



UNIVERSITÀ
DEGLI STUDI DI TRIESTE



**Corso di Laurea in Ingegneria Clinica e Biomedica
Informatica Medica I**

INFORMATICA MEDICA E eHEALTH

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Chi sono

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INTERESSI DI RICERCA

INFORMATICA SANITARIA

- Integrated care
- Mobile Apps for medicine and healthcare

NEUROMODULAZIONE

- Neurofisiologia dei gangli della base
- Dispositivi di neuromodulazione invasiva e non invasiva

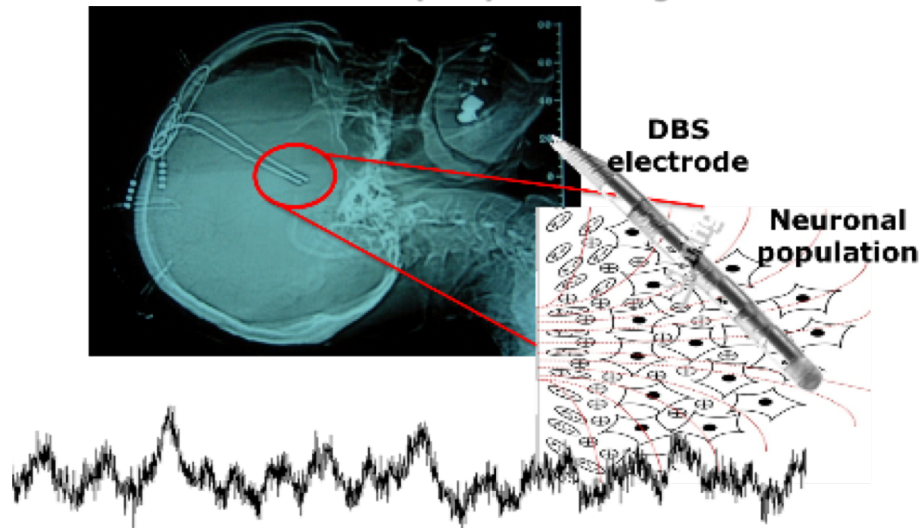


RESEARCH AREA 1: NEUROPHYSIOLOGY AND NEUROMODULATION DEVICES

INVASIVE NEUROMODULATION:

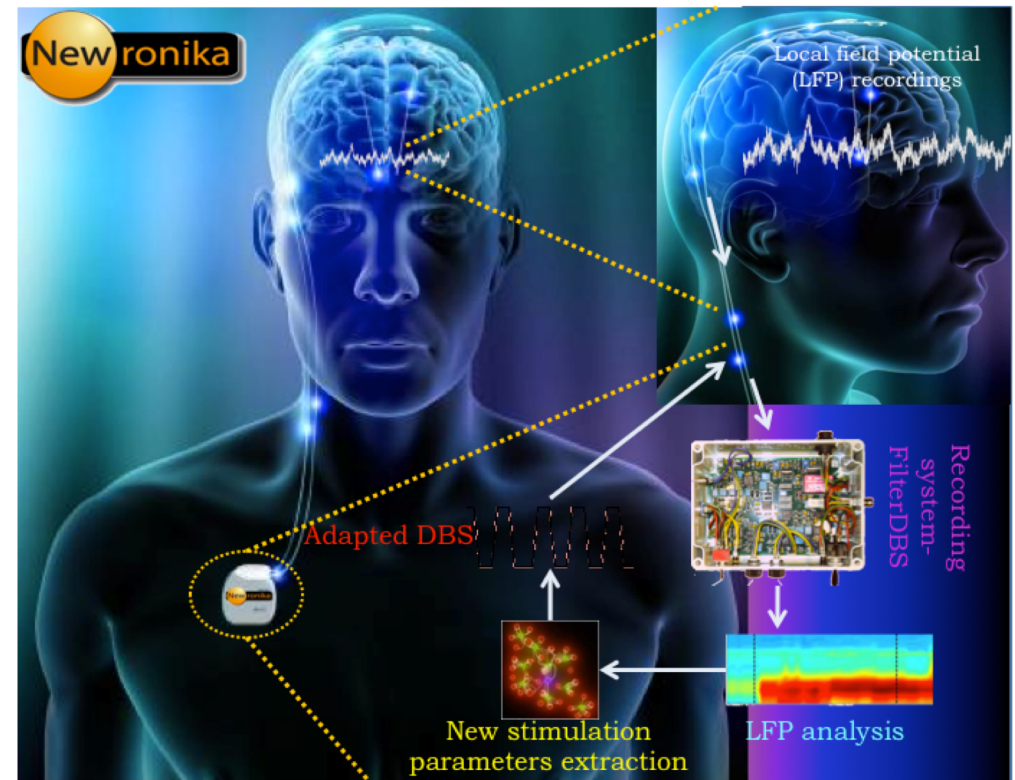
- *Deep Brain Stimulation (DBS)* for Parkinson's Disease and other neurological and neuropsychiatric disorders
- Therapy optimization and mechanisms of action understanding through local field potential analysis

