Technology driven Interactions

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Interaction design

Interaction designers strive to create useful and usable products and services. Following the fundamental tenets of user-centered design, the practice of interaction design is grounded in an understanding of real users—their goals, tasks, experiences, needs, and wants. Approaching design from a user-centered perspective, while endeavoring to balance users' needs with business goals and technological capabilities, interaction designers provide solutions to complex design challenges, and define new and evolving interactive products and services.

Interaction Design Association (IxDA)

Wearable Technologies

Wearable technology, **fashionable technology**, **wearable devices**, **tech togs**, or **fashion electronics** are clothing and accessories incorporating computer and advanced electronic technologies. The designs often incorporate practical functions and features

Wearable Technologies
E-textiles

E-textiles, also known as electronic textiles, smart textiles, or smart fabrics, are fabrics that enable digitalcomponents (including small computers), and electronics to be embedded in them. Many intelligent clothing, smart clothing, wearable technology, and wearable computing projects involve the use of e-textiles.
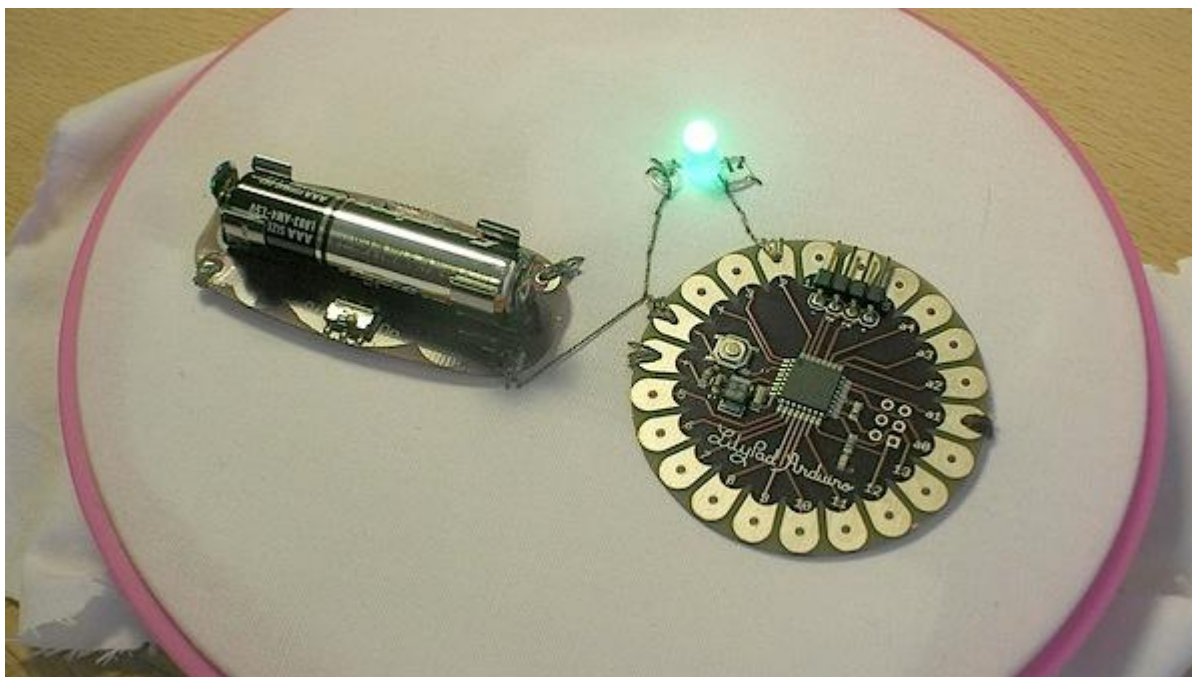
Wearable Technologies
E-textiles

Wearable Technologies
E-textiles

Wearable Technologies
Activity trackers

An activity 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 and quality of sleep. The term is now primarily used for dedicated electronic monitoring devices that are synced, in many cases wirelessly, to a computer or smartphone for long-term data tracking

