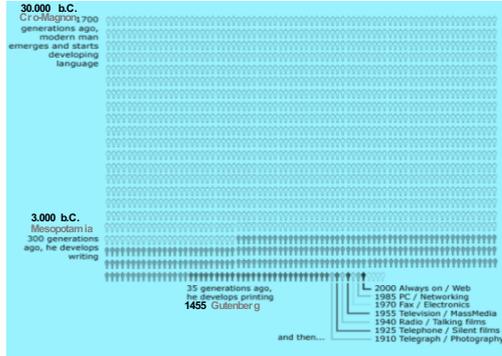PROGETTAZIONE E PRODUZIONE MULTIMEDIALE

Y 2016-2017

Prof. Alberto del Bimbo
Università di Firenze

Going towards……….

PROGRESS IN HUMAN COMMUNICATION

Main inventions	Application Impact
Languages	Communicate symbolic experiences
Written Languages III Mil bc	Record symbolic experiences
Paper II Mil bc	Make symbolic experience portable
Print (Gutemberg) 1455	Mass distribution
Electric Telegraph (Morse) 1837	Remote wired narrow communication
Electric Telephone (Manzetti, Meucci) 1849	Remote analog communication
Radio (Marconi) 1895	Analog broadcasting of sound
Television (Baird) 1925	Combining two senses – media
Recording media	Photos, audio, video
Digital processing	Machine enhancement and processing
Internet (1990)	Interactive multimedia communication

De Kerchove Mc Luhan Univ.

THE INTERNET

- A global system of interconnected computer networks using a standard Internet protocol suite TCP/IP to serve several billion users worldwide
- Carries an extensive range of information resources and services: a) the inter-linked hypertext documents of the World Wide Web, b) support of email, c) peer-to-peer networks…
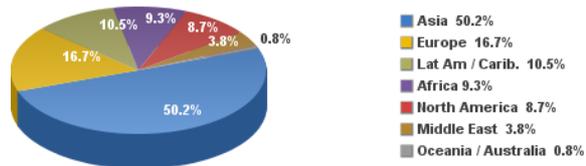- Standards for publication of web media (HTML, CSS, XML)
- Backbone exposed to masses

Evolutionary technology

1990-96	e-mail, www
1998	streaming media, e-commerce
2000	broadband, Google search engine…
2002	blogs, peer-to-peer file sharing
2004	Gmail, Facebook…
2006	Flickr, YouTube, Twitter, …..
2008	Image, Video, Audio search engines, ….
2010	Social networks
2016	IoT
…..	

INTERNET USERS AND PENETRATION

Internet Users in the World by Regions
June 2016

Asia	50.2%
Europe	16.7%
Lat Am / Carib.	10.5%
Africa	9.3%
North America	8.7%
Middle East	3.8%
Oceania / Australia	0.8%

Source: Internet World Stats - www.internetworldstats.com/stats.htm
Basis: 3,675,824,813 Internet users on June 30, 2016
Copyright © 2016, Miniwatts Marketing Group

Internet Users in the World by Regions
November 2015

Asia	48.2%
Europe	18.0%
Lat Am / Carib.	10.2%
Africa	9.8%
North America	9.3%
Middle East	3.7%
Oceania / Australia	0.8%
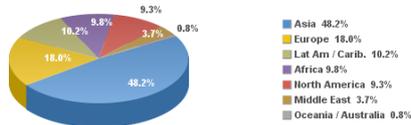
Source: Internet World Stats - www.internetworldstats.com/stats.htm
Basis: 3,366,261,156 Internet users on November 30, 2015
Copyright © 2015, Miniwatts Marketing Group

Source: Internet World Stats

Internet Users in the World
by Geographic Regions - June 2016

Region	Millions of Users - June 2016
Asia	1846.2
Europe	614.9
Latin America / the Caribbean	384.7
Africa	340.7
North America	320.0
Middle East	141.5
Oceania / Australia	27.5

