Automation Application

L-5

At Homes

Introduction

1. There is an increasing demand for smart homes, where appliances react automatically to changing environmental conditions and can be easily controlled through one common device
2. Home automation can be defined as a mechanism removing as much human interaction as technically possible and desirable in various domestic processes and replacing them with programmed electronic systems
3. It refers to the automatic and electronic control of household features, activity, and appliances

Home Automation

4. Home automation involves introducing a degree of computerized or automatic control to certain electrical and electronics system in a building

5. These lighting, temperature control

Why Home Automation

1. Your security system knows all about your occupancy of the house. With a little more development it can build an intelligent expert system to predict your usage, and for example turn the alarm on if you forget
2. Your central heating programmer knows the standards of comfort you expect but does not know which rooms are in use
3. By linking just these two you could achieve a reduction in fuel costs and a better match to your requirements

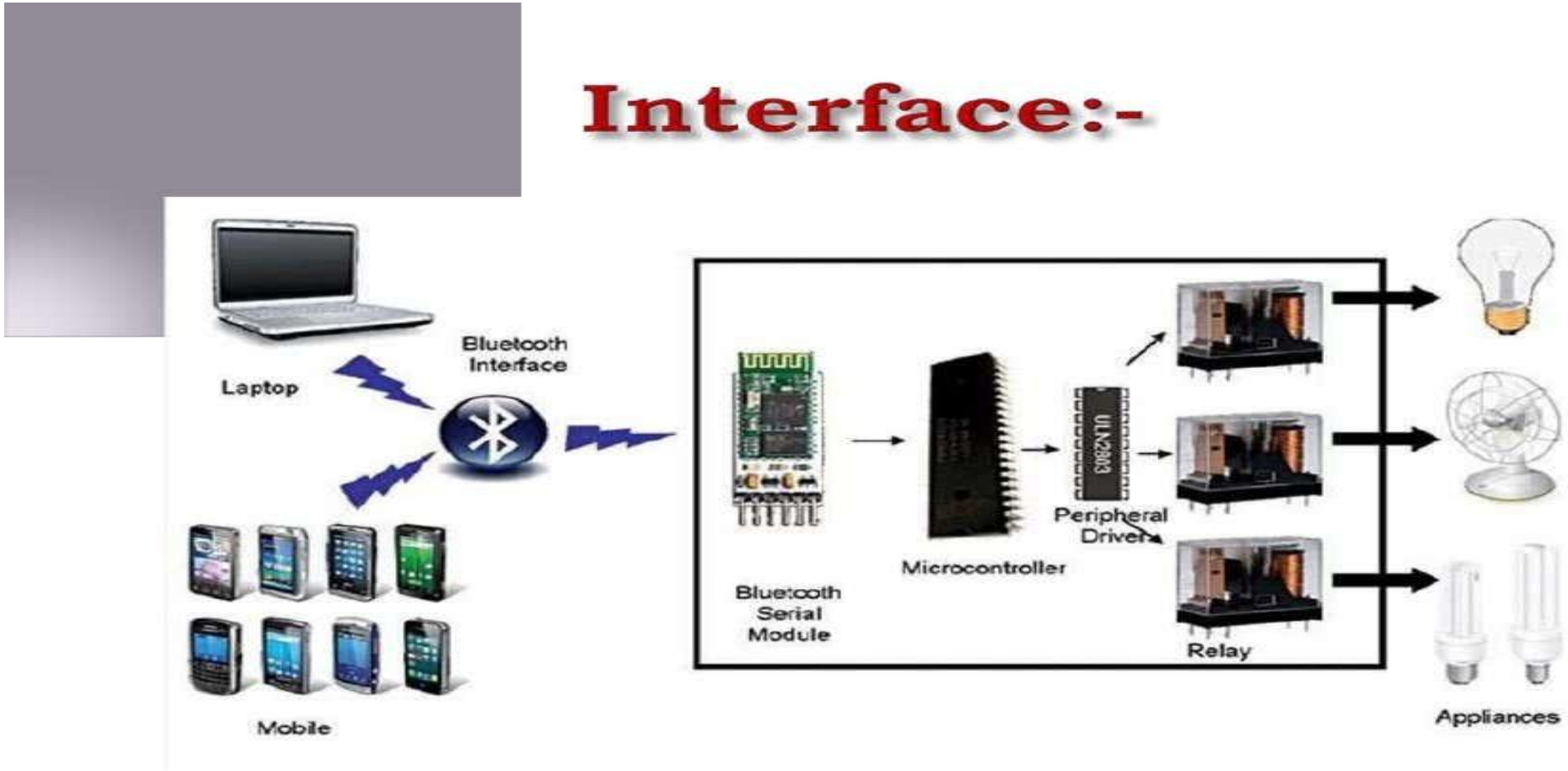
Need for Automation

1. Increase comfort of your home
2. Decrease effort required to perform menial tasks
3. Ease of living for elderly
4. Home security
5. Increase efficiency of power usage in the home
6. Feel more in control
7. Money and energy saver
8. Useful for physically challenged people and old age people
9. Security purpose

Where Used

1. Alarms , locks, garage doors, security
2. Heating and air conditioning
3. Home theaters, in house sound
4. Sprinklers, phones and intercoms
5. Smart chip bearing household appliances (white goods) e.g dish washers
6. Turn lights down/off at night
7. Operating outside lights
8. Turning lights or radio on/off when someone approaches the house, simulating occupancy