Wearable Technologies
Activity trackers

Wearable Technologies Smartwatch

Wearable Technologies
Smartwatch

Wearable Technologies
SmartGlasses

Wearable Technologies
SmartGlasses
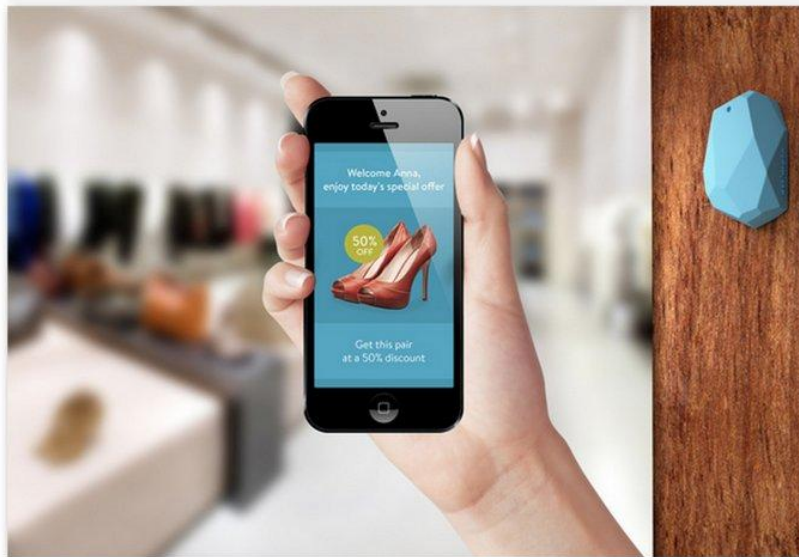
Wearable Technologies
Smart Tag

Technological Tools

- Environments, frameworks

- Proprietary

- Evaluation on Technological penetration of the tool

- Data Gathering

- Outcome evaluation

Augmented Reality

iBeacon

iBeacon

IoT

The Internet of Things (IoT) is the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure. Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a Smart Grid.

IoT

Libelium Smart World

Air Pollution
Control of CO$_2$ emissions of factories, pollution emitted by cars and toxic gases generated in farms.

Forest Fire Detection
Monitoring of combustion gases and preemptive fire conditions to define alert zones.

Wine Quality Enhancing
Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

Offspring Care
Control of growing conditions of the offspring in animal farms to ensure its survival and health.

Sportsmen Care
Vital signs monitoring in high performance centers and fields.

Structural Health
Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

Smartphones Detection
Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

Perimeter Access Control
Access control to restricted areas and detection of people in non-authorized areas.

Radiation Levels
Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

Electromagnetic Levels
Measurement of the energy radiated by cell stations and and WiFi routers.

Traffic Congestion
Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

Water Quality
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.

Golf Courses
Selective irrigation in dry zones to reduce the water resources required in the green.

Waste Management
Detection of rubbish levels in containers to optimize the trash collection routes.

Smart Parking
Monitoring of parking spaces availability in the city.

Smart Roads
Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intelligent Shopping
Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Noise Urban Maps
Sound monitoring in bar areas and centric zones in real time.

Water Leakages
Detection of liquid presence outside tanks and pressure variations along pipes.

Vehicle Auto-diagnosis
Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

Item Location
Search of individual items in big surfaces like warehouses or harbours.

libelium
www.libelium.com

SMART

- Collecting DATAs

- Analyzing DATAs

- Interconnection
- Experience Delivery

Interaction Design: simple facts

- It's all about creating experiences

- Designer is the first user

- Goal Driven

Interaction Design and Technology

- The goal is designing a meaningful experience

- Technology is a tool in a context

- Abandon the general Design Principles

Interaction Design: principles

- Simplicity:

The design should make simple, common tasks easy, communicating clearly and simply in the user's own language

Interaction Design: principles

Interaction Design: principles

- Visibility:

The design should make all needed options and materials for a given task visible without distracting the user with extraneous or redundant information

Interaction Design: principles

Interaction Design: principles

- Feedback

The design should keep users informed of actions or interpretations, changes of state or condition, and errors or exceptions that are relevant and of interest to the user through clear, concise, and unambiguous language familiar to users.

Interaction Design: principles

Interaction Design: principles

- Tolerance

The design should be flexible and tolerant, reducing the cost of mistakes and misuse by allowing undoing and redoing, while also preventing errors wherever possible by tolerating varied inputs and sequences and by interpreting all reasonable actions.

