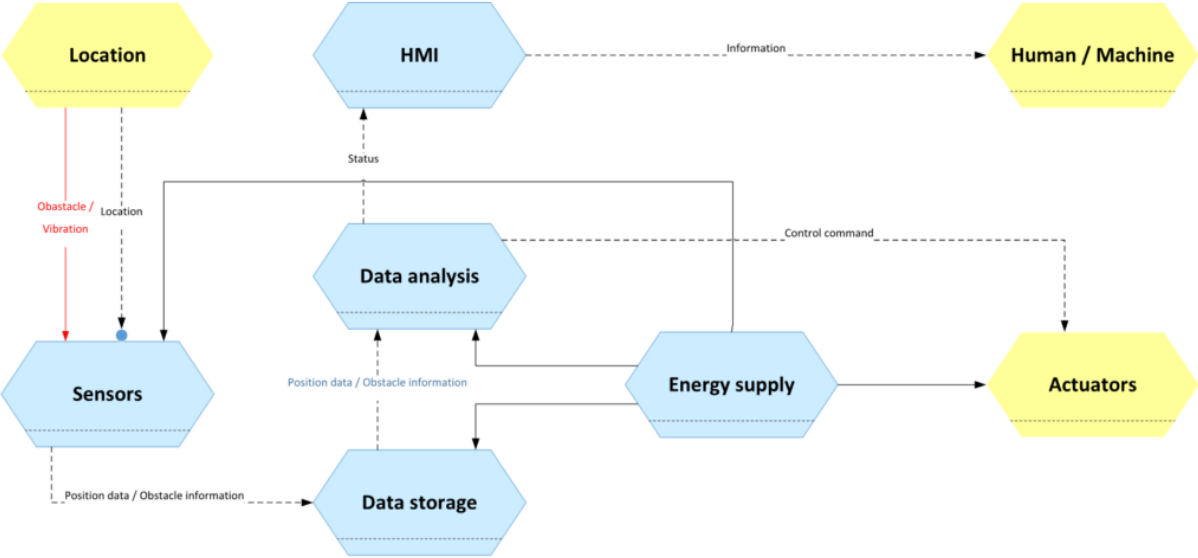# Area Based Position Determination

For various applications the smart product must be able to detect objects and persons in a room, e.g. to avoid collisions. For this purpose, a system for position determination is required.
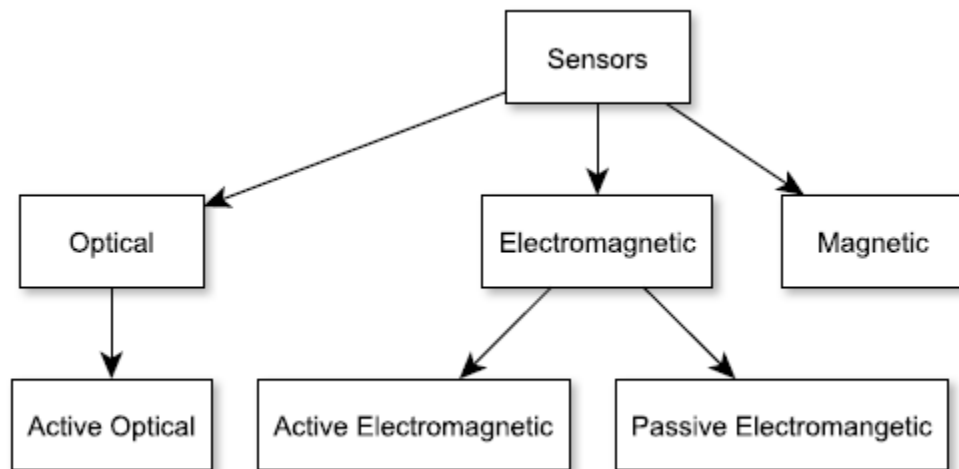
VALUE STRATEGIES

