

Tech Trends

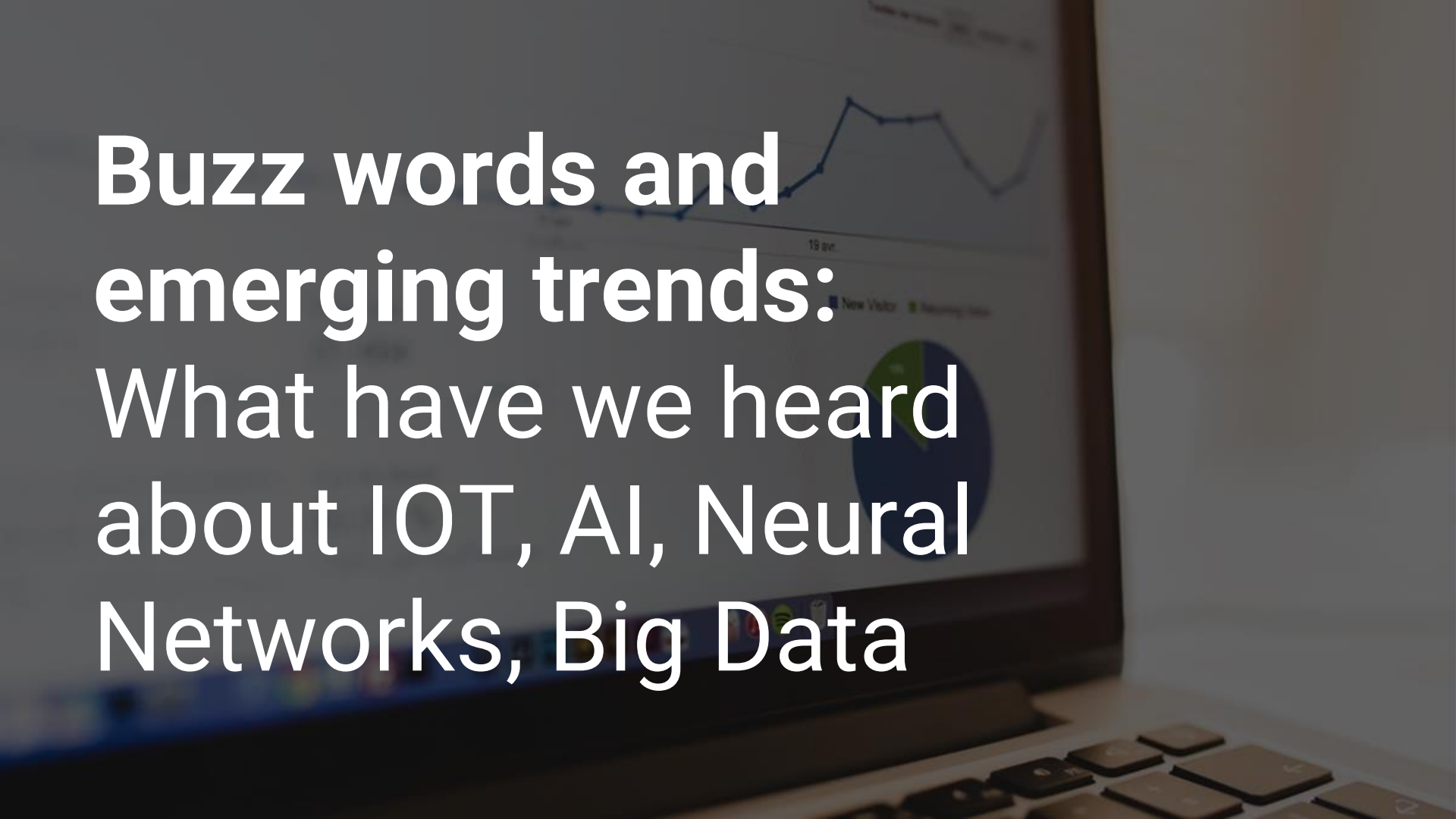
Big Data, IOT, Security, Machine Learning, Search engines

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A laptop screen is shown in a dark, dimly lit environment. The screen displays a data dashboard. At the top, there is a line graph with a blue line showing fluctuations. Below the graph, there are some labels like '19 av.' and 'New Visitor'. To the right of the text, there is a pie chart with green and blue segments. The overall scene is dark, with the light from the screen illuminating the laptop's keyboard and the surrounding area.