Interaction Design: principles
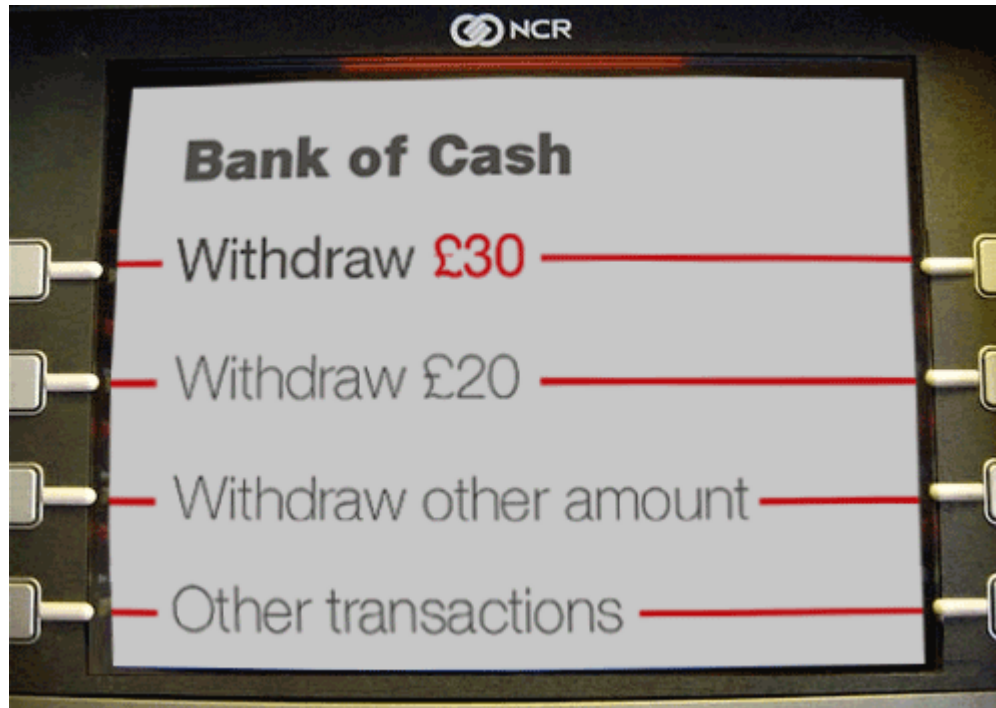
Interaction Design: principles

- Reuse

The design should reuse internal and external components and behaviors, maintaining consistency with purpose rather than merely arbitrary consistency, thus reducing the need for users to rethink and remember.

Interaction Design: principles
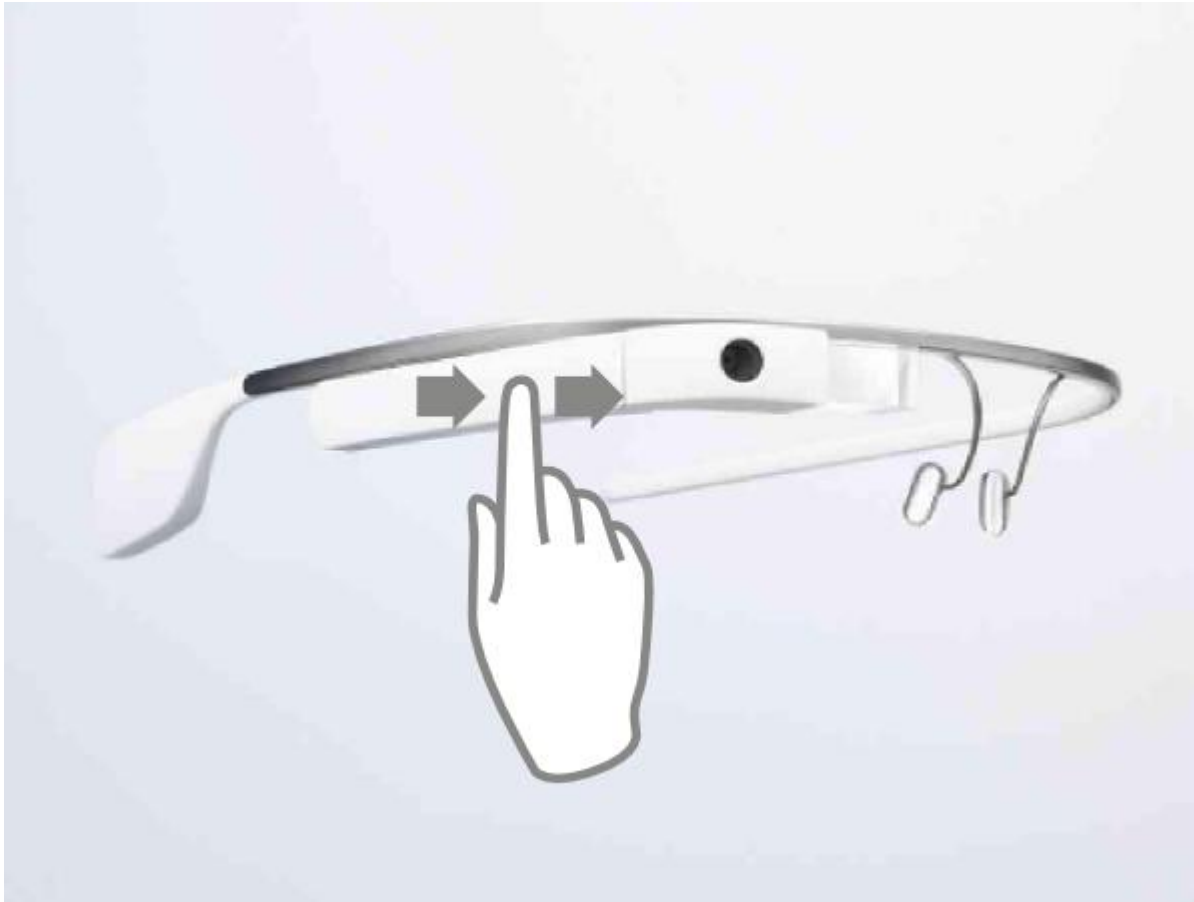
Physical Computing