Source: Internet World Stats - www.internetworldstats.com/stats.htm
Basis: 3,675,824,813 Internet users estimated for June 30, 2016
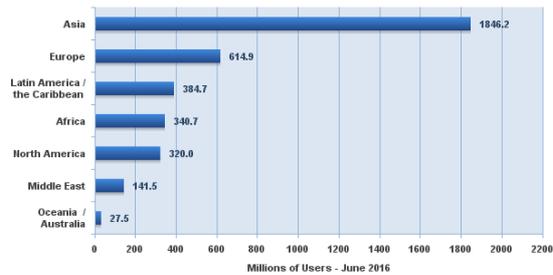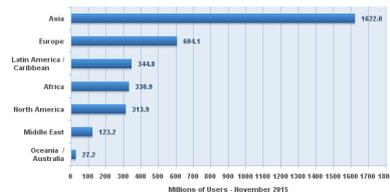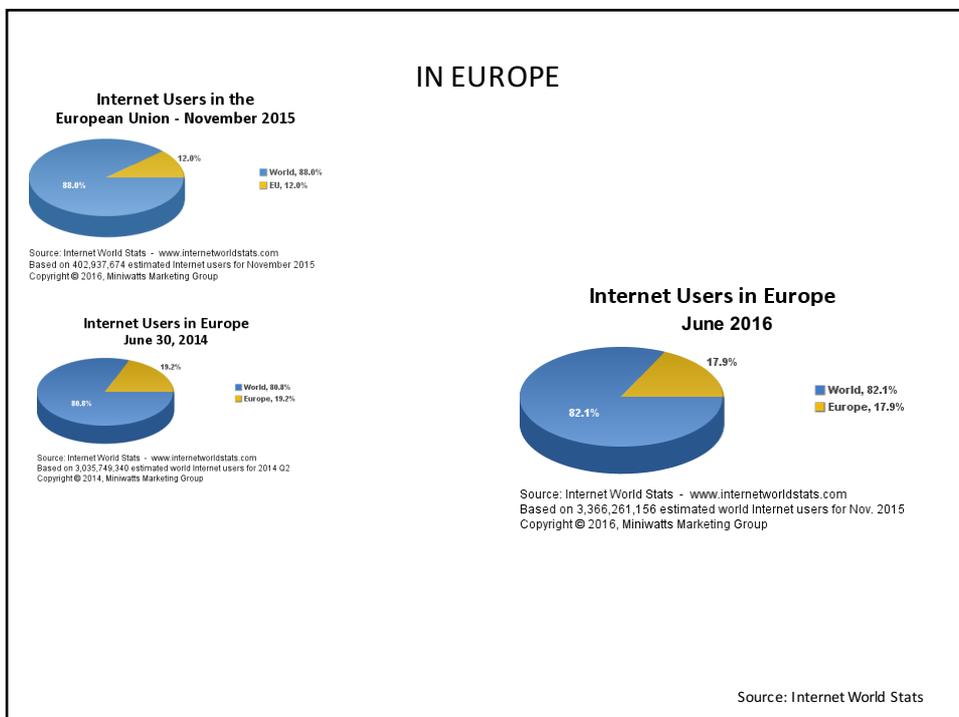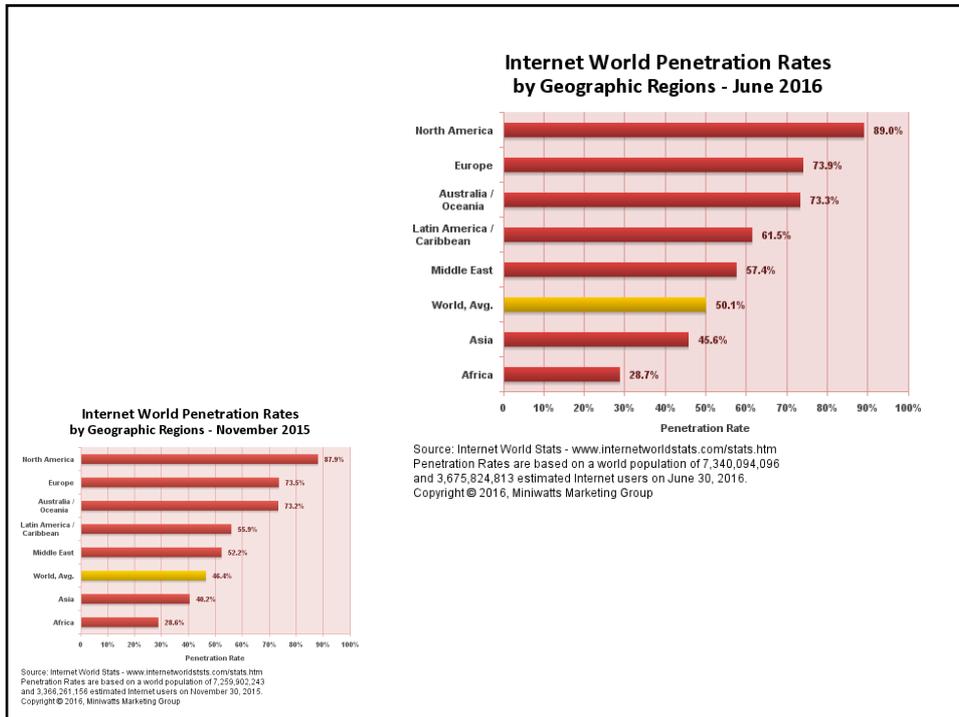Copyright © 2016, Miniwatts Marketing Group

Internet Users in the World
by Geographic Regions - 2015

Region	Millions of Users - November 2015
Asia	1622.0
Europe	604.1
Latin America / Caribbean	344.8
Africa	330.9
North America	313.9
Middle East	123.2
Oceania / Australia	27.2

