AI for Health and Well-being @UNIBO

**ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA**

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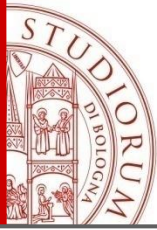
MISSION

To develop, apply, evaluate and disseminate Artificial Intelligence (AI) methods for health and well being

Our **interdisciplinary** AI research includes the development of transformative medical AI applications to improve

- the understanding of healthy and pathological processes

- advance patient health
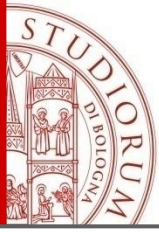
ALMA AI – AI for HEALTH & WELL-BEING

FIELDS OF APPLICATION

Development and application of AI models for:

• predictive, personalized, preventive, and participatory (P4) medicine

• healthy aging

• biomarker discovery

• early diagnosis and prediction of patient-specific therapy and treatment

• Big data analytics, including multi-omic biomedical data (genomics, radiomics, etc.) and mitigation of their heterogeneity by harmonization and integrative methods
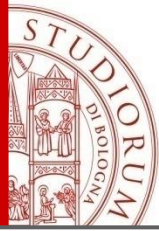
- UNIBO has been granted a total EU contribution of more than **17 M€** distributed in **30 H2020 projects (5 under IMI-2 JTI, 25 under SC1)**

- The University of Bologna is tightly interconnected and works synergically with **three main hospitals** at Regional and National level – now *Scientific Institutes for Research, Hospitalisation and Health Care*:

  - **Istituto Ortopedico Rizzoli (IOR)** is a dedicated institution for the study and care of musculoskeletal conditions

  - The **Istituto delle Scienze Neurologiche Bellaria (ISNB)** an excellence in neurological sciences research and care

  - **Policlinico St. Orsola – Malpighi**, the first city hospital with about 2,000 beds
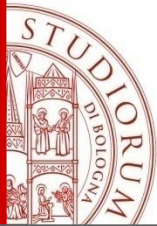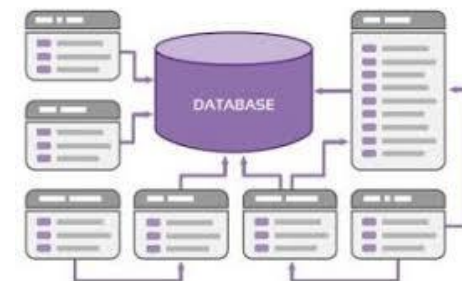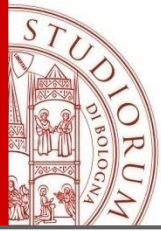
H2020 PROJECTS 2014-20

- 25 projects
- 9.1 **M€**

ONGOING AND FUTURE PROJECTS

Planned the construction of a database regarding
all the research activities in the field
of AI for health and well-being

Workshop: December 17th

Data and AI methods @UNIBO
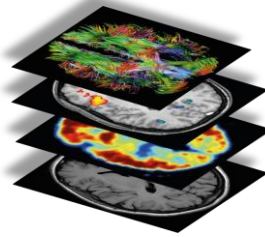
Data @UNIBO

multimodal neuroimaging data

clinical examination

genetic analysis

test scores

lab analysis

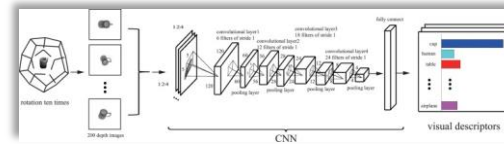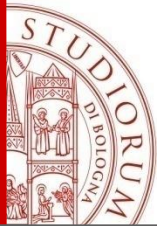**AI methods @UNIBO**

machine learning system
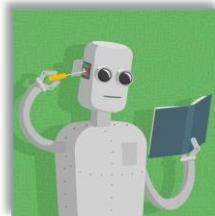
deep learning networks

CNN

visual descriptors

Data and AI methods @UNIBO

- First attempt of a **comprehensive cohort studies and biobank mapping**
- Big opportunities for **observational research**
- **7 Departments** involved
- **78 cohorts** mapped
- **15 studies** includes more than 1,000 subjects
- **130,560 subjects** analysed
- **over 60 papers published** in international journals publicly available from these cohort studies
- **6 macro-areas and several topics covered**:
  - *Inflammatory syndrome*
  - *Diet-related diseases*
  - *Hepatology and nephrology*
  - *Cancer*
  - *Neurodegenerative and brain diseases*
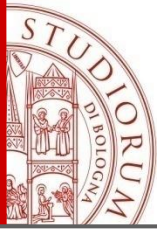 - *Cardiovascular diseases*

DATA @UNIBO: COVID-RELATED RESEARCH

In response to the global emergency caused by the **Covid-19 pandemic**, the University has promptly and actively taken part in national and international initiatives with research projects and innovative contributions involving the **multi-disciplinary resources and skills within our community**.

The main **projects and initiatives developed by UNIBO researchers** are available here: Funded Projects.