Physical computing uses electronics to prototype new materials for designers and artists

It involves the design of interactive objects that can communicate with humans using sensors and actuators controlled by a behaviour implemented as software running inside a microcontroller.

Massimo Banzi

Physical Computing

- Interactions in physical computing are made possible mainly by sensors

- They translate human natural body movements and environmental changes into machine readable values

- Using appropriate libraries, softwares and tools they can be translated into feedbacks and interaction triggers

- Feedbacks can also be delivered trough actuators

- In the physical computing domain interactions are meant to be analog

Physical Computing
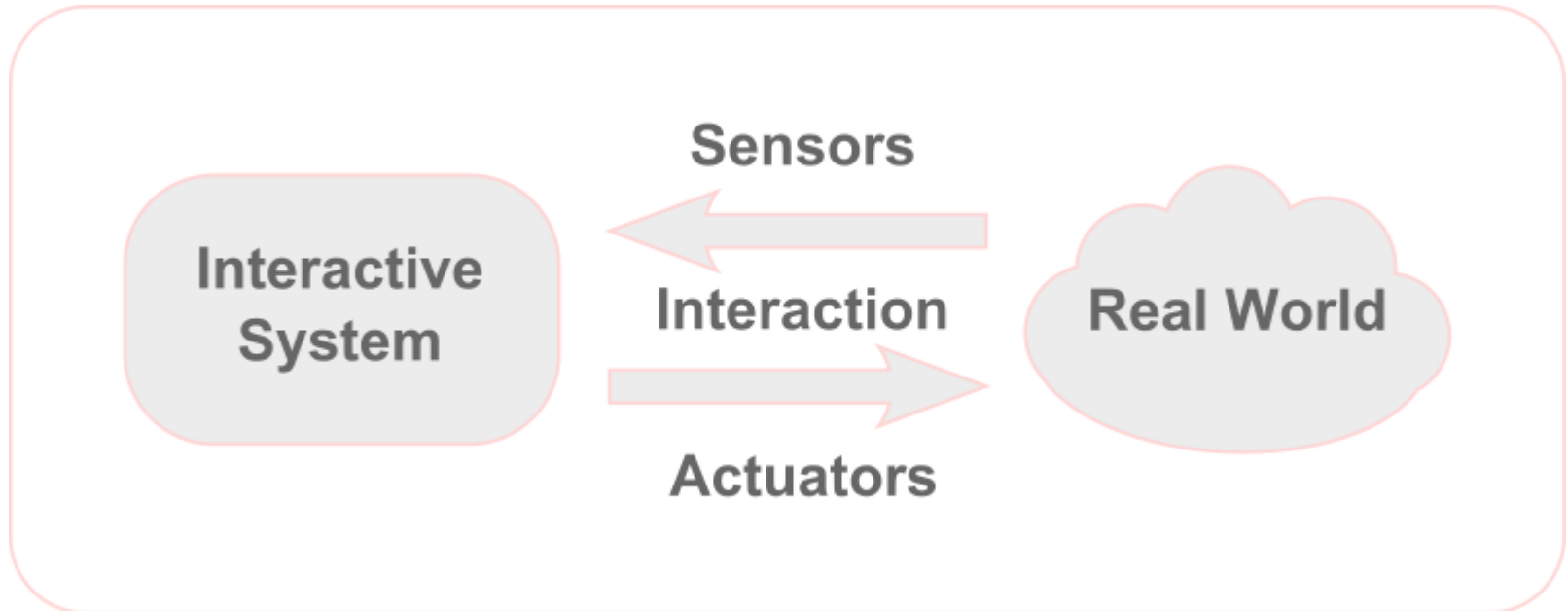
Sensors

- Light Dependant Resistor
- Detects Lightning conditions
- Analog

Sensors

- Button
- Detects pressure
- Digital

Sensors

- Ultrasonic PING