Local Field Potential (LFP) recordings



Synchronous presynaptic and postsynaptic activity of neuronal populations → **deep EEG**

Adaptive Deep Brain Stimulation (aDBS)



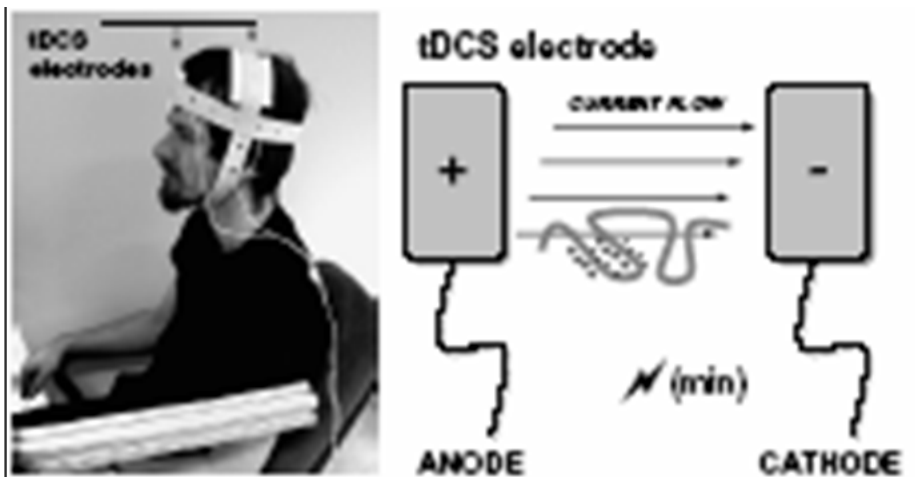
RESEARCH AREA 1: NEUROPHYSIOLOGY AND NEUROMODULATION DEVICES

NON-INVASIVE NEUROMODULATION

- *Transcranial Direct Current Stimulation (tDCS)* for depression, pain, and post-stroke rehabilitation.
- Development of portable devices that can be configured by the neurologist and used by the patients at home



Low-intensity (<2mA) DC current application on the scalp, on the area that has to be modulated.