9. Operating television, hot water heater, kettle, toaster etc. ready for your use
10. Optimizing use of low cost electricity (economy 7)
11. Working with intelligent electrical white goods e.g. washing machine, fridge, microwave etc.

Technology used



Components

Relay

1. A relay is a electrically operated switch
2. Relays are used where it is necessary to control a circuit by low-power signal
3. Relays protect electrical circuits from overload or faults

Types of Relay

1. Electromagnetic Relay
2. Solid State Relay
3. Time Relay
4. Temperature Relay
5. Wind speed Relay
6. Acceleration Relay

Other components

a) Android Phone
b) Microcontroller
c) WiFi (module)
d) Transformer (220V/12V)
e) Voltage Regulator IC 7805
f) Diode Bridge
g) LED’s and BULB’s
h) Resistor, capacitor and connecting wires
i) Supply Board

Contd.

1. The IOT is the technology being used for home automation system
2. The term Internet of Things was first used by Kevin Ashton in 1999
3. Refers to uniquely identifiable objects (things) and their virtual representations in an Internet –like structure.
4. Some important benefits of internet of things includes:

a) Tracking behavior
b) Enhanced situational awareness
c) Sensor driven decision analytics
d) Instantaneous control and response

Contd.

The interactions between these entities are creating new types of smart applications and services.

SENSORS + CONNECTIVITY + PEOPLE + PROCESSES

Starting with popular connected devices already on the market

SMART THERMOSTATS

nest

Save resources and money on your heating bills by adapting to your usage patterns and turning the temperature down when you're away from home.

CONNECTED CARS

car2go

Tracked and rented using a smartphone. Car2Go also handles billing, parking and insurance automatically.

ACTIVITY TRACKERS

BASIS

Continuously capture heart rate patterns, activity levels, calorie expenditure and skin temperature on your wrist 24/7.