- Detects distance of obstacles and objects
- Analog

Sensors

- Potentiometer
- Used to Trim
- Analog

Sensors
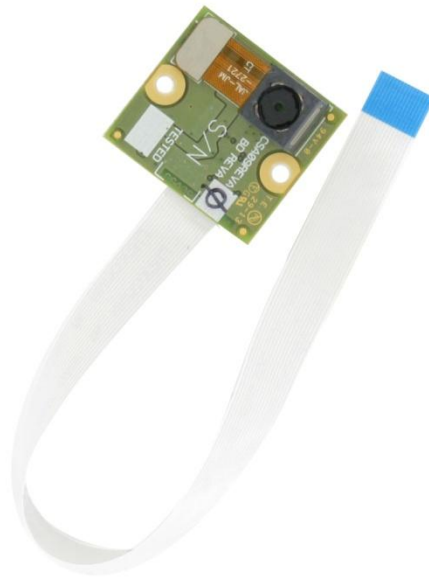
- Camera
- Can Record Video and still images
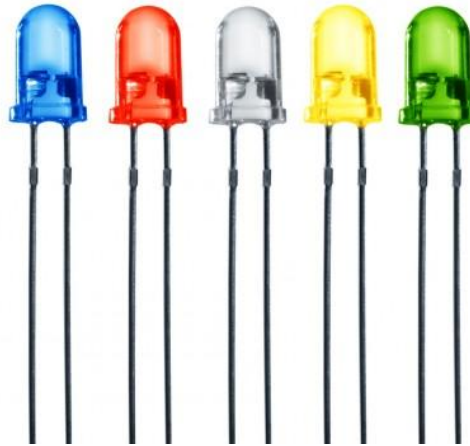- Analog - Digital

Sensors

- Air Quality Sensor
- Detects air pollution and balance
- Analog - Digital

Actuators \ Feedback Devices

- Actuators and Feedback Devices in physical design are the actual medium in which the effect of the interaction consists

- They directly modify the physical and tangible reality

- They are directly responsible on the Interaction quality
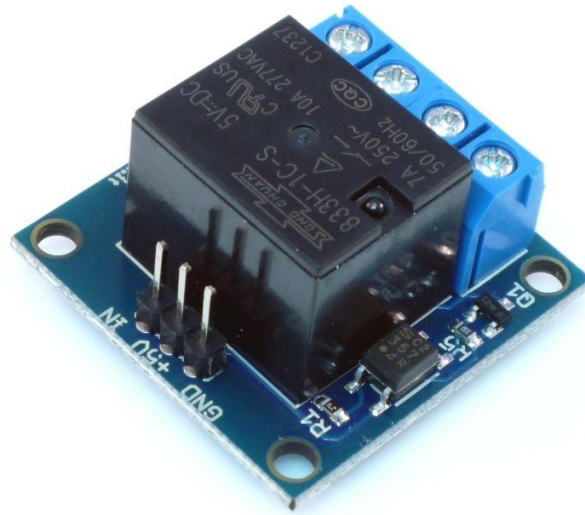
Actuators \ Feedback Devices

- LEDs
- Turn on \ Off – Change color if RGBY
- Analog - Digital

Actuators \ Feedback Devices

- Servo-motor
- Change Phyisical Position
- Analog

Actuators \ Feedback Devices

- Relais
- Open \ Closes a circuit
- Digital

Actuators \ Feedback Devices

- Loudspeakers
- Emits Sounds
- Analog