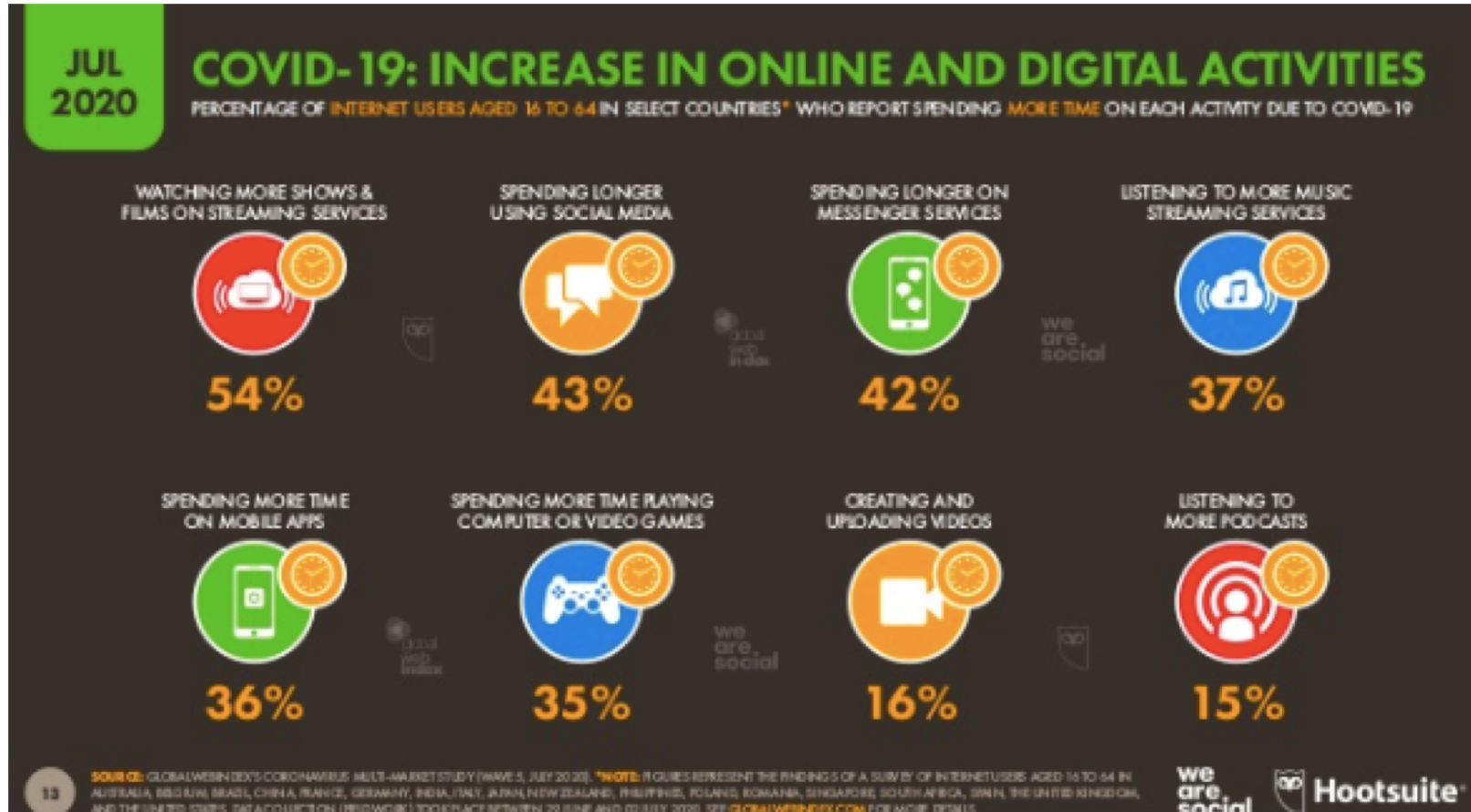


RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH



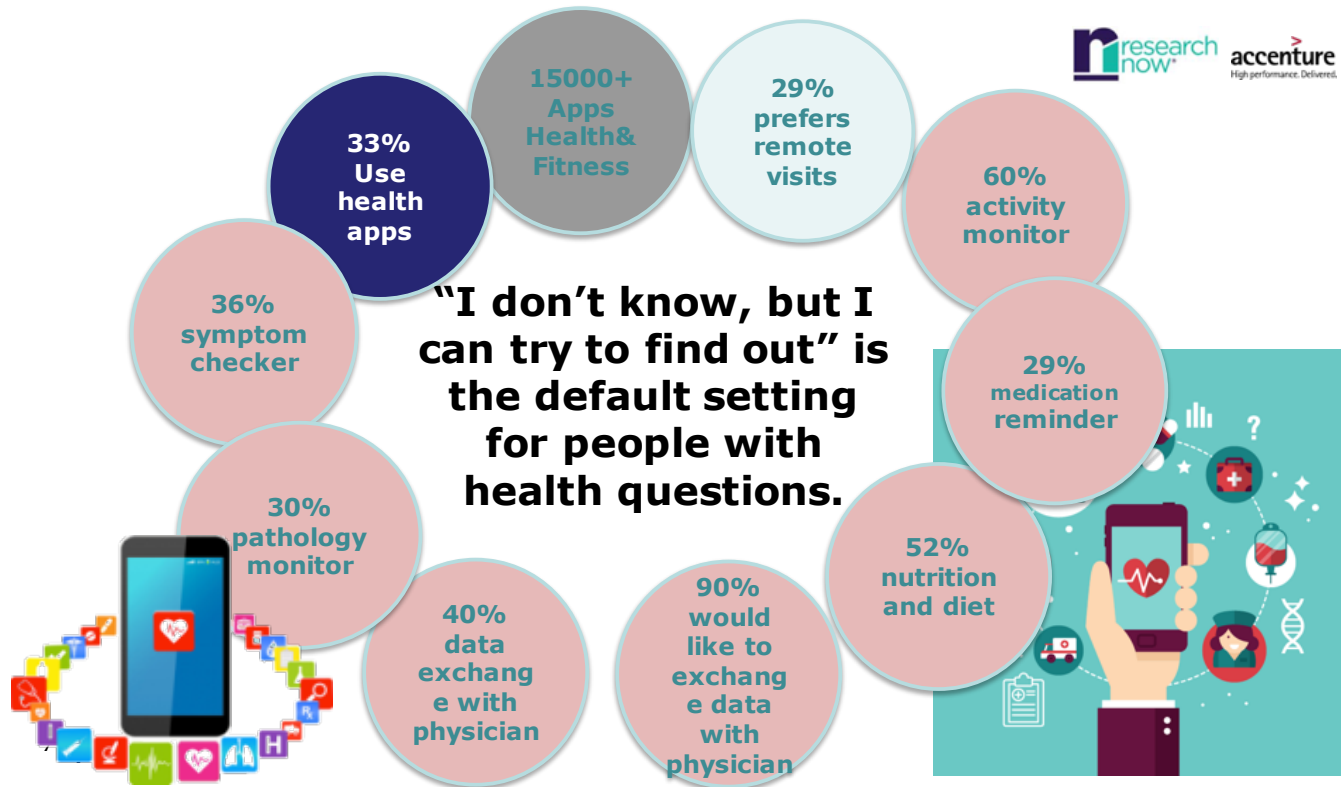
More than half of the worldwide population uses social media

RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH

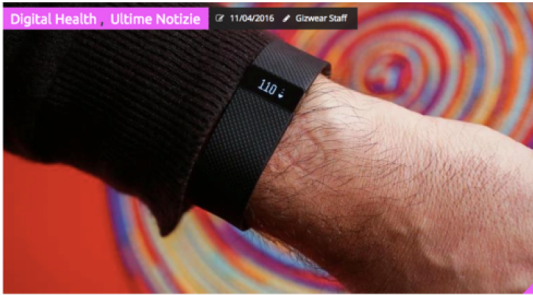


RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH

27% of internet users and 20 percent of adults have tracked their weight, diet, exercise routine, symptoms, or another health indicator online.



RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH



Fitbit Charge HR salva la vita ad un malato di cuore!

The number of devices connected to the Internet was 12.5 billion in 2010, making the number of connected devices per person >1 (1.84) for the first time in history. Now they are 25 billions



O'Ve: lo smartwatch che monitora i raggi UV e ci protegge dalle malattie della pelle!