Source: Internet World Stats - www.internetworldstats.com/stats.htm
3,366,261,156 Internet users estimated for November 30, 2015
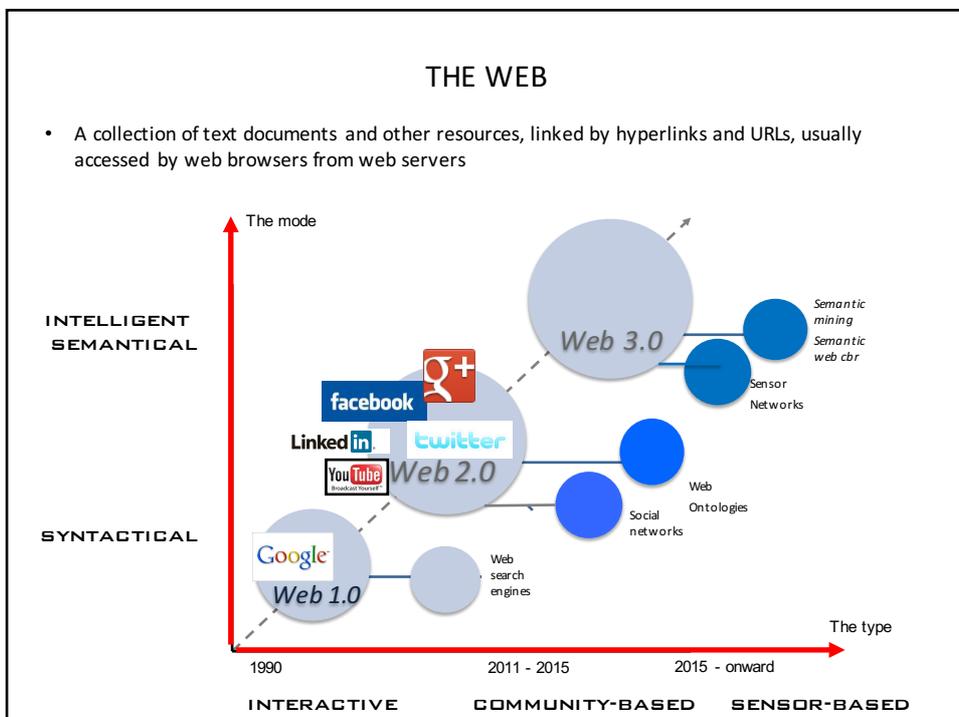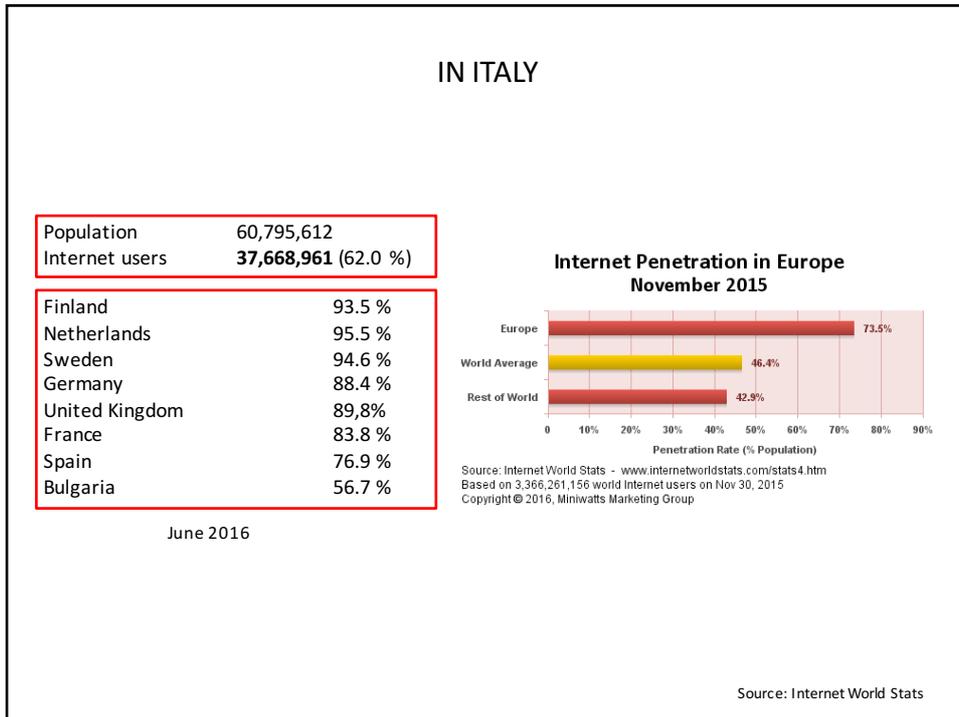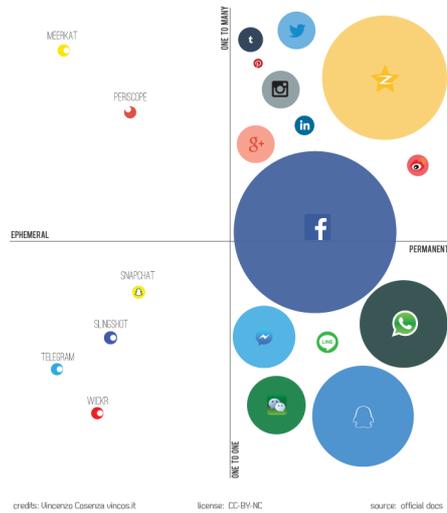Copyright © 2016, Miniwatts Marketing Group

Source: Internet World Stats

Internet World Penetration Rates
by Geographic Regions - June 2016

Region	Penetration Rate
North America	89.0%
Europe	73.9%
Australia / Oceania	73.3%
Latin America / Caribbean	61.5%
Middle East	57.4%
World, Avg.	50.1%
Asia	45.6%
Africa	28.7%

Penetration Rate

Source: Internet World Stats - www.internetworldstats.com/stats.htm
Penetration Rates are based on a world population of 7,340,094,096
and 3,675,824,813 estimated Internet users on June 30, 2016.
Copyright © 2016, Miniwatts Marketing Group

Internet World Penetration Rates
by Geographic Regions - November 2015

Region	Penetration Rate
North America	87.9%
Europe	73.5%
Australia / Caribbean	73.2%
Latin America / Caribbean	55.9%
Middle East	52.2%
World, Avg.	46.4%
Asia	40.2%
Africa	28.6%

Penetration Rate

Source: Internet World Stats - www.internetworldststs.com/stats.htm
Penetration Rates are based on a world population of 7,259,902,243
and 3,366,261,156 estimated Internet users on November 30, 2015.
Copyright © 2016, Miniwatts Marketing Group

IN EUROPE

Internet Users in the
European Union - November 2015

- 12.0%
- 88.0%
- World, 88.0%
- EU, 12.0%

Source: Internet World Stats - www.internetworldstats.com
Based on 402,937,674 estimated Internet users for November 2015
Copyright © 2016, Miniwatts Marketing Group

Internet Users in Europe
June 30, 2014

- 19.2%
- 80.8%
- World, 80.8%
- Europe, 19.2%

Source: Internet World Stats - www.internetworldstats.com
Based on 3,035,749,340 estimated world Internet users for 2014 Q2
Copyright © 2014, Miniwatts Marketing Group

Internet Users in Europe
June 2016

- 17.9%
- 82.1%
- World, 82.1%
- Europe, 17.9%

Source: Internet World Stats - www.internetworldstats.com
Based on 3,366,261,156 estimated world Internet users for Nov. 2015
Copyright © 2016, Miniwatts Marketing Group

Source: Internet World Stats

IN ITALY

Population	60,795,612
Internet users	**37,668,961** (62.0 %)

Finland	93.5 %
Netherlands	95.5 %
Sweden	94.6 %
Germany	88.4 %
United Kingdom	89,8%
France	83.8 %
Spain	76.9 %
Bulgaria	56.7 %

June 2016

**Internet Penetration in Europe
November 2015**

Europe — 73.5%
World Average — 46.4%
Rest of World — 42.9%

Penetration Rate (% Population)

Source: Internet World Stats - www.internetworldstats.com/stats4.htm
Based on 3,366,261,156 world Internet users on Nov 30, 2015
Copyright © 2016, Miniwatts Marketing Group

