics (CFD). Excludes printed circuit board design software which is captured by the PCB class.
Gaming	Games played on computers and laptops, handheld devices, game consoles, phones and tablets. Also includes gaming controllers, card, board, gambling games and all toys.
Image processing	Method and operations performed on a visual image, by enhancing the image or distilling information from it.
Machine learning	The use of data and algorithms to imitate the way that humans learn, by gradually improving its accuracy.
Printing	Apparatus and processes to transfer text and images onto a paper or other similar mediums by utilising dedicated hardware devices.

Subclass	Scope
Scanning	Optical processes performed by dedicated hardware to capture images, printed text, handwriting or an object as a digital facsimile of the original.
Security	Processes for safeguarding and defending computers, servers, mobile devices, electronic systems, networks and data.
Social media	Computer-based technology that facilitates the sharing of ideas, thoughts, and information through the building of virtual networks and communities.
Speech recognition	Systems and methods which enable a program to process human voice or speech into a written format or machine commands.
Streaming	Processes for delivering media content in a continuous transfer of compressed data over the internet for immediate display.
Storage	Magnetic, optical or mechanical media devices and systems that record and preserve digital information for ongoing or future operations. This class includes both local and remote storage locations but excludes database technologies and all forms of solid state memory storage which are captured by their own classes.
UI	User interfaces (UI) where a human user interacts with a computer, website or application.

Superclass | ELECTRICAL

Subclass	Scope
ADC & DAC	Analog-to-digital converters (ADC), taking an analog wave as an input and converting it to a digitally represented output form and digital-to-analog converters (DAC) performing the reverse, converting a digital representation into an analog form. Included are Flash (direct conversion), Pipeline, Delta-sigma and Successive approximation register (SAR) devices.
Amplifiers	Electronic devices which increase the voltage, current or power of a signal as employed in wireless communications, broadcasting and in audio equipment of all kinds. This class excludes operation amplifiers (op-amps) and integrated circuit amplifiers.
Audio transducers	Includes both input sensors which convert sound into an electrical signal (e.g. microphones) and output actuators that convert the electrical signals back into sound (e.g. loudspeakers). This class captures hearing aids, earphones & buds (both wired and wireless), headsets & headphones, loudspeakers and microphones.
Cables	Core of metal wire offering good conductivity such as copper or aluminium, along with other material layers including insulation, tapes, screens, armouring for mechanical protection, and sheathing.
Capacitors	Passive two-terminal electrical components used to store energy electrostatically in an electric field. Also includes super capacitors (SC) or ultra capacitors, which have a capacitance value much higher than other capacitors but with lower voltage limits. These bridge the gap between electrolytic capacitors and rechargeable batteries.
Connections	Electromechanical devices used to join electrical conductors and create an electrical circuit. Excludes fuses which are captured by switches.
Displays	Display devices for the transitory presentation of images, text or video transmitted electronically. Not included are any touch sensor devices which are captured by their own class.

Subclass	Scope
Inductors	Passive electrical components which oppose sudden changes in current, also known as coils or chokes, used for choking, blocking, attenuating, or filtering high frequency noise in electrical circuits, storing and transferring energy in power converters, creating tuned oscillators and impedance matching. Also included are transformers made of two or more inductors.
Lighting	Devices that produce visible light from electric power. Includes incandescent, halogen, fluorescent, LED, neon, high intensity discharge (HID), sodium and carbon arc devices.
Motors	Devices which convert electricity into mechanical energy using the principles of electromagnetism.
PCBs	Electronic circuits used in devices to provide mechanical support and a pathway for electronic components, generally constructed using sheets of non-conductive material, such as fibreglass or plastic, onto which the copper connecting circuitry is attached. Includes PCB design software, PCB process and manufacturing methods.
Resistors	Components employed within a circuit specifically designed to restrict the flow of electric current when a potential difference is manifest across it. Included are all forms of resistors and associated technologies together with their manufacture.
Switches	Devices used to interrupt the flow of electrons in a circuit. This class also includes relays and fuses.

Superclass | MATERIALS

Subclass	Scope
Fabrics	Materials made through weaving, knitting, spreading, felting, stitching, crocheting or bonding that may be used in the production of further products, such as clothing and upholstery.
Gases	Suspensions of matter that conform to the shape of a container in which they are held and acquire a uniform density within the container, even in the presence of gravity and regardless of the amount of substance in the container. Includes all associated production, processes and treatments.
Glass	Materials made by fusing sand with soda and lime and cooling rapidly
Insulation	Materials or substances used to insulate from either thermal or acoustic conduction. This class excludes pipes and electrical cables.
Liquid processing	Treatments, processes and processing of all forms of liquids and fluids. It excludes gases, their associated processes and treatments which are captured by the gases class.
Nanomaterials	Materials of which a single unit is sized (in at least one dimension) between 1 and 100 nm. They occur in nature, may be an incidental product of human activity or deliberately manufactured and engineered to exhibit novel characteristics such as increased strength, chemical reactivity or conductivity compared to the same material without nanoscale features.
Packaging	Products made of any materials to be used for the containment, protection, handling, delivery and presentation of goods. This class includes luggage, baggage and suitcases.
Protective equipment	Protective clothing, helmets, goggles, or other garments or equipment designed to protect from injury or infection. These hazards include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter. Also includes recent coronavirus PPE technologies.