SOWATCH: lo smartwatch che previene l'ictus

You can be 100 percent identified, as an individual, by your Fitbit data.



THIM, il primo wearable al mondo "migliora-sonno" | Video



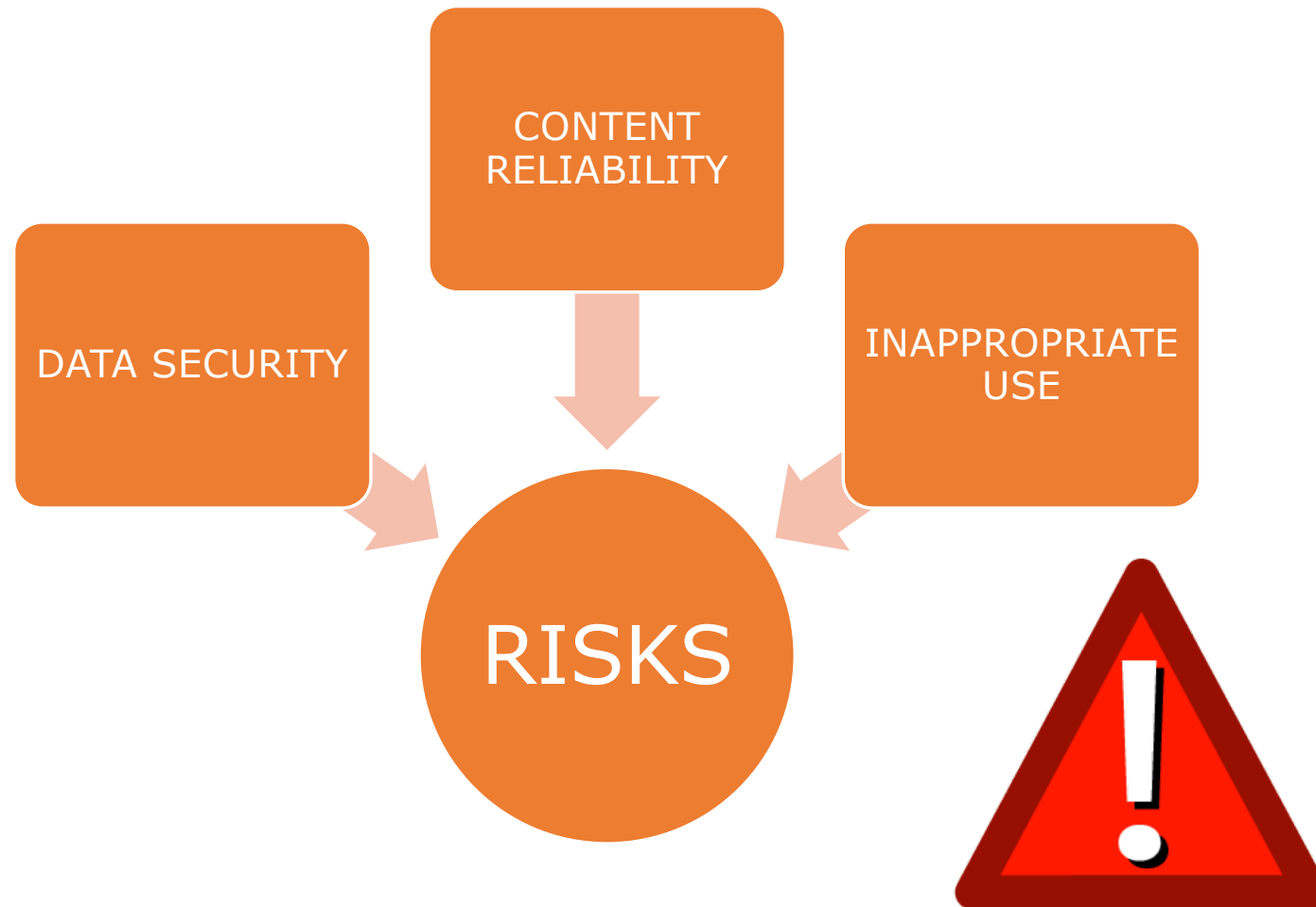
Dignity Health using Google Glass to improve clinical efficiency

