

IBM Watson

L'approccio cognitivo alla Sanità



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Raised Lighter Tribute

Holding up lighters at a concert has been occurring since at least as early as the late 1960s



Smartphone Light Tribute

Same feeling, same passion different asset and more than lights ?

BIC® CONCERT LIGHTER APP HOW TO GET IT

Download the BIC Concert Lighter App from the iTunes® Store, BlackBerry App World™ or search for it in the Android Market. You may also use one of the available barcode scanner apps on your phone to scan the appropriate QR code:

BLACKBERRY
APP WORLD™



BlackBerry App
World™

ITUNES STORE



iTunes® Store

FOR ANDROID™



Android,
Search "BIC Lighter"



Android is a trademark of Google Inc. Use of this trademark is subject to Google Permissions.

Digitization does impact the business

Disruptive Innovation

The biggest taxi company
owns no cars.



Alibaba

The largest retailer
carries no inventory.



The largest accommodation company
owns no real estate.



The biggest media company
owns no content.



.... What's next ?



Cloud Computing



Mobile

Big Data

Sicurezza



Social Media



Internet of Things

Data the new resource for economic development



Oil & Gas

80,000 sensors in a facility
produce **15 petabytes** of data



Public Safety

520 terabytes of data are produced
by New York City's surveillance cameras each day



Energy & Utilities

680m+ smart meters will produce
280 petabytes of data by 2017



Healthcare

The equivalent of **300 million** books of health
related data is produced per human in a lifetime

Data



Information



Knowledge



Cognitive Systems Era

Tabulating Systems Era



Programmable Systems Era



... learn and interact naturally with people to extend what humans can do on their own. They help us solve problems by penetrating the complexity of Big Data.

Three capabilities differentiate cognitive systems from traditional programmed computing systems...



Understanding

Cognitive systems understand like humans do.



Reasoning

They reason. They understand underlying ideas and concepts. They form hypothesis. They infer and extract concepts.



Learning

They never stop learning getting more valuable with time. Advancing with each new piece of information, interaction, and outcome. They develop “expertise”.

.... allowing them to interact with humans.

Cognitive systems are creating a new partnership between humans and technology.

Humans excel at:

- COMMON SENSE
- MORALS
- IMAGINATION
- COMPASSION
- ABSTRACTION
- DILEMMAS
- DREAMING
- GENERALIZATION



Cognitive Systems excel at:

- LOCATING KNOWLEDGE
- PATTERN IDENTIFICATION
- NATURAL LANGUAGE
- MACHINE LEARNING
- ELIMINATE BIAS
- ENDLESS CAPACITY

PIENSE

THINK

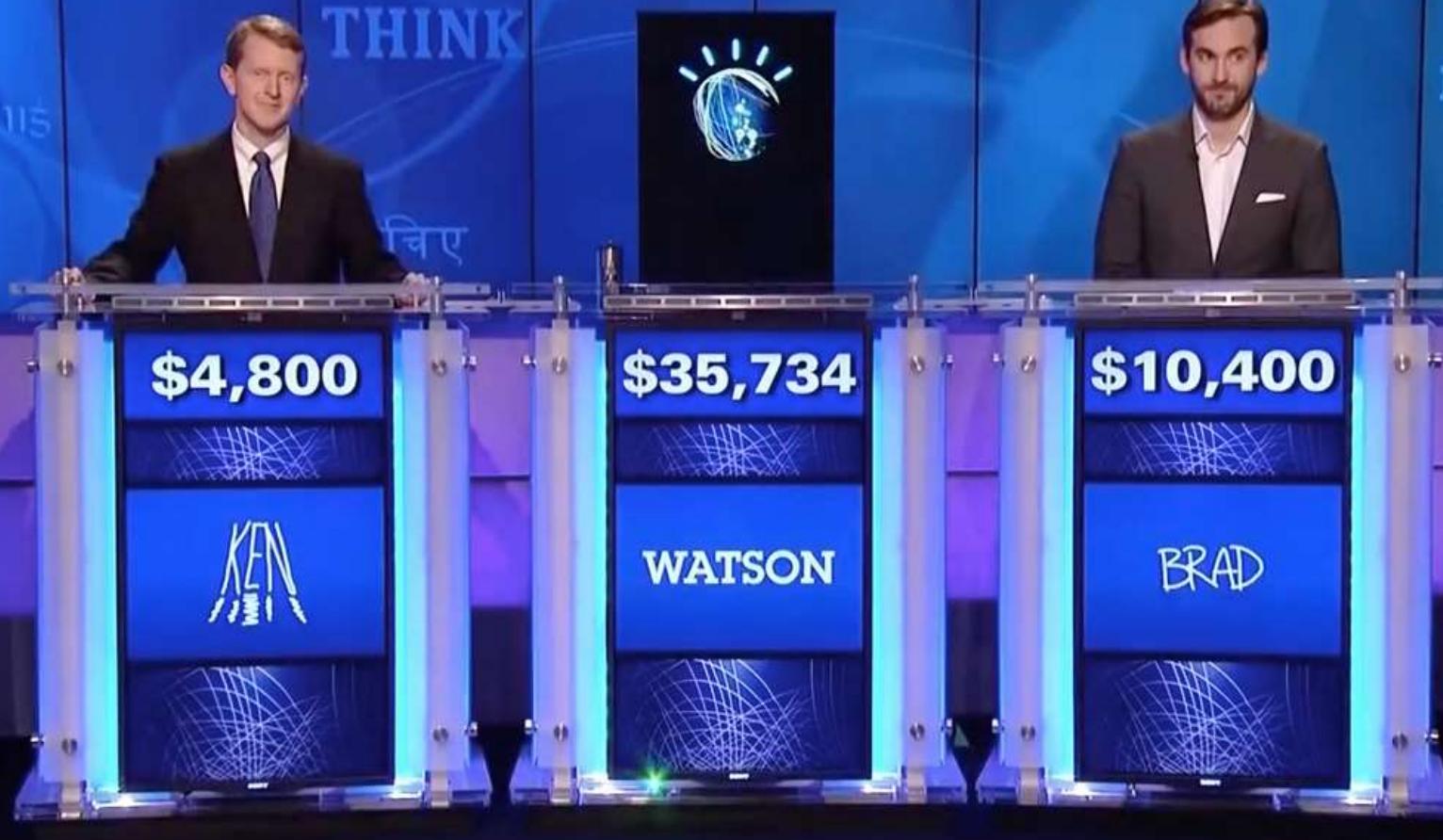
ΣΙΜΑΩΝΙΣ

चिए

ΣΚΕΨΟΥ

DENKE

PENSER



Cognitive systems rely on collections of data and information

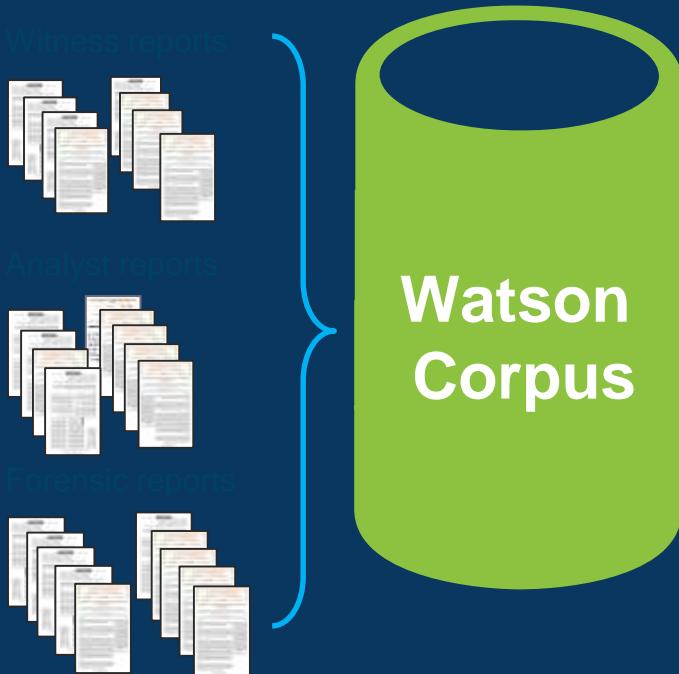


Data, information, and expertise
create the foundation.