**Buzz words and
emerging trends:**
What have we heard
about IoT, AI, Neural
Networks, Big Data

IOT - Internet of Things

Smart Devices

Nest acquisition for \$ 3.2 B

Tesla over the air fix

Smart devices everywhere

Nest, Sprinkler controllers, Fitbit

15B

CONNECTED
DEVICES IN 2015



40B

CONNECTED
DEVICES BY 2020



 = 1B DEVICES

A close-up photograph of a person's hands working on a printed circuit board (PCB). The person is using a soldering iron to solder a component. The background is blurred, showing some bokeh lights. The text 'Current Market' is overlaid on the left side of the image.

Current Market

2015:

15 billion connected things

\$1.9 billion from IoT
services

Projection 2020



ABI: 250,000 connected cars

IDC: \$7 billion from IoT services

Gartner: \$300 billion from IoT products

IDC: Global IoT market \$7.1 trillion

2035



GE: \$10-15 trillion added to GDP

Cisco: \$19 trillion

ABI: 450 million IoT cars

Common Use cases

Nest

Smart Lighting

Tracking towels at hotels(RFID)

Smart Parking

Oil and Gas

Tracking Cattle

Smart Refrigerators(Food Industry/ Medical)

Smart Trucking Fleets

Water Quality Monitoring

Square Tag

Tile app

What wouldn't change?

Cities

Security

Supply Chain

Buildings

Home

Safety

Homes

Health

Security

Kitchens

Factories

Transportation

Appliances

Machines

Airports, stations
Roads, tracks Cars,
trains, planes

People

Robots

Traffic

Challenges

Security

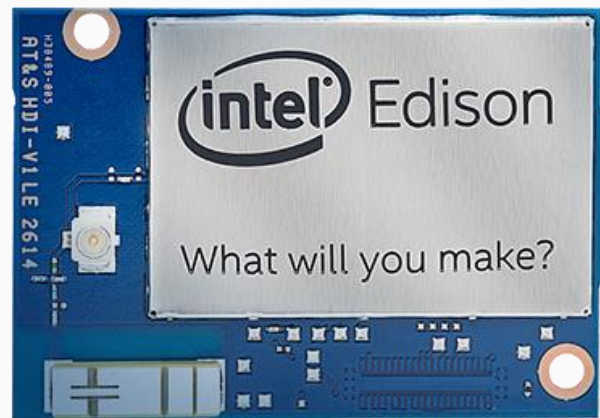
Battery Life

Networking

Localization(location)

