Intelligenza Artificiale e nuove tecnologie per la demenza

Cristian Leorin
cristian.leorin@unipd.it
Contenuti

- Intelligenza Artificiale
- Horizon 2020 e Progetti Europei
- ICT e Tecnologie Assistive
- E-Health and integrated care
- Presente e Futuro...

cristian.leorin@unipd.it
“The question for all of us”, is, how can we use technology to make the quality of life better as people get older?”

Gill Pratt
Could artificial intelligence make doctors obsolete?

*BMJ* 2018; 363 doi: https://doi.org/10.1136/bmj.k4563 (Published 07 November 2018)
Cite this as: *BMJ* 2018;363:k4563

AI (artificial intelligence) is the simulation of human intelligence processes by machines, especially computer systems. These processes include **learning** (the acquisition of information and rules for using the information), **reasoning** (using rules to reach approximate or definite conclusions) and **self-correction**.
Artificial Intelligence for Dementia Diagnosis – Genetic Analysis, Speech Analysis, and More

Last updated on February 10, 2019, published by Kumba Sennaar
Kumba covers emerging technology research breakthroughs and news at TechEmergence. She has performed research through the National Institutes of Health (NIH), is an honors graduate of Rensselaer Polytechnic Institute and a Master’s candidate in Biotechnology at Johns Hopkins University.

Dementia AI Applications Overview

The majority of AI use-cases for predicting dementia appear to fall into four major categories:

- **Speech Monitoring**: Companies are using machine learning to analyze speech patterns to detect and monitor dementia progression.

- **Medical Image Analysis**: Companies are developing software using machine learning to analyze brain deterioration from scans to help predict the onset of dementia.

- **Visual Indicators**: Companies are training algorithms to assess eye movement patterns to track and correlate cognitive function and brain activity.

- **Genetic Analysis**: Companies are using machine learning to analyze genetic data to predict the onset of dementia.
The challenges

- Ageing population
- Increased disease burden
- Unsustainable and unequal health & care systems
- Health & care sector under pressure to reform
“Silver Tsunami” = an existential risk to society

- **Older citizens depicted as:**
  - A burden to caregivers, families, communities...
  - Slower at pretty much everything
  - Incapable of changing their ways
  - Frail, forgetful, ill, foolish, incompetent, repulsive
  - Can’t or don’t want to learn new things.
Transforming Health and Care

- Acute care → Long-term-care
- Single Diseases → Multiple chronic conditions
- Passive Patient → Active consumer
- Institutional care → Home care
- Generic Approach → Personalised Care
CASE STUDIES

- Geriatric Care
- Mental Health
- COPD
- Diabetes

CROSS-CUTTING THEMES

- Financial Models for Care Integration
- Care Process Design
- IT Management
- Patient Involvement
- Financial Flows
WHO global strategy on integrated people-centred health services 2016-2026

Executive Summary

Placing people and communities at the centre of health services
WHO global strategy on integrated people-centred health services 2016-2026
Assistive Technology Definition

Any item, piece of equipment, or product system whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities.
Business Model Evolution in Healthcare Emphasizes Actionable Information

Historic/Evidence Based Care
- Sell Parts/Hardware
- Consumables/Upgrades
- Repair/ Maintenance Support
- Leasing and Buying Support

Differentiation solely through product innovation
- Medical Products

Real-time Outcome based Care
- Product-as-a-Service
- Data-as-a-Service
- Platform-as-a-Service
- Managed Services

Differentiation by providing services to key stakeholders such as Physicians, Patients and Payers

Predictive & Preventive Care
- Insight-as-a-Service
- Automation-as-a-Service
- Robotics-as-a-Service

Differentiation via intelligent solutions for evidence/outcome based health benefits to demonstrate value to end-users
- Intelligence
- Services
- Medical Products

Medical Platforms
- Wearables/ Biosensors
- Big Data & Health Analytics
- IoMT
- mHealth

Medical Solutions
- Artificial Intelligence
- Augmented Reality
- Robotics

Last Decade

Current Decade

Next Decade

Source: Frost & Sullivan
Today in healthcare, individuals are often segmented into broad demographic categorizations. This one size fits all approach leads to initiatives that have low compliance, and often fail to achieve desired milestones. By creating a more comprehensive view of the individual, healthcare stakeholders are discovering new ways to engage consumers and truly impact healthy outcomes.
AI Systems Critical to Deployment of Internet of Medical Things

The Internet of Medical Things (IoMT) entails any ecosystem of connected medical technologies supporting targeted health and well-being services. Applications are often developed in coordination with multiple stakeholders who specialize in specific aspects of solution development and deployment.