Source: Internet World Stats

THE WEB

- A collection of text documents and other resources, linked by hyperlinks and URLs, usually accessed by web browsers from web servers

The mode

INTELLIGENT SEMANTICAL

Web 3.0

Semantic mining
Semantic web cbr
Sensor Networks

facebook · g+ · Linked in · twitter · YouTube

Web 2.0

Web Ontologies
Social networks

SYNTACTICAL

Google
Web 1.0

Web search engines

The type

1990   2011 - 2015   2015 - onward

INTERACTIVE   COMMUNITY-BASED   SENSOR-BASED

SOCIAL NETWORK & INSTANT MESSAGING

- Facebook SN
  - >1.15 Billion users daily active
  - >1.9 Billion users monthly active
- Twitter SN
  - >300 Millions monthly active
- Google+ SN
  - >300 Million users monthly active
- LinkedIn SN
  - >100 Million users monthly active
- Instagram
  - >75 Million users daily active
  - >400 Millions users monthly active
    Whatsapp IM
  - >1.2 Billions users monthly active

It took Radio 38 years to reach 50 million users,
TV: 13 years,   Internet: 4 years,   iPod: 3 years

Source: Social Media Statistics

ONLINE COMMUNICATION MATRIX
April 2015

credits: Vincenzo Cosenza vincos.it   license: CC-BY-NC   source: official docs
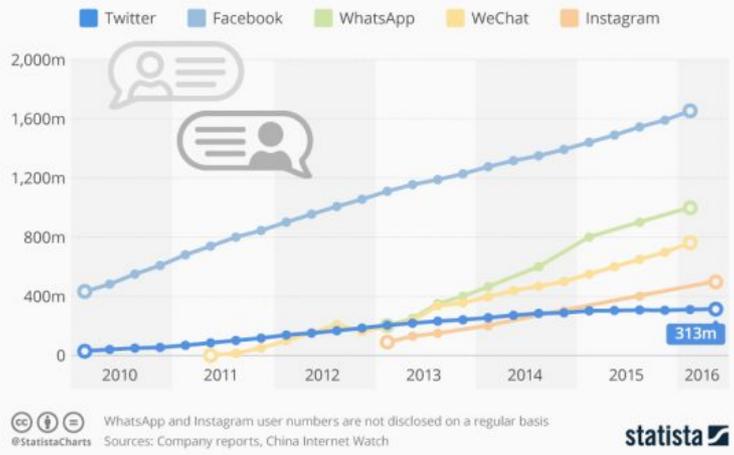
SOCIAL NETWORK DIFFUSION

WORLD MAP OF SOCIAL NETWORKS
January 2016

WORLD MAP OF SOCIAL NETWORKS
Ranked 2nd - January 2016

Facebook   QZone   V Kontakte   Odnoklassniki
Twitter   Facenama

Instagram   Twitter   V Kontakte   Odnoklassniki
Linkedin   Facebook   Reddit

credits: Vincenzo Cosenza vincos.it   license: CC-BY-NC   source: Alexa/SimilarWeb

credits: Vincenzo Cosenza vincos.it   license: CC-BY-NC   source: SimilarWeb/Alexa

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SOCIAL COMMERCE

- Social media dominates nearly every aspect of consumer life
- In US 74% of buyers rely on social networks to guide their purchases
- US consumers will spend $327 billion online in 2016

- Facebook, Pinterest, and Twitter have been preparing features specifically designed to help brands boost e-commerce sales:
  - Facebook introduced 360 Ads for immersive experiences
  - YouTube added 360 Ads for more impactful visuals
  - Twitter continued testing its Buy button

GOING MOBILE

- By 2015, mobile devices is the primary way in which we access the Internet

    - 78% of Facebook users access via mobile
    - 76% of Twitter users access via mobile
    - 40% of Youtube global watch is via mobile

Global Mobile vs. Desktop Internet User Projection, 2007 - 2015E
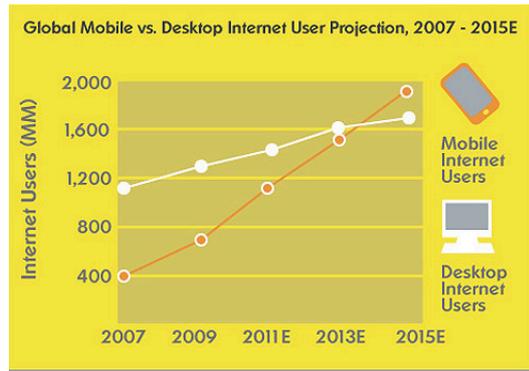
Source Social Stand Media (2014)

MOBILE vs DESKTOPS & LAPTOPs

Internet *Usage* (Engagement) Growth Solid
+11% Y/Y = Mobile @ 3 Hours / Day per User vs. <1 Five Years Ago, USA

Time Spent per Adult User per Day with Digital Media, USA, 2008 – 2015YTD

eMarketer June 2015

MOBILE USAGE

80% OF INTERNET USERS SEARCH VIA SMARTPHONES

9% SEARCH USING SMARTWATCHES

HOURS CONNECTED TO THE INTERNET

TV..............1.5 HOURS
PCs.............1.6 HOURS
MOBILE......1.8 HOURS
OTHERS.....2.1 HOURS

55% OF MOBILE DATA USAGE IS SPENT ON WATCHING VIDEOS

78% OF FACEBOOK USERS ARE MOBILE ONLY

50.3% OF ECOMMERCE WEB TRAFFIC COMES FROM MOBILE DEVICE

BY **2017** MOBILE COMMERCE WILL ACCOUNT FOR OF OVERALL COMMERCE REVENUES **24.4%**

60% OF GLOBAL MOBILE CONSUMERS USE MOBILE DEVICES AS PRIMARY INTERNET SOURCE

Syndacast.com 2016

ANDROID vs MOBILE

MOBILE
% who use the following OS on their mobile
● Android   ● iOS (for iPhone)