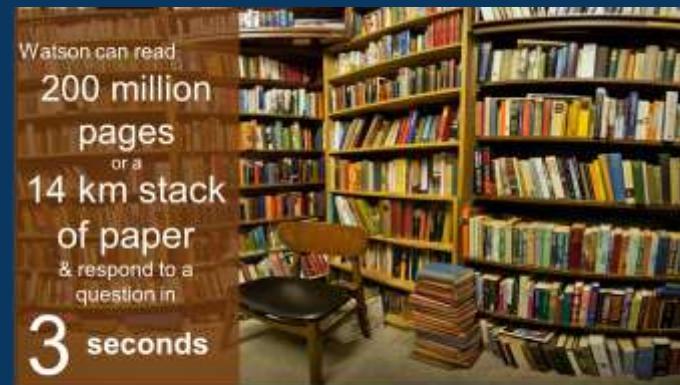
Examples include:

- | | |
|----------------------|------------------------------|
| Analyst reports | Newspapers |
| tweets | Blogs |
| Wire tap transcripts | Wiki |
| Battlefield docs | Court rulings |
| E-mails | International crime database |
| Texts | Stolen vehicle data |
| Forensic reports | Missing persons data |

... unlocks unstructured data and aids breakthrough insights....



Watson
Reads



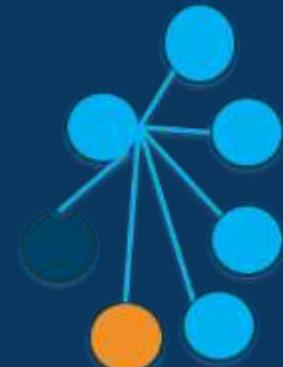
Watson
Evaluates



Weighs and
Scores Evidence

- Quantity
- Proximity
- Relationship
- Domain Truths

Watson
Links



... leverage Watson APIs to apply cognitive capabilities

50 underlying technologies

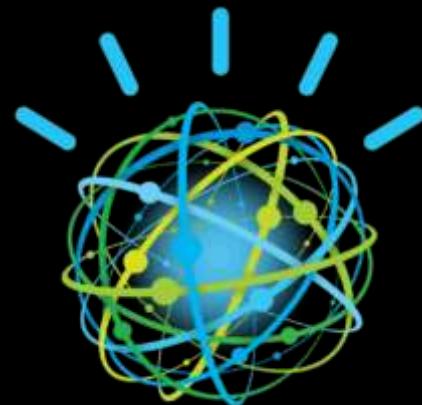
Entity Extraction	Natural Language Classifier
Sentiment Analysis	Personality insights
Emotion Analysis (Beta)	Relationship Extraction
Keyword Extraction	Retrieve and Rank
Concept Tagging	Tone Analyzer
Taxonomy Classification	Emotive Speech to Text
Author Extraction	Text to Speech
Language Detection	Face Detection
Text Extraction	Image Link Extraction
Microformats Parsing	Image Tagging
Feed Detection	Text Detection
Linked Data Support	Visual Insights
Concept Expansion	Visual Recognition
Concept Insights	AlchemyData News
Dialog	Tradeoff Analytics
Document Conversion	
Language Translation	