Solutions may be tailored to one use case, or bridge across various layers of the care continuum.
 Technologies to support community-dwelling persons with dementia: a position paper on issues regarding development, usability, effectiveness and cost-effectiveness, deployment, and ethics  

http://dx.doi.org/10.2196/rehab.6376

Summary:

• avoiding replication of technology development that is unhelpful or ineffective
• focusing on how technologies succeed in addressing individual needs of persons with dementia.
• It is suggested to include these recommendations in national and international calls for funding and assistive technology research programs.
• practitioners, policy makers, care insurers, and care providers should work together with technology enterprises and researchers to prepare strategies for the implementation of assistive technologies in different care settings.
Gestisci in modo semplice le tue medicine

Calendula è un assistente per la gestione personale delle medicine che ti aiuterà a seguire le tue prescrizioni mediche senza impostare migliaia di promemoria sul tuo telefono od avere paura di dimenticare di assumere farmaci.
Imposta dose e trattamento, associali alla tua routine giornaliera e lascia che Calendula lava per te.

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Calendula fornisce:
- Un'interfaccia semplice ed intuitiva
- Promemoria per l'assunzione di medicine, con allarmi completamente configurabili
- Trattamenti flessibili, con opzioni specifiche per pillole contraccettive ed altri medicinali con periodo di sospensione
AI in Clinical Applications

- Oncology Diagnostic Assistance
- Medical Image Processing
- Physician and Hospital Error Reduction
- Analysis of Patient’s Electronic Health Records
- Population Health Management
- Predictive Care Guidance
- Effectiveness of Care Metrics

Source: Frost & Sullivan
From user integration
To co-creation

Phase 1: Understanding
- Understand needs of end-user groups
- Understand state-of-the-art of technology

Phase 2: Conceptualization
- Specify target group
- Create ideas to fulfil needs identified in Phase 1
- Develop use cases

Phase 3: Testing
- Test components or system in realistic / real environments
- Repeat tests if necessary

Business Modelling
- Create business model
- Test business model (e.g., pricing)

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The *Connected Health Summer School* is an annual multi-disciplinary training programme designed for researchers interested in the development of new eHealth services and apps. The aim is to create an international and intersectoral network of researchers and professionals that fosters mutual knowledge exchange in the field of smart environments technologies for persons with dementia.
How can assistive technology help?

Assistive technology can:

- help you to live more independently;
- provide support and reassurance; and
- reduce the risk of accidents.

Assistive technology can help you to do things like:

<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
<td>Remember days, dates and time.</td>
</tr>
<tr>
<td>Find things.</td>
</tr>
<tr>
<td>Take your medication on time.</td>
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<tr>
<td>Keep in touch with family and friends.</td>
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<tr>
<td>Continue to do things that you have always done.</td>
</tr>
<tr>
<td>Let you know if the gas is left on.</td>
</tr>
<tr>
<td>Let you know if a tap is left running.</td>
</tr>
<tr>
<td>Raise an alarm.</td>
</tr>
<tr>
<td>Let people know where you are if you become lost or disorientated.</td>
</tr>
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COME L’IA RIVOLUZIONA L’ELDERLY CARE

1. At home health monitoring
2. Smart device assisted daily living
3. Smart device assisted fall detection
4. Virtual companions
5. Anti-aging research
Come procedure...

Tech Working Group

- Co-Design and Co-creation
- Interdisciplinary group
- Real experts (PWD) – New roles
- Bottom-up solutions
- Calm technology: no innovation 4All
- Integrated care and interoperability
- Ethical issues
Statement on Artificial Intelligence, Robotics and ‘Autonomous’ Systems
GRAZIE!

Cristian Leorin

cristian.leorin@novilunio.net

cristian.leorin@unipd.it

www.novilunio.net