Superclass | ENERGY

Subclass	Scope
Batteries	Energy sources consisting of one or more electrochemical cells, which transform their chemical energy into electrical energy. Includes all associated battery technologies and manufacturing.
Fuel cells	Devices which create electricity by creating a chemical reaction between a fuel and an oxidant. Fuels include hydrogen, methane, propane, methanol, diesel fuel or gasoline.
Gas turbines	Internal combustion engines consisting of an air compressor, combustion chamber, and turbine wheel that is turned by the expanding products of combustion.
Hydroelectric	Technologies harnessing the kinetic energy of flowing water where turbines and generators convert this energy into electricity.
Nuclear	Technologies using nuclear fission to split atoms, releasing nuclear energy to create electricity.
Photovoltaics	Materials and devices manufactured from semiconductors which convert sunlight into electrical energy. Includes photodiodes, photodetectors and light sensors.
Piston engines	Engines constructed from one or more cylinders, in which close fitting pistons can move up and down and deriving their power from the burning of a compressed air-fuel mixture in each of the cylinders in succession.
Wind turbines	Power generating devices that are driven by the kinetic energy of the wind. Includes Horizontal axis wind turbines (HAWTs) and Vertical axis wind turbines (VAWTs).

Superclass | SEMICONDUCTORS

Subclass	Scope
Etching	Microfabrication process to chemically remove layers from the surface of a wafer during manufacturing with wafers undergoing many etching steps before completion. Includes relevant lithography technologies.
Memory	All types of solid state memory employed in main and secondary applications, including flash and SSD (solid state disk memory). Excludes all mechanic methods of data storage as well as magnetic and optical media.
Processors	Logical circuits on a chip which respond and process basic instructions to drive a particular computer or computing function including fetching, decoding, executing, and writing back operations of an instruction.
Substrates	Solid, usually planar substance or wafer onto which a layer of another substance is applied and to which that second substance adheres. Fabricated from silicon, silicon dioxide, aluminium oxide, sapphire, germanium, gallium arsenide (GaAs), silicon and germanium alloy or indium phosphide (InP) and serve as the foundation upon which electronic devices such as transistors, diodes, and especially integrated circuits (ICs) are deposited. This class excludes etching which has its own class but includes relevant lithography technologies.
Transistors	Three-terminal semiconductor electronic devices used as switches or amplifiers. Also included are TFT transistor arrays (used in displays) and spin transistors.

Superclass | CHEMICALS

Subclass	Scope
Coatings	Mixtures of film-forming materials with pigments, solvents and other additives, which when applied to a surface and cured or dried, yields a thin film that is functional and often decorative. Includes paints, platings, drying oils and varnishes, synthetic clear coatings, and other products whose primary function is to protect the surface of an object from the environment.
Industrial chemistry	Design of industrial chemistry equipment and reactors. Processing of ores and minerals for metals and rare earth elements. Cement, concrete, and asphalt production. Manufacture of fertilisers and papers. Electrochemical processes such as waste treatment. Hydrocarbon processing excluded.
Polymers	Substances which have a molecular structure built up mostly or completely from a large number of similar units bonded together. Includes many synthetic organic materials used as plastics and resins.
Separation & purification	Equipment and methods for separation together with purification of mixtures. Includes distillation, chromatography, molecular sieves, and ion exchange.
Synthesis & processes	Methods and processes for chemical reactions and synthesis. Descriptions of the chemical properties of chemicals. No specific application excluded but focussed on the chemical rather than a specific application. Industrial processes are captured by their own class.

Superclass | TELECOMMUNICATION

Subclass	Scope
Antennae	Devices and apparatus made of conductive metal that send and/or receive electromagnetic radio waves.
Location & satellite	Technologies related to satellite communication, geocentric orbit type satellites, remote sensing satellites and global positioning satellite (GPSS) and terrestrial based location technologies.
Optical networks	Data communication networks built with optical fiber technology utilising optical fiber cables as the primary communication medium.
Wired networks	Networks employing physical connections to devices including all associated infrastructure.
Wireless networks	Networks employing radio systems to connect devices to other devices and networks, including all associated infrastructure. All types of wireless networking are captured including wireless personal area networks (WPANs), wireless local area networks (WLAN), mobile ad hoc networks (MANET), wireless metropolitan area networks (MAN) including WiMAX, wireless wide area networks (WAN or WWAN), cellular or mobile networks and global area networks. It excludes all satellite communications which are captured by the location & satellite class.

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Universal Technology Taxonomy

Introducing the world's first Universal Technology Taxonomy.

This article sheds light on why CIPHER launched the world's first universal technology to classify patents and example analysis using UTT.

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