65% 60% 54% 47% 36%
13% 19% 21% 14% 28%

LatAm APAC Middle East & Africa Europe North America

TABLET
% who use the following OS on their tablet
● Android   ● iOS (for iPad)

27% 25% 25% 18% 18% 16% 15%
10% 10% 13%

LatAm Europe Middle East & Africa North America APAC

Android is the top operating system
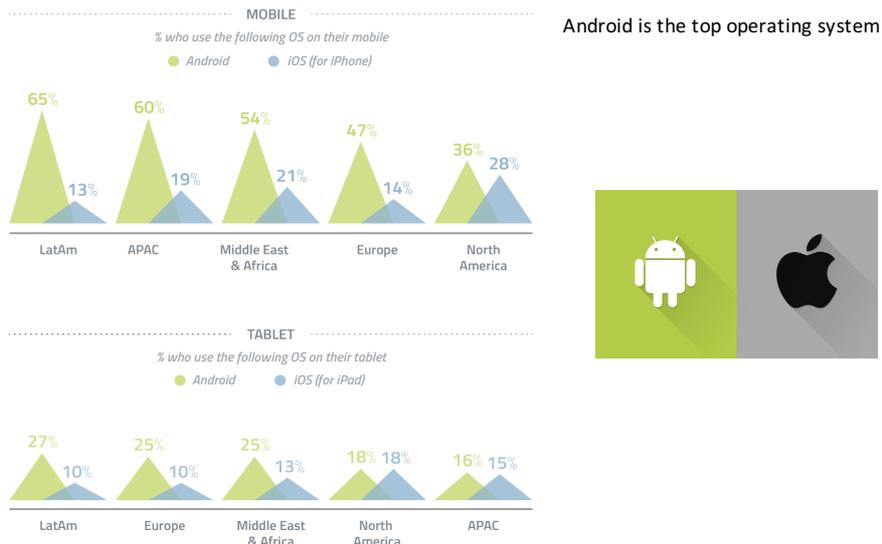
Globalwebindex Q2 2015

THE WEB, THE SOCIAL AND THINGS CONNECTIVITY

The reach of computing systems extended into the realm of physical assets
Sensors going to be the largest source of data

> 6 billion connected things in use worldwide in 2016, up 30% from 2015.
This number will reach about 21 billion by 2020

Gartner, Inc. Nov. 2015

Sensor-based

Community-based

Interactive

1990-2011   **2011 - 2015**   2015-onwards
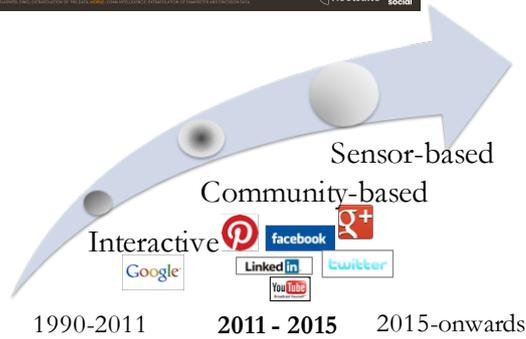
MINIATURIZATION OF TECHNOLOGY

February 22, 2016 Press Release

Heptagon (Singapore), today announced it has developed the world's smallest near-field optical sensing module based on the company's state-of-the-art wafer-level miniaturization technology. The new sensor has a **thickness of only 350 microns** and a **2 mm² surface area**, which includes a built-in illuminator, light sensor, electronics, crosstalk prevention features, and a lens system……
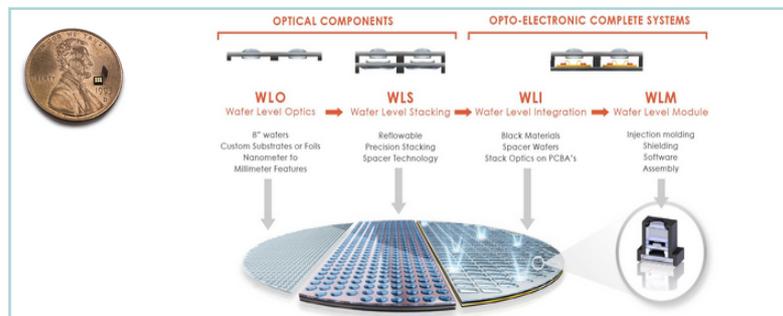
INTERNET OF THINGS

- A global network infrastructure with self-configuring capabilities based on standard communication protocols
- Where physical and virtual *things* have identities, physical attributes and are seamlessly integrated into the information network

Keynote Theater   Future Connected Cars   Smart Cities   Wearable Tech   Supply Chain & Logistics   Smart Home   IoT Architecture   Manufacturing   Healthcare

IoT Analytics   Energy & Agriculture   IoT Security   Technical Symposium   IoT Cloud   IoT & the Data Center   IoT Open Source   Ecosystem Center Stage

TRENDS AND APPLICATIONS

CLOUD COMPUTING

Interconnected users, devices and sensors are contributing to huge data volumes

A New computational paradigm based on *computation as a public utility* to face the information overload and processing requirements…….
(J. McCarthy, 1961):
- usage on demand and self-service
- measured service (*pay-as-you-go*)
- resource optimization
- scalability
- reliability
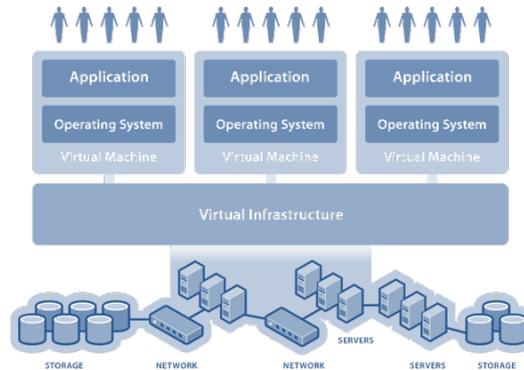
Centralized usage of resources, ubiquitous web-based access based on resource virtualization and Web 2.0 Rich Internet Applications

CLOUD COMPUTING MODELS

IaaS	PaaS	SaaS
App	App	App
VM	services	services
Server	Server	Server
Storage	Storage	Storage
Network	Network	Network

Infrastructure from facilities to hardware. Provides application interfaces to the infrastructure

App. development platform Allows developers to build applications

Self-contained environment for delivery of the entire user experience

Users are given larger degree of control on resources: storage, processing, network

For developers and integrators:

Publicly available applications

Amazon…

Google App Engine, MS Windows Azure

Google mail, docs, Flickr, CRM tools….