SMART OUTLETS

belkin

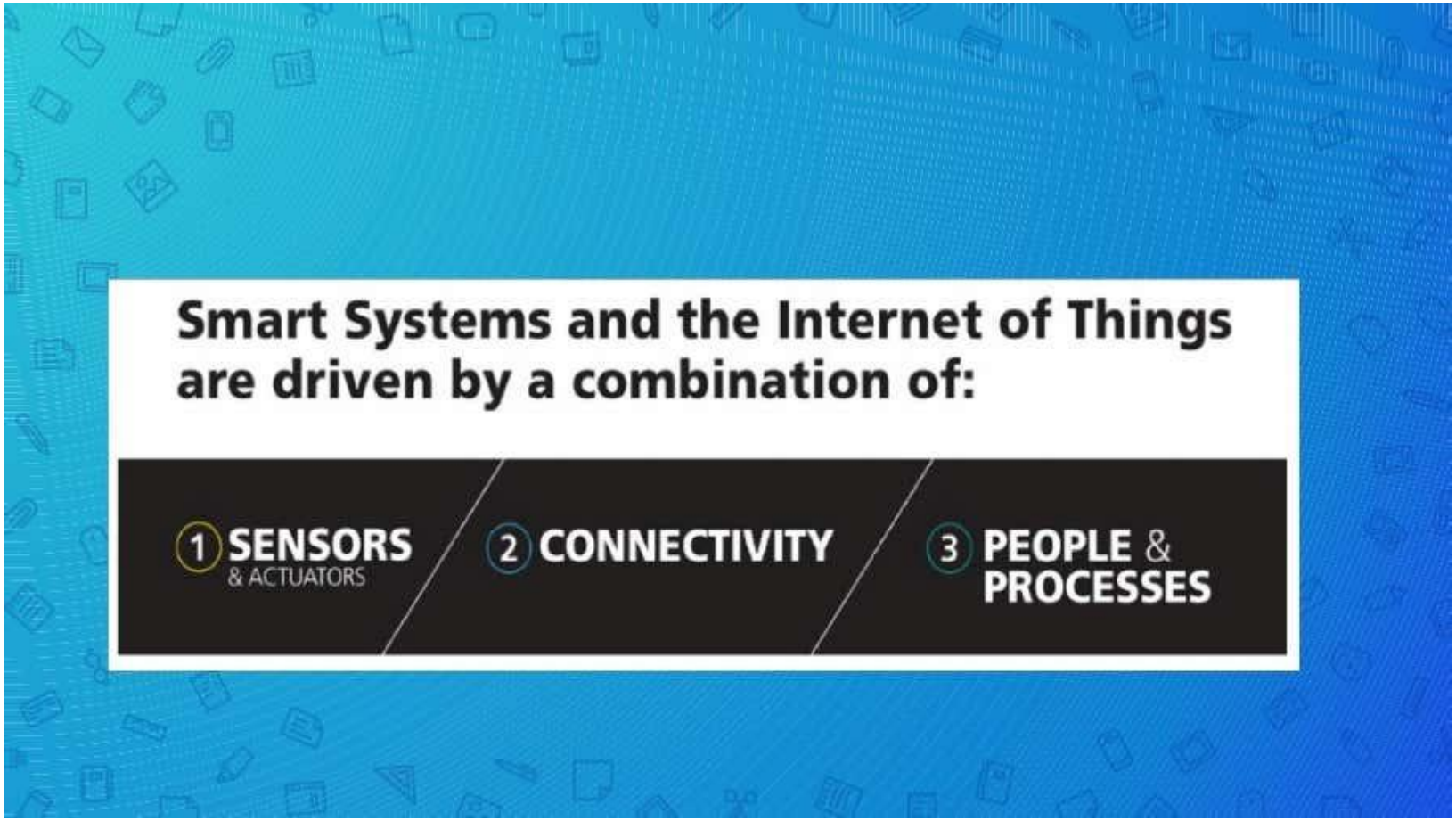
Remotely turn any device or appliance on or off. Track a device's energy usage and receive personalized notifications from your smartphone.