Hodei Technology helps hospitals use Google Glass for surgical collaboration; rural telemedicine

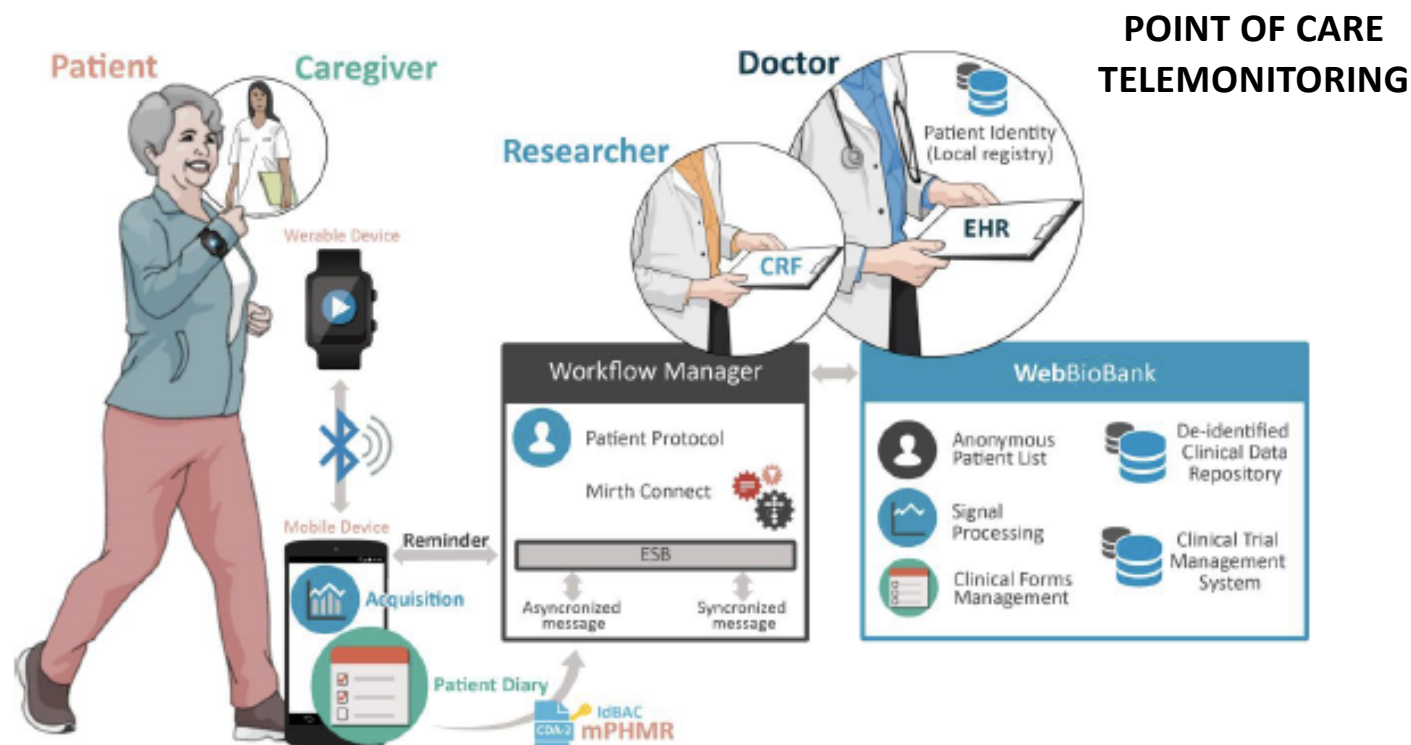


RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH

9



RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH



- Although much work has been done on patient's access to EHRs, transfer of information from mHealth Apps to EHR systems is still low.
- We are studying a standards-based architecture that can be adopted by mHealth Apps to exchange information with EHRs to support better quality of care.