- Three distinct service models:
  - Infrastructure-as-a-Service
  - Platform-as-a-Service
  - Software-as-a-Service

- Three distinct implementation models:
  - Private cloud
  - Public cloud
  - Hybrid cloud

Enterprise shares control with Vendor

Vendor has control

SMART COMPUTING

Smart computing is utilizing the processing power of cloud computing to optimize business decisions in real time and convert data from social and sensors into both meaningful information and actionable intelligence

It refers to intelligent data analytics that can interpret data streams in real-time and make appropriate decisions. Smart systems are being implemented as *smart buildings, greener buildings, water management systems, smart cities, traffic congestion solutions, smart healthcare delivery, user profiling ……….*

Public Transport
Fleet management
Fare collection
Electric buses
Integrated multimodal transport network

Smart Buildings
Energy-efficient buildings
Smart homes
Smart museums

Traffic Management
Adaptive traffic control
Driving times
Trip planning
Parking availability

Smart Tourism
Personalized services
Crowd suorcing
User connectivity
Service sharing

eGovernment

Electricity/Water/Gas Smart Grid
Smart metering
Distribution management
Electric vehicles
Urban flooding

Smart Services
Street lighting
Smart tourism
Waste collection
Air pollution detection

INTELLIGENCE IN MACHINES

Machine Learning and Deep Neural Networks. Move beyond classic computing to create biologically inspired systems that can autonomously learn to perceive the world on their own

They ground on the availability of large masses of data to address key challenges in *computer vision, automatic speech recognition, natural language processing, audio recognition…..*
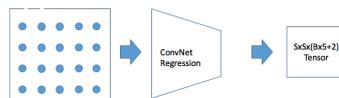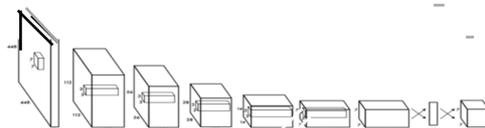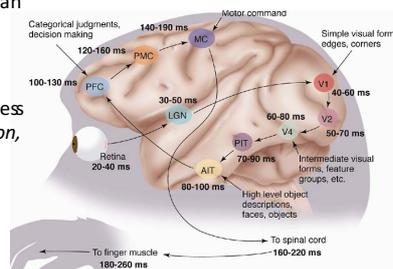
PROGRESS IN COMPUTER VISION

Computer Vision: a powerful artificial sense
to extract information from images: about
places, objects, people....

Fixed external cameras: to understand real
world observations, contextual behaviors
and situational conditions of people
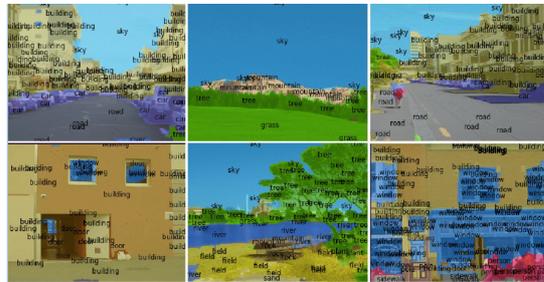
AUGMENTED HUMAN CAPABILITIES

Wearables as an industry and market are still
immature and struggle to find their place in
everyday life. But will be increasingly available
and used in the future...

Wearable cameras to augment the personal
experience providing the equivalent of multiple
simultaneously active eyes (in 2015   Google Glass
get a stop...)

The Apple watch starts create a rising tide

In 2015   Oculus Rift was introduced

In Feb 2016 Sony Xperia Eye announced

SEAMLESSLY FLOWING EXPERIENCE

The experience will seamlessly flow across a shifting set of devices and interaction channels blending physical and virtual environments

Increasing convergence of innovative technologies Mobile, Social, Cloud, Big Data, Internet of Things….. into applications and services centered on the user experience. Mobile apps will remain important but there will be a shift on providing an experience that exploits different devices, including IoT sensors, common objects…

EXPANDED REALITY

Larger video displays, interactive flat screens, video installations, 3D display and interactivity have become fixtures and communication tools

Provide an effective way to control the atmosphere, the nature of the presentation and the full sensory experience
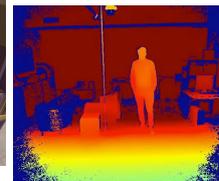
ADVANCED APPLICATIONS at MICC

The Social Museum and Smart Tourism Project
"Cluster Tecnologici Nazionali: Tecnologie per le Smart Communities"

- Reshaping visitors experiences in Italian cities of art and supporting providers and administrative bodies with smart services.

- Cloud-based web 2.0 technology platform, for tourists/citizens/operators of art cities:
  - Internet of Things to improve awareness and interactivity in museums and outdoor
  - Visitors' flow and behavior understanding and anomaly detection using computer vision
  - Augmented reality on mobile devices with indoor /outdoor localization
  - Visitor social profiling solutions from social networks and sensors to provide personalized suggestions and content
  - ….