PARKING SENSORS

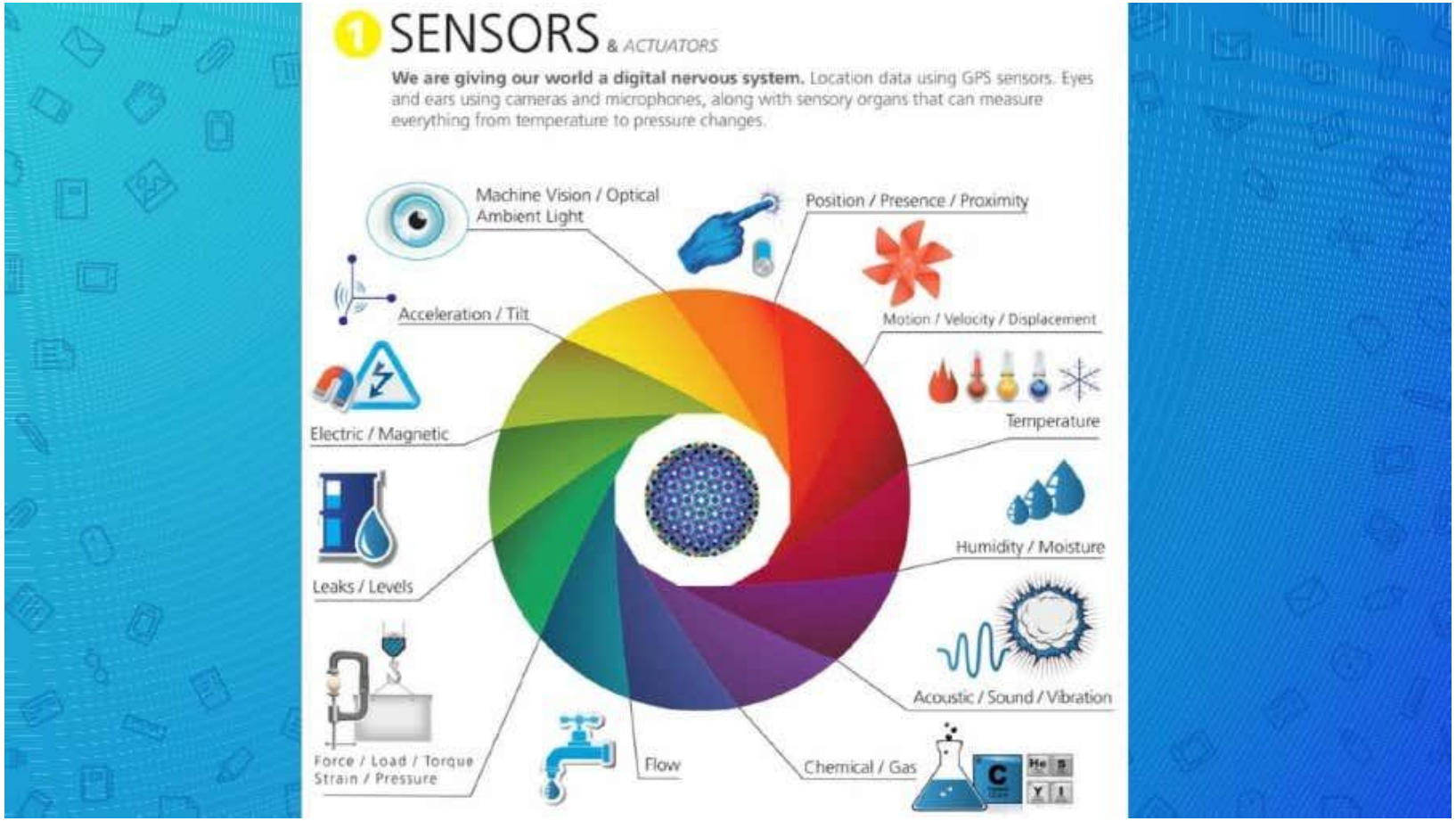
STREETLINE

Using embedded street sensors, users can identify real-time availability of parking spaces on their phone. City officials can manage and price their resources based on actual use.