RESEARCH AREA 2: mHEALTH AND INTEGRATED HEALTH

- POINT OF CARE TELEMONTITORING FOR THERAPY OPTIMIZATION
- INTEGRATION BIOSIGNALS/BIODATA FROM PATIENTS

The application interface consists of several key components:

- GRAPH Screens:** Display real-time beta band data for 'Right Side' (purple line) and 'Left Side' (green line) over a 24-hour period. Each graph includes a 'Change Day' button and a 'Set ON and OFF' button.
- ANALYSIS Screen:** Provides summary statistics for 'ON status' and 'OFF status' for both 'Right Side' and 'Left Side'. It includes a bar chart and an 'UPDATE' button.
- SUMMARY Table:** A grid showing 'ON status' and 'OFF status' for each 30-minute interval. A 'SAVE' button is located below the table.

Time	ON status	OFF status	SUMMARY
00:00-00:30	0	0	0
00:30-01:00	0	0	0
01:00-01:30	0	0	0
01:30-02:00	0	0	0
02:00-02:30	0	0	0
02:30-03:00	0	0	0
03:00-03:30	0	0	0
03:30-04:00	0	0	0
04:00-04:30	0	0	0
04:30-05:00	0	0	0
05:00-05:30	0	0	0
05:30-06:00	0	0	0
06:00-06:30	0	0	0
06:30-07:00	0	0	0
07:00-07:30	1	0	1
07:30-08:00	1	0	1
08:00-08:30	1	0	1
08:30-09:00	1	0	1
09:00-09:30	1	0	1
09:30-10:00	1	0	1
10:00-10:30	1	0	1
10:30-11:00	1	0	1
11:00-11:30	1	0	1
11:30-12:00	1	0	1
12:00-12:30	1	0	1
12:30-13:00	1	0	1
13:00-13:30	1	0	1
13:30-14:00	1	0	1
14:00-14:30	1	0	1
14:30-15:00	1	0	1
15:00-15:30	1	0	1
15:30-16:00	1	0	1
16:00-16:30	1	0	1
16:30-17:00	1	0	1
17:00-17:30	1	0	1
17:30-18:00	1	0	1
18:00-18:30	1	0	1
18:30-19:00	1	0	1
19:00-19:30	1	0	1
19:30-20:00	1	0	1
20:00-20:30	1	0	1
20:30-21:00	1	0	1
21:00-21:30	1	0	1
21:30-22:00	1	0	1
22:00-22:30	1	0	1
22:30-23:00	1	0	1
23:00-23:30	1	0	1
23:30-00:00	1	0	1

PROGETTI IN CORSO E POSSIBILI TESI

AREA DELLA NEUROMODULAZIONE

- EEG pediatrico: identificazione di indici quantitativi per la valutazione dello stato di crescita del neonato
- LFP nella Malattia di Parkinson e DBS adattativa: identificazione di algoritmi di retroazione e biomarker
- tDCS e sport: valutazione dell'effetto della stimolazione in boxeure pesisti professionisti
- tDCS e cefalea: l'utilizzo della termografia come strumento di identificazione del sito di stimolazione ottimale

AREA DEL eHEALTH

- JAME: Sistema indossabile per il controllo del tremore
- Telemonitoraggio dei pazienti con Malattia di Parkinson: sviluppo di un'applicazione mobile per la gestione ottimale dello stato clinico
- Nutrigenomica e sistemi di supporto alla decisione: definizione di algoritmi per la valutazione della dieta
- IBM Watson e AI per la medicina: primi esperimenti di applicazione in ambito odontoiatrico



INFORMATICA MEDICA

Che cos'è?