Florence, Venice
experimental areas

ADVANCED APPLICATIONS at MICC

NEMECH experiences
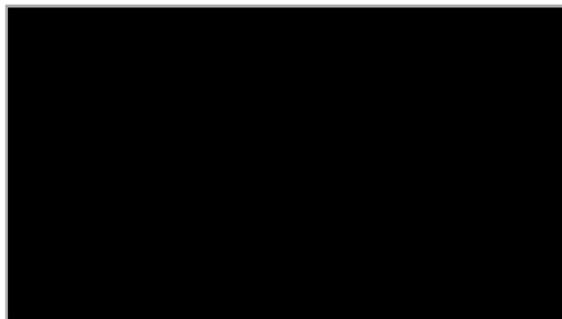
Computer Vision enabling technology

The MNEMOSYNE project
at Bargello Museum in Florence

05/04/17

ADVANCED APPLICATIONS at MICC

NEMECH experiences

Wearable vision system

Computer Vision enabling technology

Progettazione e Produzione Multimediale
(PPM) Course
2016-2017 Edition

What do we cover with PPM this year

This (and other) is covered in the Course of Visual and Multimedia Recognition next in your future.....
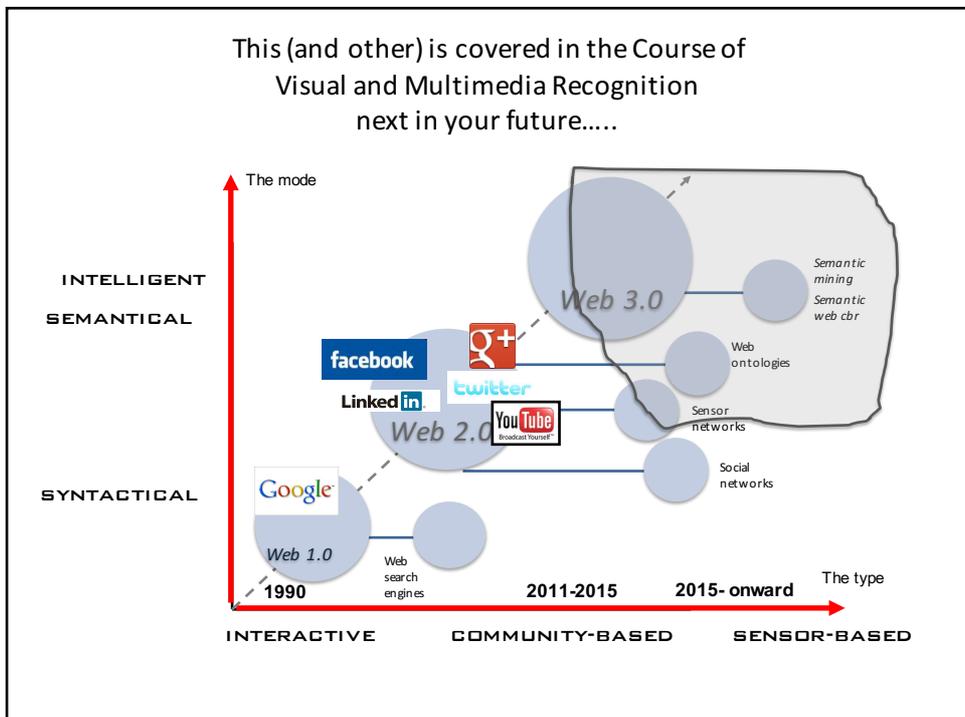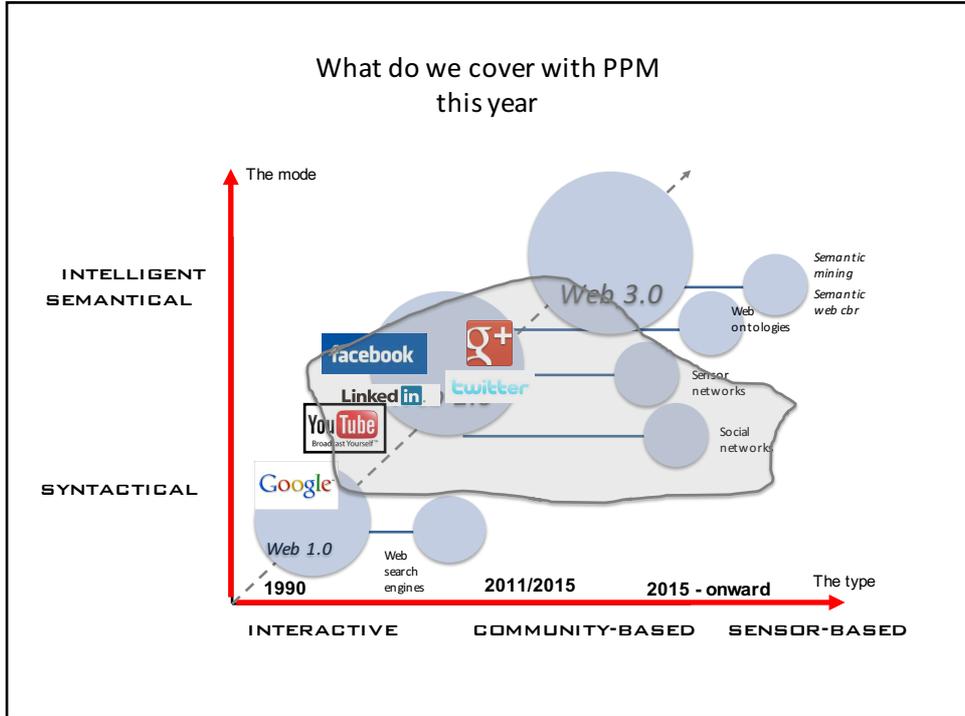
Progettazione e Produzione Multimediale course
this year…………

- PART I   media and media formats
    - Color and color images; video;
    - WORDPRESS development platform
    - Laboratory I
- PART II   web programming
    - HTML5, CSS, Boostrap development framework
    - Web Interface design
    - JAVASCRIPT (basics)
    - Laboratory II
- PART III client-server programming
    - PHP, AJAX, JQUERY
    - Laboratory III
- PART IV going social and mobile
    - Mobile programming PhoneGap