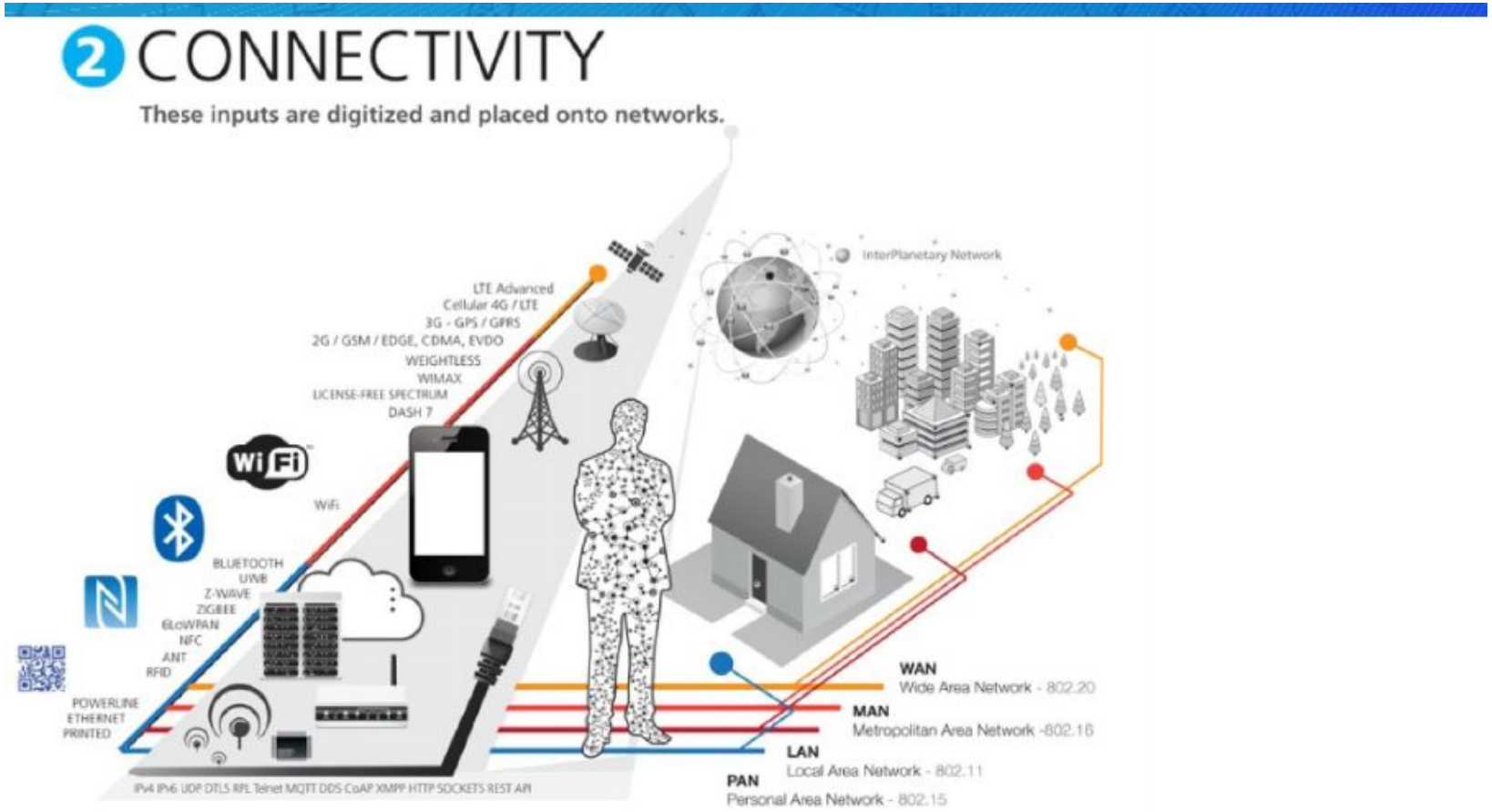
Methodology



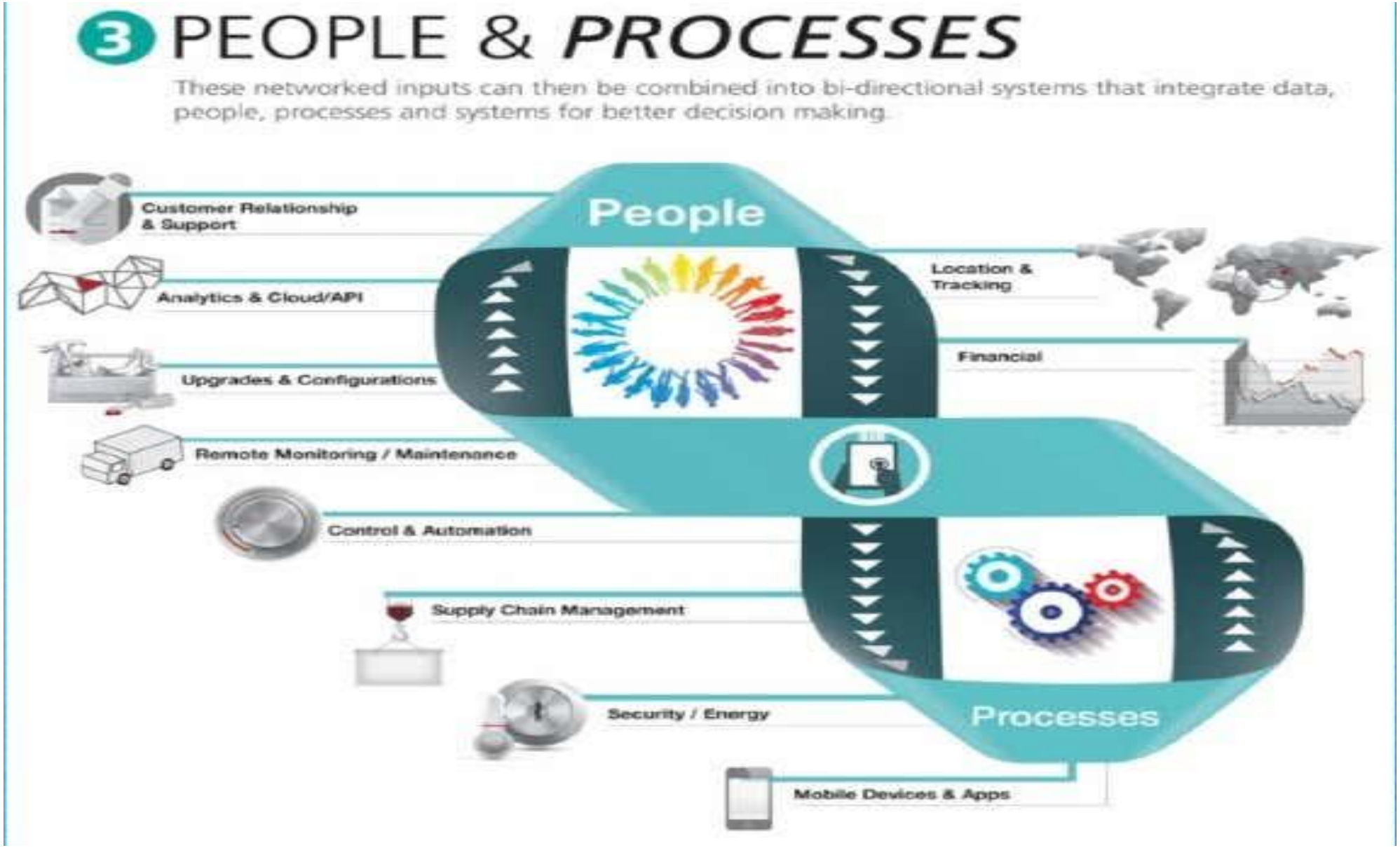
Sensors.


1 SENSORS & ACTUATORS
We are giving our world a digital nervous system. Location data using GPS sensors. Eyes and ears using cameras and microphones, along with sensory organs that can measure everything from temperature to pressure changes.
Machine Vision / Optical
Ambient Light
Position / Presence / Proximity
Acceleration / Tilt
Motion / Velocity / Displacement
Temperature
Electric / Magnetic
Humidity / Moisture
Leaks / Levels
Acoustic / Sound / Vibration
Force / Load / Torque
Strain / Pressure
Flow
Chemical / Gas

Connectivity



People and Processes



Applications

We can perform variety of task via help of this system

1. Automatic light and camera on/off by motion sensor
2. Main door open/close detection by magnetic door sensor
3. Automatic AC on/off by temperature sensor
4. Alarm when smoke detected by smoke sensor
5. Appliance controlled through mobile phone
6. Notification via Email & SMS for getting info about any devices

Challenges

1. Reliability

For home automation to succeed, developers must address concerns about the reliability of smart devices compared with traditional home products and equipment

2. Security

To be reassured that no malicious parties will be able to hack into their smart home systems

3. Equipment and installation cost

Automation of home is widely related to financial costs. The total cost depends on the equipment you install in your house and on how much it takes to install. The more advance the system; the cost of the system will be high as it has more features and advantages

Related work

1)Google is working in the field of home automation naming it as ‘’Google nest’’. They defined it as’’ Google Nest is a home. Home. Its more than just four walls and a roof over your head. Its where you feel safest and most comfortable’’

2) Their mission is to create a home that takes care of the people inside it and the world around it. Because if we really think about it, the world is just one big neighborhood.