Name/ Talha Hisham Mansour

Section/ 18

B.N./ 17

Topic/ Internet of Things

Screenshots:

Home page:

Graphical user interface, text, application, email

Description automatically generated

How it works:

A picture containing text

Description automatically generated

Applications:

Text

Description automatically generated

Graphical user interface

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Graphical user interface, application

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Graphical user interface

Description automatically generated

Future developments:

Graphical user interface, text

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Graphical user interface, text, application

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References:

Graphical user interface, text, application

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# source code

home page:

<html>

<head>

<title>Introduction</title>

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<body>

<div class="sidebar">

<h1 class="bartitle">Menu</h1>

<a href="index.html" class="activetab">Introduction</a>

<a href="IoT.html">How it works</a>

<a href="Applications.html">Applications</a>

<a href="futuredevs.html">Future Developments</a>

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<div class="header">

<h1 class="headtitle">Introduction</h1>

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<p>The IoT concept was coined by a member of the Radio

Frequency Identification (RFID) development community in

1999, and it has recently become more relevant to the practical

world largely because of the growth of mobile devices,

embedded and ubiquitous communication, cloud computing

and data analytics.<br></p>

<h2 class="subheader">What is internet of things</h2>

<p>

The internet of things (IoT) is the working of physical devices

with the help of internet, physical devices which are embedded

with sensors, electronics, software’s and network connectivity

that enable these objects to collect and exchange data. It was

first introduced by Kelvin Ashton in the year 1998

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How it works:

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<div class="header">

<h1 class="headtitle">How IoT works</h1>

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<p>The technology behind the Internet of Things has been a long time in the making, even starting before we had computers. Machine-to-Machine (M2M) communication has been a thing for quite some time, perhaps starting with the telemetric systems of the early 20th century that transmitted encoded readings from measuring instrumentation over phone lines, radio waves or satellite communications. The first was used in 1912 to transmit data from a power plant in Chicago to a central office via telephone lines. Telemetry has since been used for things like monitoring weather and tracking wildlife, and it's even used to monitor the occupants and equipment on the International Space Station (ISS).<br>

We have been living in the computer age since the middle of the 20th century, and we've been in the age of the Internet since ARPANET was created by the U.S. Advanced Research Projects Agency in 1969. It wasn't until Tim Berners-Lee unveiled the World Wide Web in 1991 that a lot of people began hopping online, and now it's more unusual not to be connected to the Internet. The web grew, high-speed Internet entered the home and wireless networking became ubiquitous. And all that time, microchips and other computing equipment were getting smaller and smaller until we finally started putting them in mobile devices. Our smartphones of today can hop on the net via cellular or WiFi signals and talk to other devices through Bluetooth and other local communication methods. And thanks to the same technology, so can a lot of other electronic gadgets.<br>

The processing of data on web-connected servers in large data centers, what we refer to as the cloud, has also contributed greatly to the ability of everyday gadgets to become part of the IoT. These devices may connect to the Internet by sending data to your phone or some other dedicated hardware in your home that acts as a hub over a local communication method, such as:<br>

Bluetooth<br>Bluetooth LE (low energy)<br>6LowPan<br>IEEE 802.15.4<br>NFC (near-field communication)<br>ZigBee<br>Z-wave<br>

That connection can be made directly through your router or modem via WiFi or wired methods like Ethernet, cable or power line networking (signals sent directly over your home's power lines). It could also bypass your home network entirely via cellular communication. They may also communicate with other smart devices in the vicinity.<br>

The connected gadgets of the IoT contain computing hardware, including processors with embedded programming telling them what to do, sensors that gather various sorts of readings (such as temperature, moisture, light, motion, chemical levels, heart rate and body movement) and communication hardware that can send and receive signals.<br>

Some connected systems may be able to use other nearby devices to gather data, like city road systems that signal smartphones to help monitor traffic conditions. Smart devices can work in conjunction with tagging technology including RFID tags, QR codes, barcodes and the like to obtain data about items. The devices also need a power source, which can include a connection to a power outlet, a solar panel, or even replaceable or rechargeable batteries, provided the embedded hardware is of the low-power variety. Companies are also working on wireless power for a possible future power source.<br>

The devices may be run mostly via their own embedded software or firmware, but they can also offload a lot of the processing to cloud-based software via the Internet, where they can crunch more data. Some use advanced algorithms that let them learn from and adjust to various stimuli and patterns (letting them program themselves, to an extent). This sending and processing of the sensor data is often nearly instantaneous (thanks to the usually lightning-fast speeds of Internet communication), allowing the devices to react in real-time.<br>

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Applications:

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<div class="header">

<h1 class="headtitle">Applcations of IoT</h1>

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<p>Typically, IoT helps in advanced connectivity of devices,

systems, and services that goes beyond machine-to-machine

(M2M) communications. IoT is mostly suitable for heart

monitoring implants, biochip transponders on farm animals,

electric clams in coastal waters, automobiles with built-in

sensors, devices for environmental/food/pathogen monitoring or

field operation devices that assist firefighters in search and

rescue operations. More number of people wants to avoid

troublesome situations. In the modern world people wants more

luxury, So IoT is mostly used in home automation (also known

as smart home devices) such as the control and automation of

lighting, heating (like smart thermostat), ventilation, air

conditioning (HVAC) systems, and appliances such as

washer/dryers, robotic vacuums, air purifiers, ovens or

refrigerators/freezers that use Wi-Fi for remote monitoring. In

the future hundreds of billions of physical devices which are

embedded with smart sensors will interact with one another

without human involvement, on a Machine-to-Machine basis.