La trasformazione digitale in Sanità



IoT Mobile Social
Empowerment
Pazienti



Big Data
Sistemi Cognitivi
Medicina
Personalizzata

FSE - Continuità Assistenziale



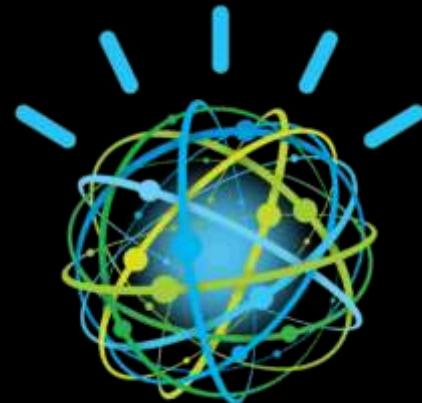
Sistemi Gestionali e Clinico-Sanitari



La trasformazione digitale in Sanità



**IoT Mobile Social
Empowerment
Pazienti**



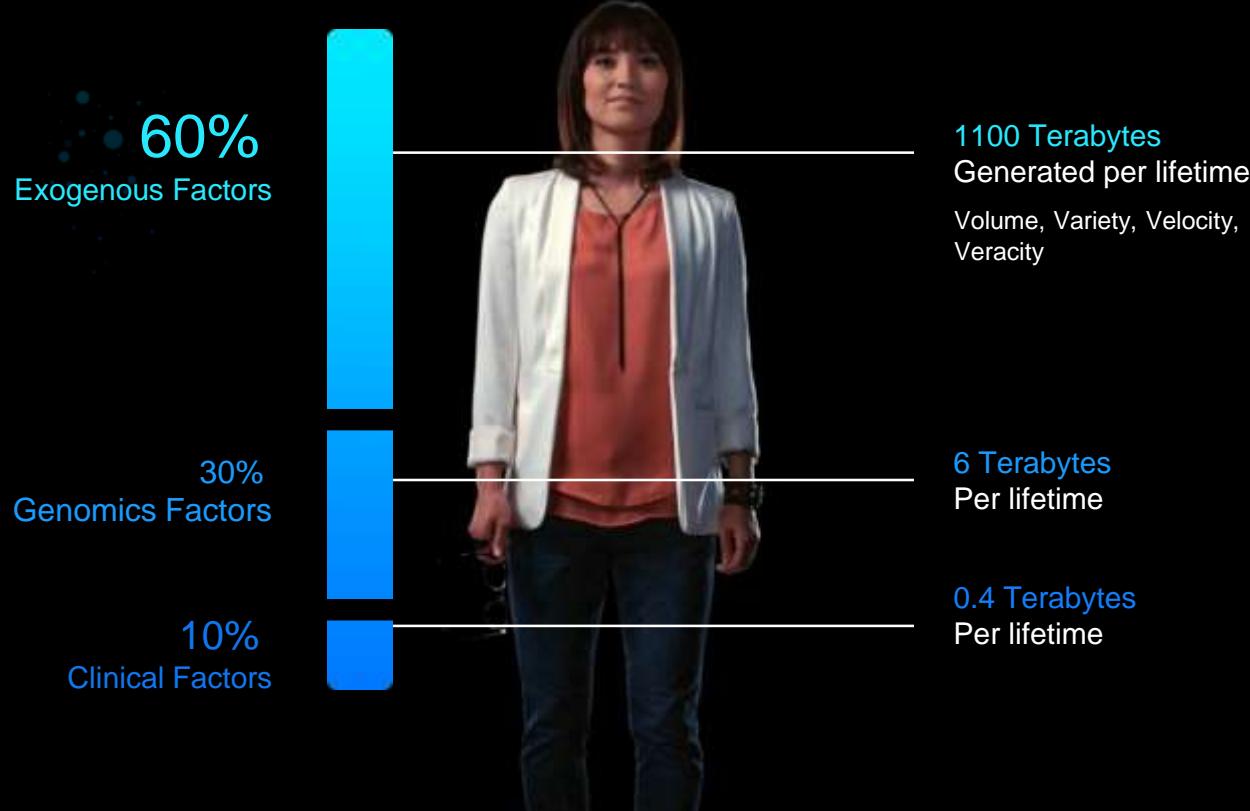
**Big Data
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Sistemi Gestionali e Clinico-Sanitari

Una enorme quantità di dati inesplorati e esterni ai sistemi sanitari è determinante per la nostra salute



IBM Watson Oncology Advisor



Analisi della corpora
medico-scientifica

MSK Best Practice

Trattamenti basati sull'evidenza
Medicina Personalizzata

**Watson Oncology Advisor is working
with leading oncology centers in the
world for diagnosis and prescription
(EBM)**

- 5000+ ore di training MSK
- 600k testi specializzati
- 12 Milioni pagine testuali
- 290+ riviste specializzate





Patient EMR

Patient Details MRN: 040103110830840 Name: Lin J. Yamato Age: 37

SUMMARY | ENCOUNTERS | CONDITIONS | ALLERGIES | MEDICATIONS | LABS | PATHOLOGY | IMMUNIZATIONS | **IMAGING** | PROCEDURES | DOCUMENTS | CLINICAL SUMMARY

<input checked="" type="radio"/> From date:	<input type="text"/>	To date:	<input type="text"/>	Show	Show all
<input type="radio"/> Last:	<input type="text"/>	Units:	<input type="text"/>	Send to EMR	Reset

Imaging Report

Imaging

Sort By:

- Modality
- Ordered by
- Date

Expand all

Collapse all

MRI



CT (3)



CT Chest (2)

02/07/2012:
Joanne Cameron / Chest

CT Abdomen (1)