In short

- PART I media and media formats
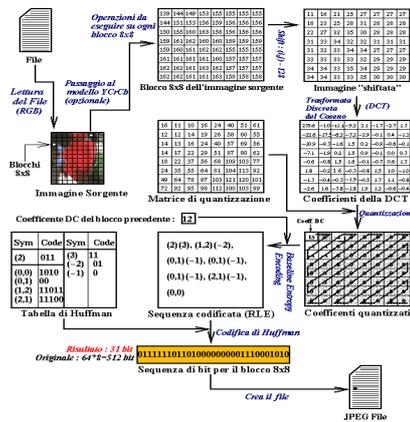
In short

- PART II web programming
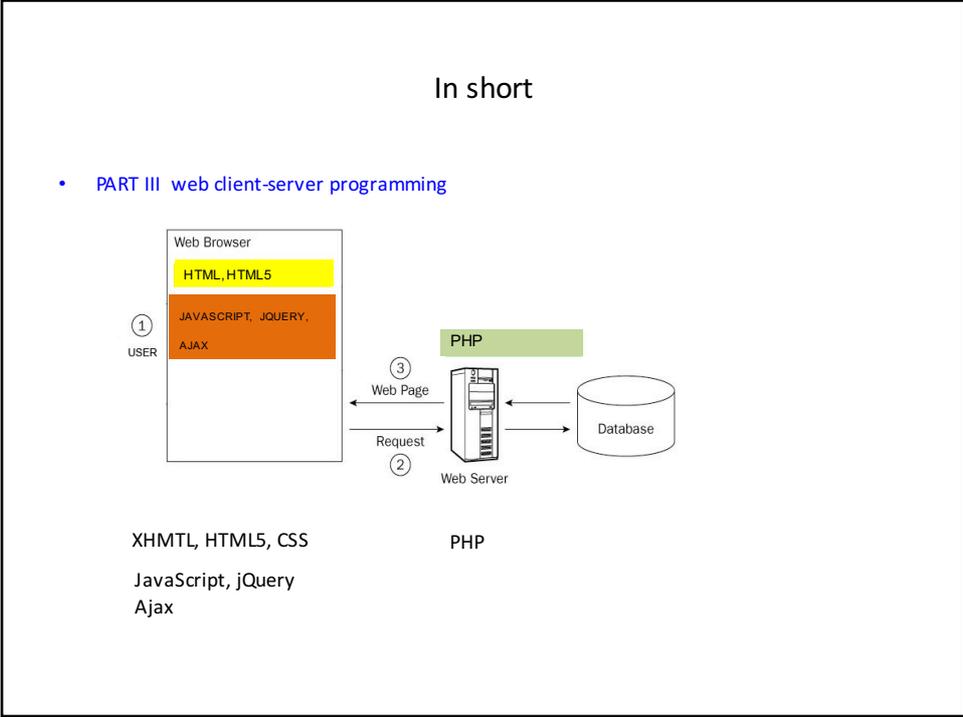
Web Browser

HTML, HTML5

① USER

③ Web Page

② Request

Web Server

Database
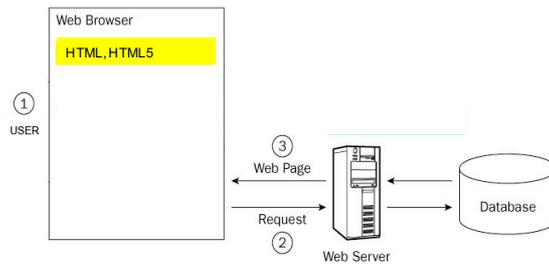
XHMTL, HTML5, CSS

In short

- PART II Web interface design

W3C World Wide Web Consortium
Usability and accessibility guidelines

Plan

Research

User-Centered Design

Measure

Design

Adapt

SITE NAME

WELCOME TO OUR SITE
Fresh Ideas for your business

In short

- **PART III web client-server programming**

XHMTL, HTML5, CSS   PHP

JavaScript, jQuery
Ajax
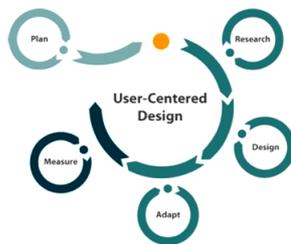
In short

- **PART IV Mobile programming**

Mobile application development platforms:

JQuery mobile
PhoneGap

In short

- PART V Sensors interfacing
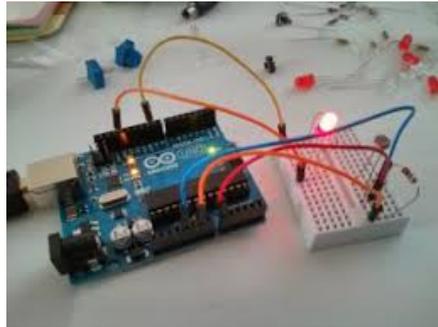
Arduino
development
platform (intro)

i-beacon

Multimedia Design and Production

- **COURSE CREDITS   6**

- **CLASS SCHEDULE**
  Frontal lessons: Plesso Didattico Morgagni
    - Tuesday 14.00 – 16 pm   Room 13
    - Wednesday 8.15– 11.15 am   Room 8

- **LABORATORY**
    - Tuesday 14.00 – 16 pm   Room 106 (when scheduled)
    - Wednesday 8.15– 11.15 am   Room 106 (when scheduled)

    - MICC Media Integration and Communication Center, Viale Morgagni 65

- **MODALITIES**
  - Class participation (optional);
    - Class partecipation includes attending frontal lessons by the instructor
  - Test exam and Laboratories (mandatory);
    - Laboratory includes incremental development of a project
  - Final project development (mandatory);
    - (individual or two-students) held at MICC; the following options are available:
      - small-scale project (approx 1 man-month)   for the Course exam only
      - medium scale project (approx 2-3 man-months)   for the Course exam and Thesis
  - Review/presentation (mandatory)

- **EXAM GRADING**
  - 40% class participation and laboratories, 50% final project, 10% Review/presentation

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- **COURSE SLIDES**
  - Free pdf copy downloadable at:
  - http://www.micc.unifi.it/delbimbo/teaching/multimedia-design-and-production (password protected: stud3nts)

- **REFERENCES**
  - Given at the end of each Course part