An overall summary of our covid-related research activities have been collected in a **booklet** which include horizontal thematic areas and that will shortly available on the dedicated UNIBO webpage together with a "living" **database,** that currently includes over 90 contributions relating to UNIBO research, skills and resources.
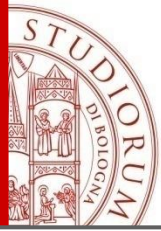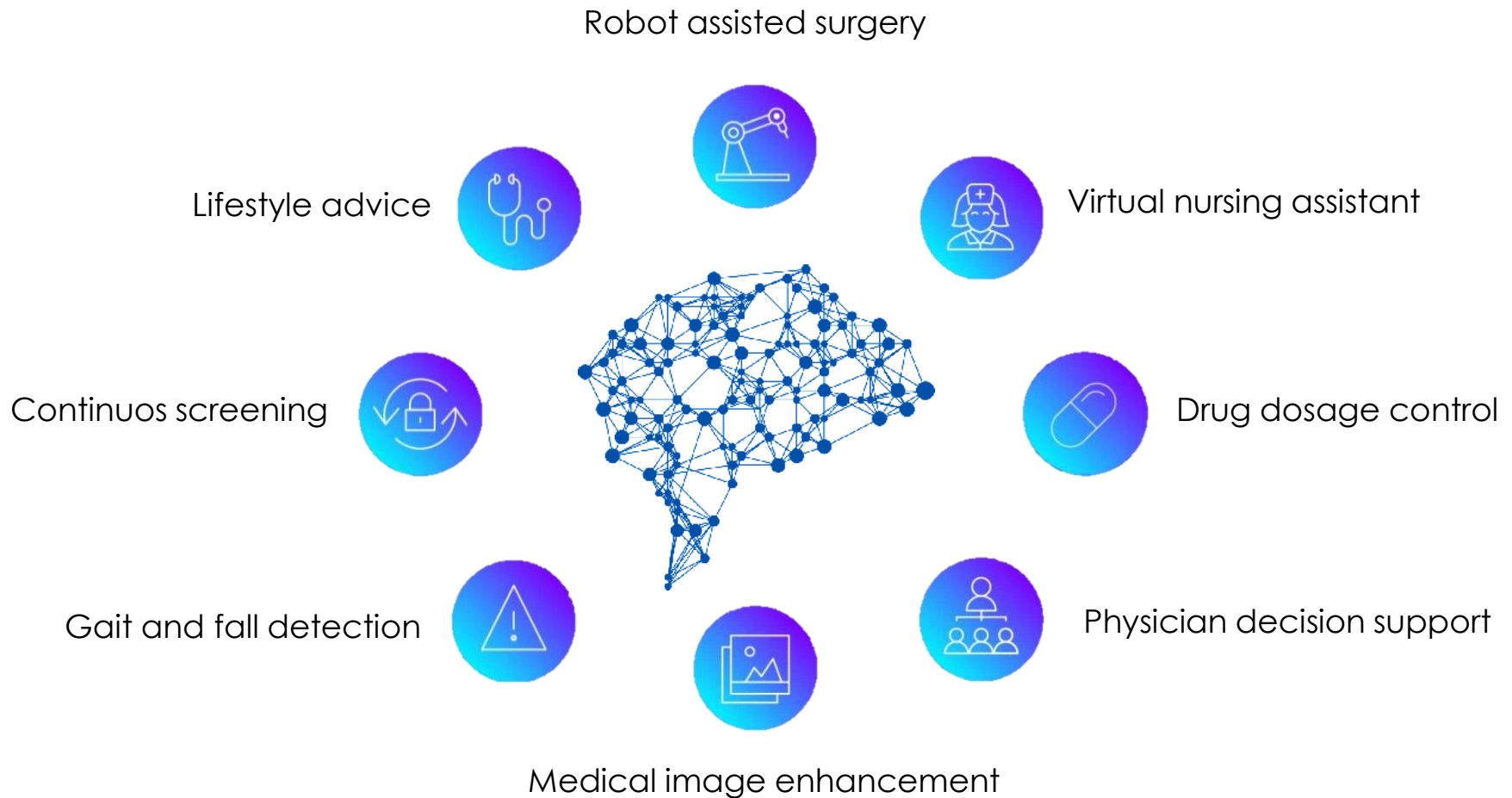
Moreover, within the last H2020 call **SC1-PHE-CORONAVIRUS-2020 – Advancing knowledge for the clinical and public health response to the 2019-nCoV epidemic,** UNIBO has been funded as Beneficiary of two research projects:
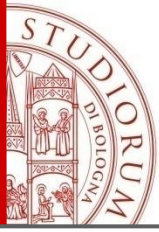
ORCHESTRA "Connecting European Cohorts to Increase Common and Effective Response to SARS-CoV-2 Pandemic", and the Innovation Action

INNO4COV-19 "Boosting Innovation for Covid 19 Diagnostic, Prevention and Surveillance"

AI for HEALTH & WELL-BEING: TOPICS

Robot assisted surgery

Lifestyle advice

Virtual nursing assistant

Continuos screening

Drug dosage control

Gait and fall detection

Physician decision support

Medical image enhancement

Programma

Will doctors be AIs with a human touch?

Stefano Diciotti - *Machine Learning for Medical data*

Gastone Castellani - *Intelligence Genomics*

Giuseppe Notarstefano - *Collective intelligence: a framework to explore complex systems biology and federated AI medicine*

Nicola Baldini - *Intelligent orthopaedics: a joint effort exploring novel solutions for research and care*