08/12/2009:
Joanne Cameron / Abdomen

Report

Chest CT Report

Referring Physician

Dr. Joanne Cameron

Source

N/A

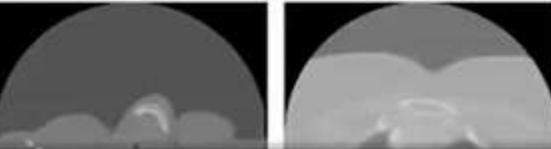
Referral Date

01/05/2012

Electronically Signed

Dr. Joanne Cameron

HIDE IMAGE



Imaging Details

Ordered by

Dr. Joanne Cameron

Indication

Abnormal chest x-ray

Status

Signed

Ask Watson



Patient EMR

Patient Details: IDN: 04010210020010 - Name: Luigia Mazzola - Age: 27

Watson has analyzed:

3,469 Textbooks

69 Guidelines

247,460 Journal articles

61,540 Clinical trials

106,054 Other clinical documents

IBM WATSON

WATSON INTEGRA I DATI DEL PAZIENTE CON LA CORPORA SCIENTIFICA

Treatment Options to Consider

Current Treatments

Clinical Trials

WATSON:

Insufficient information is available to provide treatment options with high confidence. See the Test Options tab for additional tests that would provide the needed information.

Clinical trials are an equivalent option to the top ranked treatment plan shown and should always be considered.

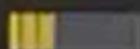
[Request Pre-auth](#)

Treatment Plan	Confidence	Patient Preferences Match
Treatment plan 1 Systemic Chemo: Cisplatin, Paclitaxel, Bevacizumab	32%	TBD match with patient preferences
Treatment plan 2 Systemic Chemo: CARBOPLATIN, Paclitaxel, Bevacizumab	30%	TBD match with patient preferences
Treatment plan 3 Systemic Chemo: Erlotinib	28%	TBD match with patient preferences

Treatment plan 1

Systemic Chemo: Cisplatin, Paclitaxel, Bevacizumab

32%



TBD

match with patient preferences

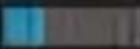


ONCOLOGY

Treatment plan 2

Systemic Chemo: CARBOPLATIN, Paclitaxel, Bevacizumab

30%



TBD

match with patient preferences



ONCOLOGY

Treatment plan 3

Systemic Chemo: Erlotinib

28%



TBD

match with patient preferences



ONCOLOGY

Radiation and Surgery are unlikely to be appropriate.

Case Information

Test Options

Treatment Options



IBM WATSON

WATSON PROPONE I PRIMI TRE PERCORSI

Patient EMR

Patient Details

Treatment Options to Consider

Current Treatments Clinical Trials

WATSON:

Treatment options are listed based on the information available.

Clinical trials are an equivalent option to the top ranked treatment plan shown and should always be considered.

Request Pre-auth

Treatment Plan	Confidence	Patient Preferences Match
Treatment plan 1 Systemic Chemo: Cisplatin, Pemetrexed	90%	Acceptable match with patient preferences
Treatment plan 2 Systemic Chemo: Carboplatin, Pemetrexed	25%	Acceptable match with patient preferences
Treatment plan 3 Systemic Chemo: Carboplatin, Paclitaxel	25%	Unacceptable match with patient preferences
Treatment plan 4 Systemic Chemo: Erlotinib	8%	Preferred match with patient preferences

EVIDENCE EVIDENCE EVIDENCE EVIDENCE

Case Information Test Options Treatment Options

IBM WATSON

WATSON ESAMINA ANCHE I CLINICAL TRIAL E PROPONE UNA NUOVA VISTA DELLE ALTERNATIVE DI TRATTAMENTO



cancer

Cancer is a disease where cells grow in an abnormal way. In cancer, cells divide without normal control and can invade other tissues, a process called metastasis.

Normal cells in the body follow an orderly path of growth and division. They die at the right time and are replaced by new cells. Cancer cells do not follow this normal pattern. They continue to grow and divide even when new cells are not needed. These extra cells can form a tumor, or cancerous growth.

Abnormal cells can also spread from the original tumor to other parts of the body. This process is called metastasis. Metastasis occurs when cancer cells break away from the original tumor and travel through the blood or lymphatic system to other parts of the body.

There are many types of cancer, each with its own unique characteristics. Some cancers are more aggressive than others, and some are more responsive to treatment than others.

The cause of cancer is not fully understood, but it is believed to be the result of genetic changes in the DNA of cells. These changes can be triggered by various factors, such as exposure to tobacco smoke, ultraviolet radiation, or certain chemicals.

Treatment for cancer depends on the type and stage of the disease. Common treatments include surgery, chemotherapy, radiation therapy, and immunotherapy.