</p>

<h2 class="subheader">Transportation</h2>

<p>The IoT can play the important role in integration of

communications, control, and information processing across

various transportation. Application of the IoT extends to all

aspects of transportation systems (i.e. the vehicle and the driver

or user). Dynamic interaction between these components of a

transport system enables inter and intra vehicular

communication, smart traffic control, smart parking,

electronic, logistic and fleet management, vehicle control, and

safety and road assistance. Modern automobiles are

equipped with sensors which are connected to the internet

through control systems. IoT plays important role in road

safety- systems. Such as collision detection, lane change warning, traffic signal control,

intelligent traffic scheduling.

</p>

<img src="carsensors.jpg" class="img">

<h2 class="subheader">Environmental Monitoring</h2>

<p>The Environmental monitoring applications of the IoT typically

use sensors to assist in environmental protection by monitoring

the atmospheric situations.like monitoring the movements of

wildlife and their habitats. The physical devices connected to

the Internet which are used as warning systems can also be used

by emergency services to provide more effective aid.

</p>

<h2 class="subheader">Medical and health care</h2>

<p>IoT devices can be used to enable remote health monitoring and

emergency notification systems. Some hospitals have begun

implementing smart beds that can detect when they are

occupied and when the patient is attempting to get up.

</p>

<h2 class="subheader">Home automation</h2>

<p>Home automation is the residential extension of building

automation. It involves the control and automation of lighting,

heating, ventilation, air conditioning (HVAC), and security, as

well as home appliances such as washer/dryers, ovens or

refrigerators/freezers. They use Wi-Fi for remote monitoring

and are a part of the Internet of things.

</p>

<img src="smarthome.jpg" class="img">

<h2 class="subheader">Agriculture</h2>

<p>By develop the agriculture machinery into smart devices causes

control the water pumps and sprayers are controlled anywhere.

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Future developments:

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<h1 class="headtitle">Future Technological Developments

For IoT</h1>

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<th class="c1">TECHNOLOGY</th>

<th>FUTURE DEVELOPMENT</th>

<th>RESEARCH NEEDS</th>

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<td class="c1">Hardware Devices</td>

<td>

<ul>

<li>Nanotechnology</li>

<li>Miniaturization of chipsets</li>

<li>Ultra low power circuits</li>

</ul>

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<ul>

<li>Low cost modular devices</li>

<li>Ultra low power EPROM/FRAM</li>

<li>Autonomous circuits</li>

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<td class="c1">SENSOR</td>

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<ul>

<li>Smart sensors (bio-chemical)</li>

<li>More sensors (tiny sensors)</li>

<li>Low power sensors</li>

<li>Wireless sensor network for sensor connectivity</li>

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<li>Self powering sensors</li>

<li>Intelligence of sensors</li>

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<td class="c1">Communication Technology</td>

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<ul>

<li>On chip antennas</li>

<li>Wide spectrum and spectrum aware protocols</li>

<li>Unified protocol over wide Spectrum</li>

<li>Multi-functional reconfigurable chips</li>

</ul>

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<ul>

<li>Protocols for interoperability</li>

<li>Multi-protocol chips</li>

<li>Gateway convergence</li>

<li>On chip networks</li>

<li>Longer range (higher frequencies – tenths of GHz)</li>

<li>5G developments</li>

</ul>

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<td class="c1">Network Technology</td>

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<ul>

<li>Self aware and self organizing networks</li>

<li>Self-learning, self-repairing networks</li>

<li>IPv6- enabled scalability</li>

<li>Ubiquitous IPv6-based IoT deployment</li>

</ul>

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<li>Grid/Cloud network</li>

<li>Software defined networks</li>

<li>Service based network</li>

<li>Need based network</li>

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<td class="c1">Software and algorithms</td>

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<ul>

<li>Goal oriented software</li>

<li>Distributed intelligence, problem solving</li>

<li>User oriented software</li>

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<ul>

<li>Context aware software</li>

<li>Evolving software</li>

<li>Self reusable software</li>

<li>Autonomous things:</li>

<li>Self configurable</li>

<li>Self healing</li>

<li>Self management</li>

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<td class="c1">Data and Signal Processing Technology</td>

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<ul>

<li>Context aware data processing and data responses</li>

<li>Cognitive processing and optimization</li>

<li>IoT complex data analysis</li>

<li>IoT intelligent data visualization</li>

<li>Energy, frequency spectrum aware data processing</li>

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<li>Common sensor ontology</li>

<li>Distributed energy efficient data processing</li>

<li>Autonomous computing</li>

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<td class="c1">Discovery and Search Engine Technologies</td>

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<ul>

<li>Automatic route tagging and identification management centers</li>

<li>On demand service discovery/integratio</li>

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<li>Scalable Discovery services for connecting things with services</li>

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<td class="c1">Security & Privacy Technologies</td>

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<ul>

<li>User centric context-aware privacy and privacy policies</li>

<li>Privacy aware data processing</li>

<li>Security and privacy profiles selection based on security and privacy need</li>

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<ul>

<li>Low cost, secure and high performance identification/authentication devices</li>

<li>Decentralized approachesto privacy by information localization </li>

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