Interfacing with Sensors

Size



Data Challenges Posed by IoT

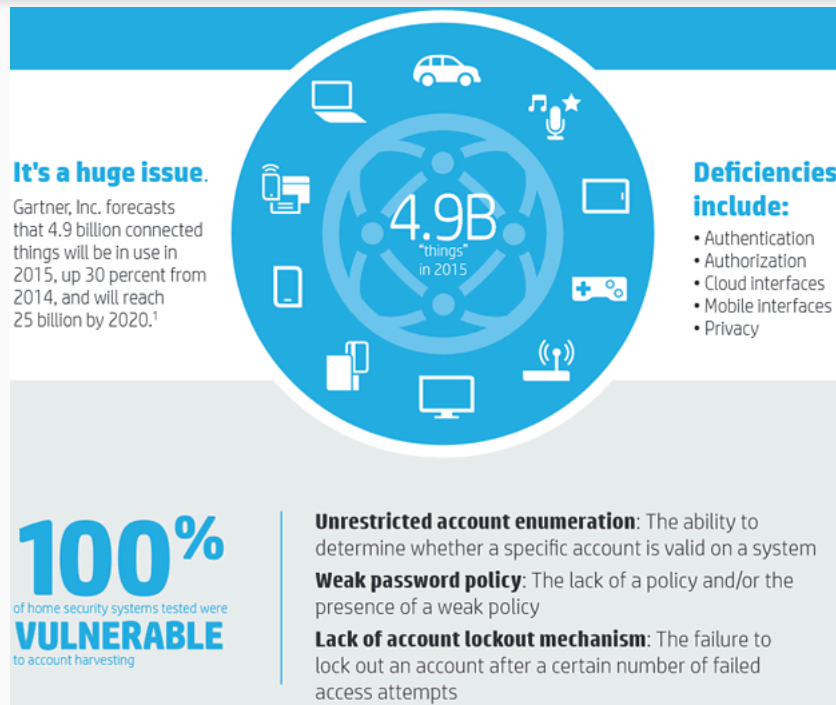
Security

Storage capacity

Processing Capacity

Internet Bottlenecks

Real time response



How to Think of IOT

Applications

Smart
Cities

Smart
Building
s

Smart
Homes

Airports

Hospital
s

Transpor
tation

System
Design

Networking

Architecture

Data
Management

Security

Component
Technologies

Location

Sensors

Interface
s

Set-up

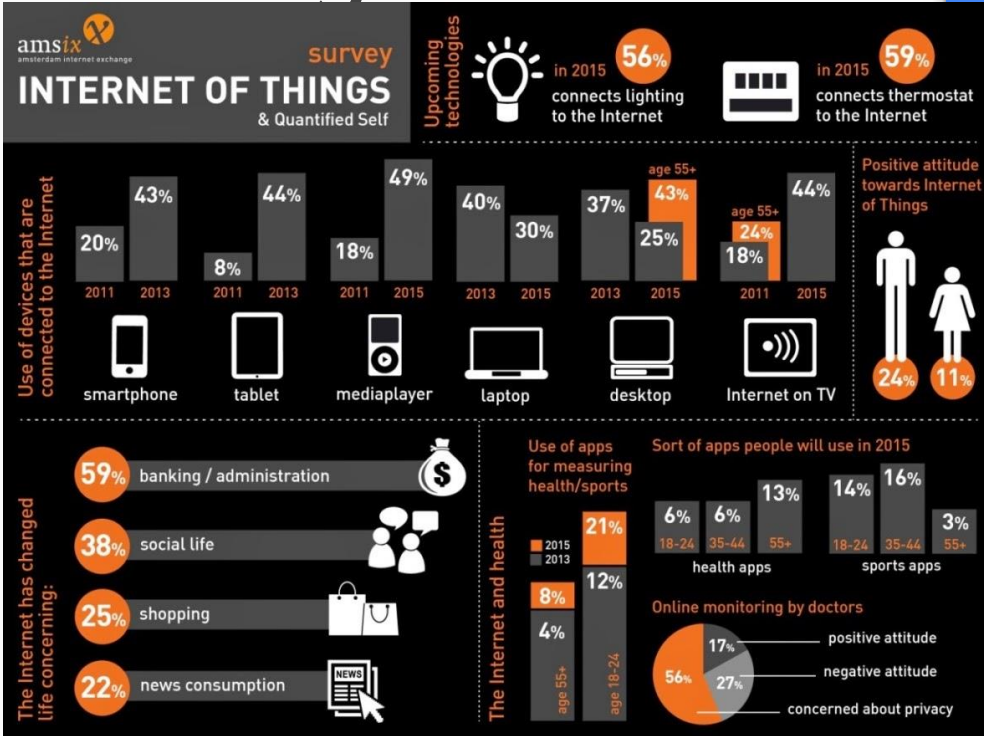
Robotics

Vehicles

Velocity of Data growth

IOT devices create a vast amount of data.