Consente ai clinici di abbinare i pazienti ai potenziali clinical trial oncologici attraverso sistemi cognitive

Estrae informazioni dale cartelle cliniche dei pazienti, legge e comprende criteri di inclusion e esclusione dai clinical trials .

IBM Watson Discovery Advisor

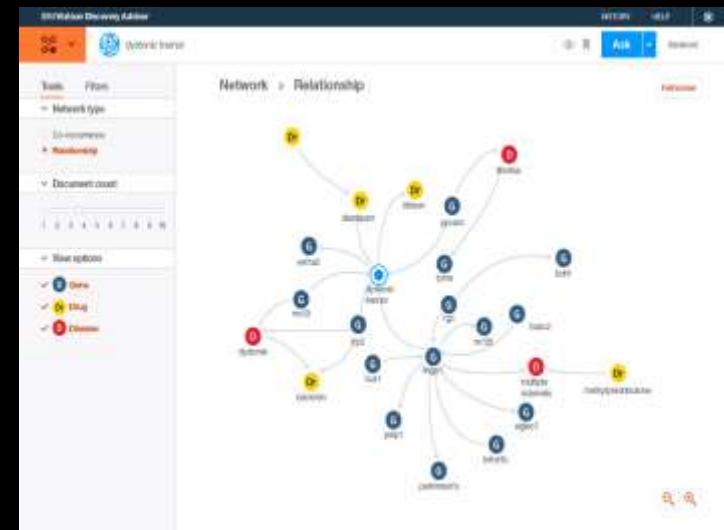


Analisi correlazione (geni, proteine, malattie, farmaci, ..)