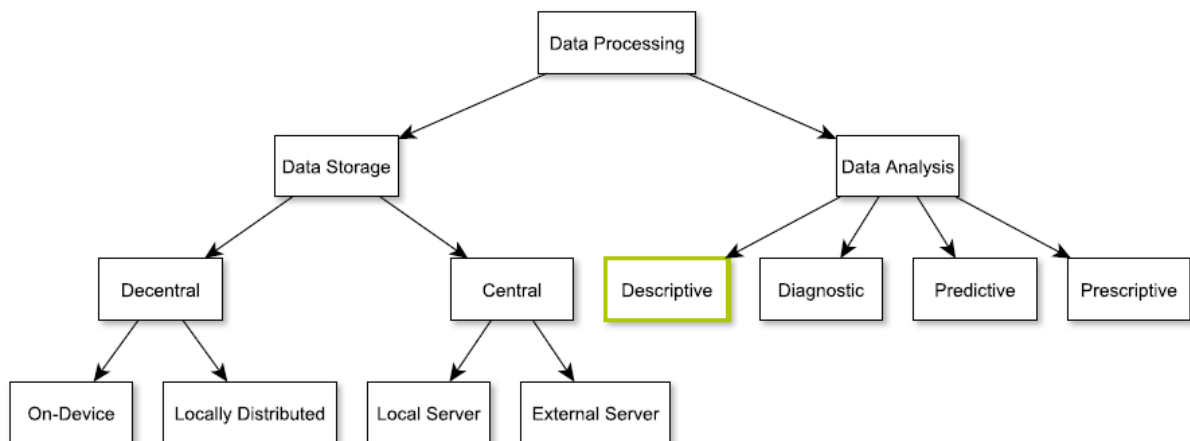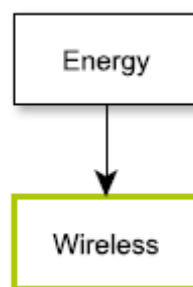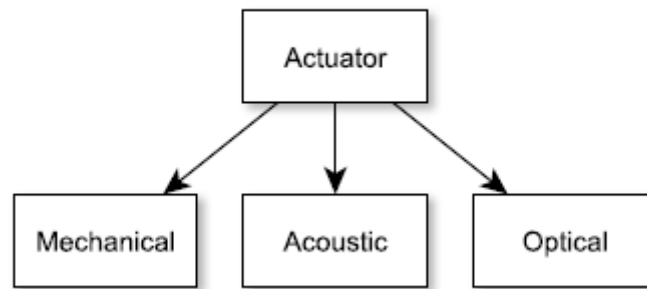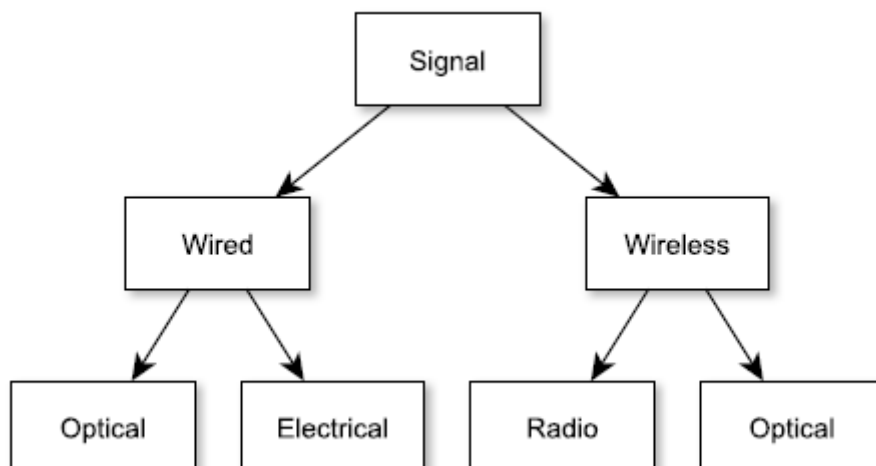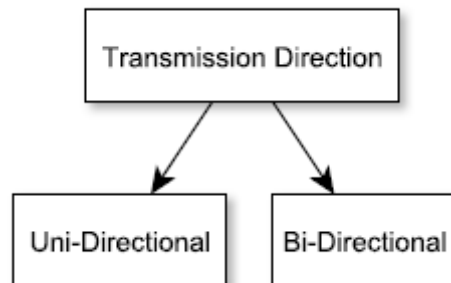| Connectivity	Adaptivity
Autonomy	User-Friendliness
Extensibility	Robustness
Multifunctionality	Foresightedness

EFFECTS

TECHNOLOGY TREES

Sensors

Data Processing

Energy Supply

Actuator

```
              ┌──────────┐
              │ Actuator │
              └──────────┘
            ↙        ↓        ↘
  ┌────────────┐ ┌──────────┐ ┌─────────┐
  │ Mechanical │ │ Acoustic │ │ Optical │
  └────────────┘ └──────────┘ └─────────┘
```

Communication

```
                          ┌──────┐
                          │ HMI  │
                          └──────┘
                   ↙                      ↘
          ┌──────────┐                ┌──────────┐
          │ Internal │                │ External │
          └──────────┘                └──────────┘
        ↙     ↓     ↘                ↙     ↓     ↘
   ┌────┐ ┌─────┐ ┌─────┐      ┌────┐ ┌─────┐ ┌─────┐
   │ UI │ │ GUI │ │ NUI │      │ UI │ │ GUI │ │ NUI │
   └────┘ └─────┘ └─────┘      └────┘ └─────┘ └─────┘
```

```
          ┌────────────────────────┐
          │ Transmission Direction  │
          └────────────────────────┘
               ↙                ↘
   ┌─────────────────┐   ┌────────────────┐
   │ Uni-Directional │   │ Bi-Directional │
   └─────────────────┘   └────────────────┘
```

```
                    ┌────────┐
                    │ Signal │
                    └────────┘
               ↙                ↘
        ┌───────┐            ┌──────────┐
        │ Wired │            │ Wireless │
        └───────┘            └──────────┘
       ↙        ↘           ↙          ↘
 ┌─────────┐ ┌────────────┐ ┌───────┐ ┌─────────┐
 │ Optical │ │ Electrical │ │ Radio │ │ Optical │
 └─────────┘ └────────────┘ └───────┘ └─────────┘
```

```
          ┌──────────┐
          │ Partners │
          └──────────┘
           ╱        ╲
     ┌───────┐   ┌───────┐
     │  MMI  │   │  M2M  │
     └───────┘   └───────┘


          ┌──────────┐
          │ Topology │
          └──────────┘
        ╱    ╱    ╲    ╲
  ┌──────┐ ┌──────┐ ┌──────┐ ┌──────┐
  │ Tree │ │ Ring │ │ Star │ │ Mesh │
  └──────┘ └──────┘ └──────┘ └──────┘
```

Functionality

```
          ┌───────────────┐
          │ Functionality │
          └───────────────┘
         ╱        │        ╲
  ┌────────┐ ┌────────┐ ┌─────────┐
  │ Simple │ │ Medium │ │ Complex │
  └────────┘ └────────┘ └─────────┘
```