IOT devices are projected to produce approximately 400 Zettabytes/ Year of data by 2018



Big Data

Data from several sources:

Medical

Social Media/ News

Stock Markets

Businesses

Sensors/ IoT

Cars

Power Grid

Transportation

Retail

Variation in Requirements

Different demands from data:

Real time

Eventual consistency

Only once processing

Complex Models

Security

Ease of use

Visualizations

Visibility

Cost

Storage

Data is vastly shifting to the cloud

HDFS, S3 and object based stores

In Memory Stores

Caching

Document Databases

Flash based storage

Replication

Relational Databases

KV stores

Processing Needs

Processing of Petabytes/query

Fast / near real time responses

Ease of Use

Inline/ Stream Processing

Fast retrieval

High throughput of writes

Cost effective

Machine Learning capabilities

Some Possible Solutions

Hadoop - Reliable but slow

Spark - New but promising

Storm - Extremely fast but limited capabilities

Oracle/ Postgres - Relational and limited

Elasticsearch - Search based querying and processing

AI, Machine Learning and Neural Networks

Brain Behind the Data we collect and IOT devices

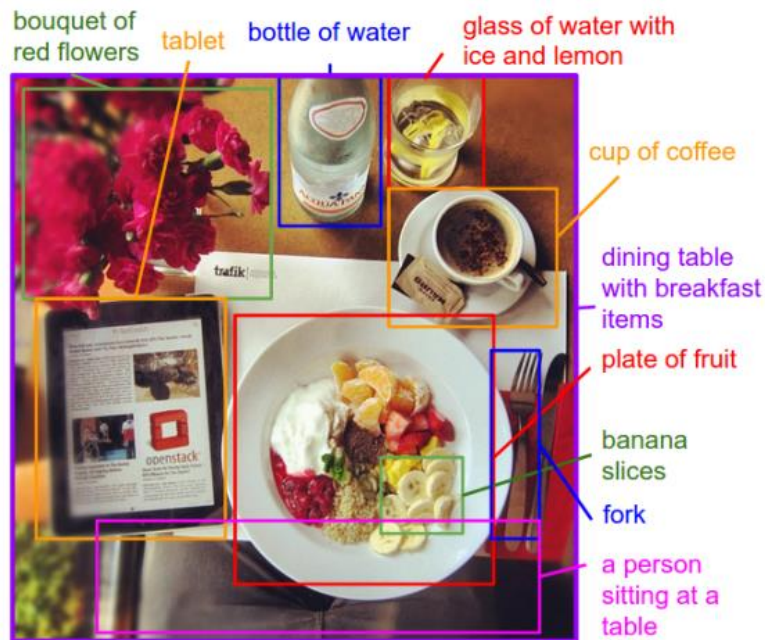
Data collected needs response system

Classification, Clustering , Anomaly detection

Recommendation Systems, Natural Language Processing

Image Analysis, Voice Transcription, Real Time Translation

Field of Fast Progress



GPU Computing

CPU's have a small number of cores

Not very efficient for floating point calculations

GPU's are massively parallel

Highly performant for floating point operations

Made Neural networks usable



Trends

Reinforcement learning

Automated response systems - Gmail

Real time Translation (Voice/ video)

Responses to Actuators for IOT devices

Driverless cars

Conclusions

A surreal painting depicting five anthropomorphic dogs sitting around a green card table in a dimly lit room. The dogs have various fur colors and textures, and their eyes are glowing with different colors (red, blue, green). They are playing a card game, with cards and chips scattered on the table. The background features a framed picture on the wall, a lamp, and a doorway leading to another room.

Very exciting times

No single technology is enough

Broad knowledge and diverse architecture

Smart everything

The future is now