Valutazione tossicità e sicurezza nuovi farmaci

Comparazione dei trattamenti

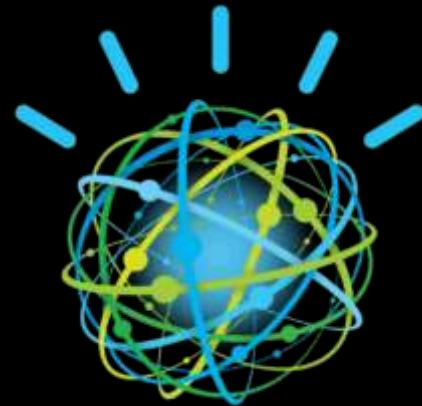
Farmaco-vigilanza



La trasformazione digitale in Sanità

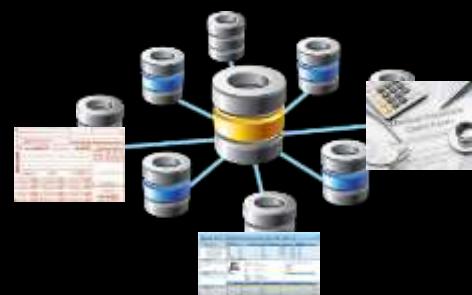


IoT Mobile Social
Empowerment
Pazienti



Big Data
Sistemi Cognitivi
Medicina
Personalizzata

FSE - Continuità Assistenziale

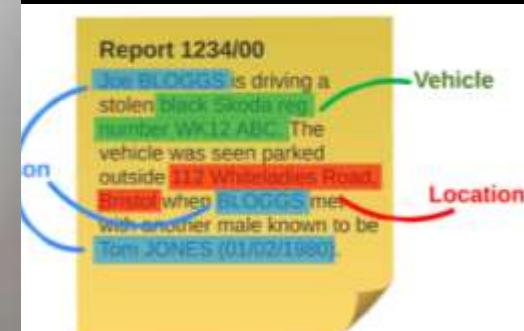
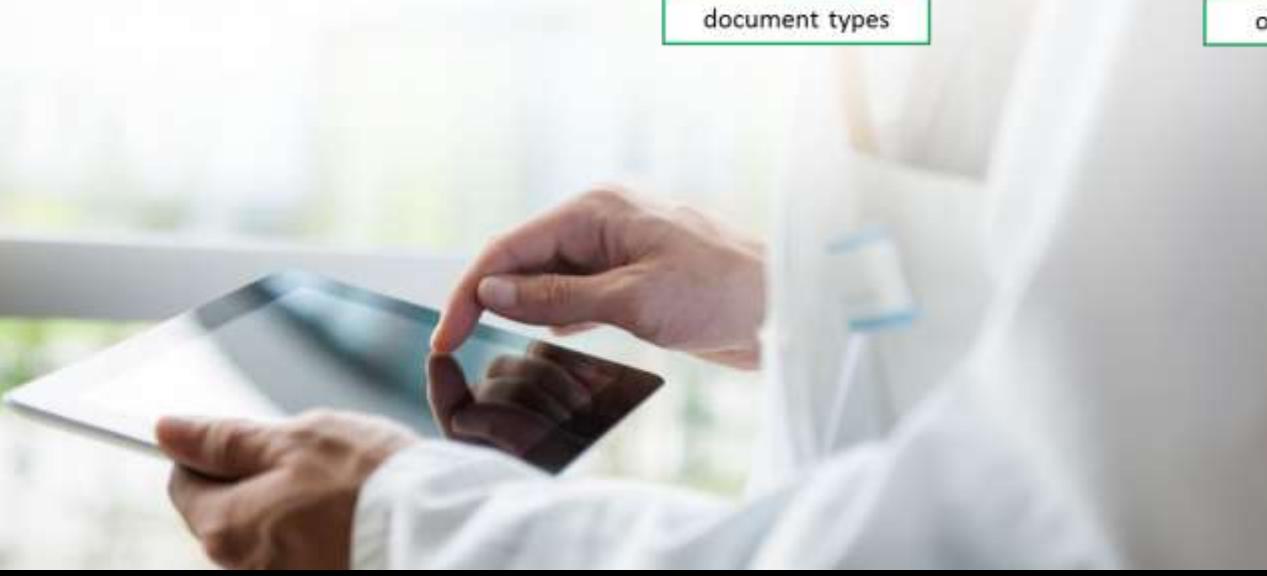


Sistemi Gestionali e Clinico-Sanitari

Watson Explorer - Estrarre valore dal FSE - Patient Summary

The screenshot displays a complex interface for extracting data from a Patient Summary (FSE). The interface is organized into several panels:

- time scale:** A chart showing the number of stays over time, with a callout "Stays with duration".
- number of stays:** A large blue circle containing the number 56.
- diagnosis:** A list of diagnoses extracted from the documents.
- medication:** A list of medications extracted from the documents.
- procedures:** A list of procedures extracted from the documents.
- diagnosis normalized to ICD-10:** A list of diagnoses normalized to the ICD-10 standard.
- document types:** A list of document types, including Thesis, Unpublished, and Patient敂tchet.
- original documents:** A panel showing the raw text of the original medical documents.



IBM Care Management

Visione del paziente a 360° gradi



Integrazione dei servizi sanitari e socio assistenziali

Continuità assistenziale

PDTA

Coordinamento e collaborazione del team di cura

Interazione basata su app e con pazienti, famiglie, operatori,...

Standardizzazione e diffusione Best Practice

Evidence Based Medicine

SCHEDE DEI FARMACI

NAZIONALI MICROMEDEX



Controllo e valutazione della letteratura ad opera di un “Editorial Board” interno

Conformità ai criteri di prescrizione dell'AIFA alle classificazioni dei farmaci in costante evoluzione

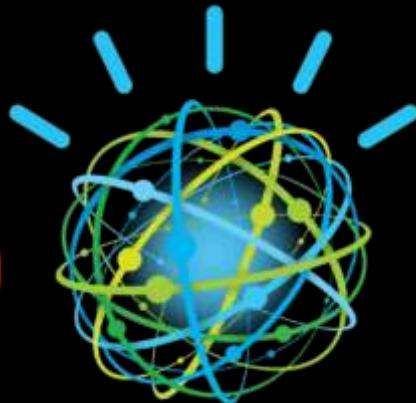
Citazioni complete delle evidenze per una più facile decisione sull'uso off-label.
Riferimenti testuali e letteratura primaria completa

²⁸
Valutazioni sulle solidità dell'evidenza e sull'efficacia linee guida complete

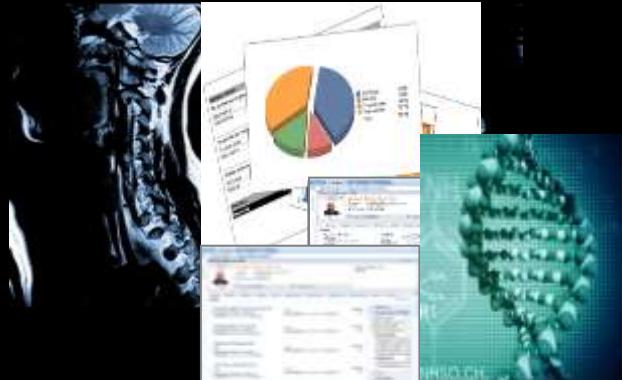
La trasformazione digitale in Sanità



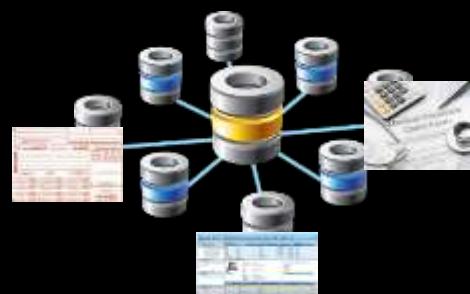
**IoT Mobile Social
Empowerment
Pazienti**



FSE - Continuità Assistenziale



**Big Data
Sistemi Cognitivi
Medicina
Personalizzata**



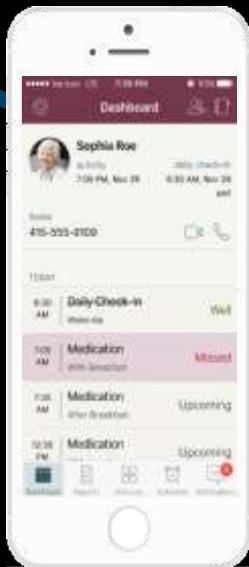
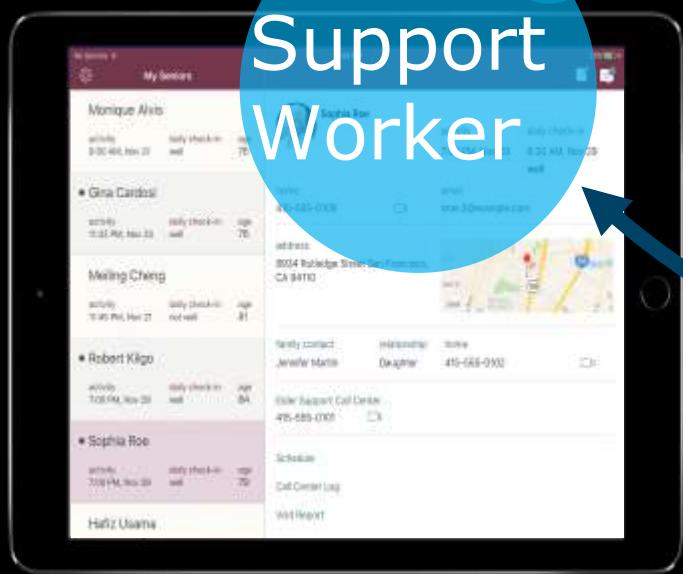
Sistemi Gestionali e Clinico-Sanitari

Global Apple + IBM Apps for Elder Services

Elder
at
Home

Support
Worker

Family /
Loved
Ones



IBM Watson™ Conversation



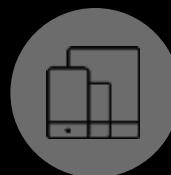
Unisce machine learning, comprensione linguaggi natural e strumenti di dialogo per creare un ingaggio automatic dell'individuo

Chatbots per Twitter
Facebook e Web

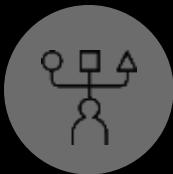
Call Centers, Virtual Assistant, Portali interattivi guidati



Create natural language interactions with the customer, including Q&A and onboarding.



Maintain cross-platform mobile and web experience.



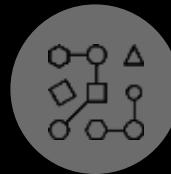
Walk customers through business processes like application forms or resetting a password.



Robot SDK is available now. Watson also has partnerships with leading robotic manufacturers.



Detect emotional states and responds in appropriate ways.



Incorporate advanced Machine Learning capabilities.

APP «cognitive» powered by Watson

IBM



IBM Watson Health Cloud - Ecosistema per la Sanità

- Real-world evidence
- Discovery advisor
- Clinical trials
- Oncology advisor
- Genomic advisor
- EMRA
- Radiology
- Cardiology
- Oncology
- Ophthalmology



“Coping With Humans”
Support Group

Questions?



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