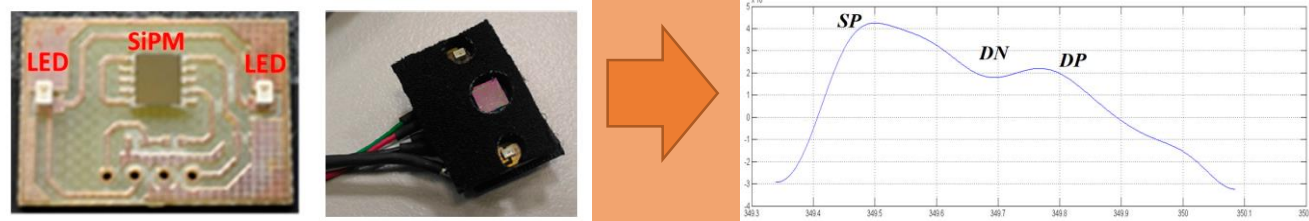
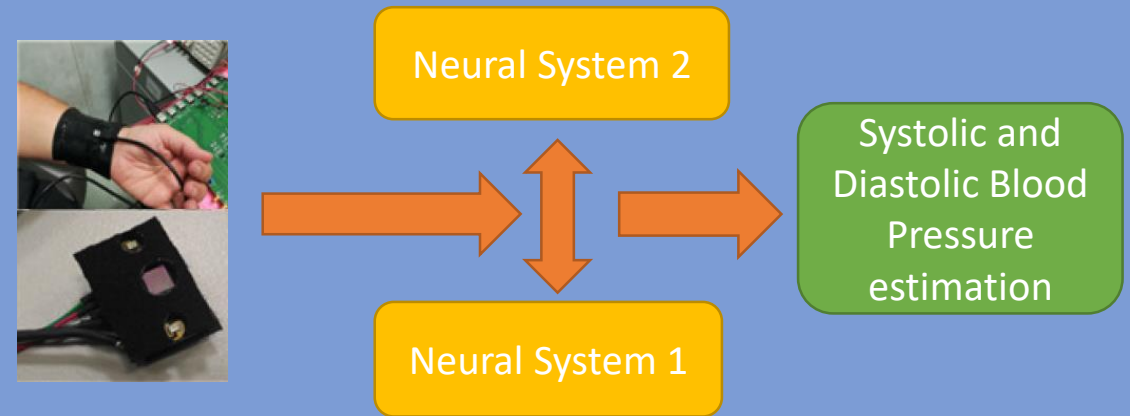


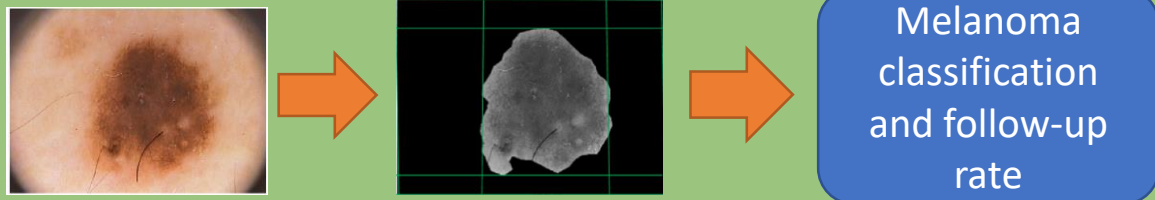
Stima dei segnali PPG ed ECG



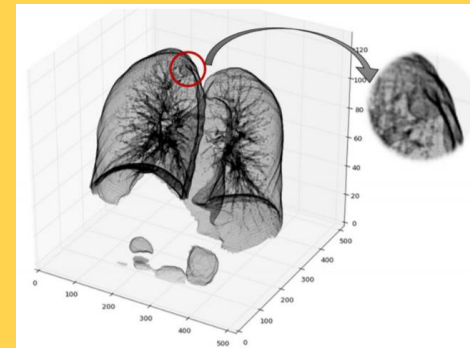
Stima della pressione sanguigna



Classificazione di melanomi

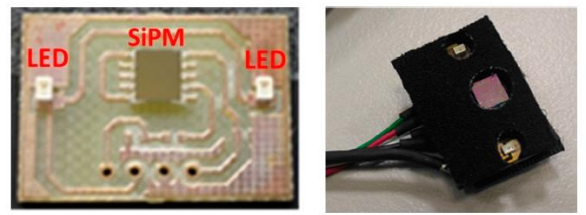


Discriminazione di cancro ai polmoni



- Classificazione dei tumori
- Stima del massimo diametro di una lesione

Stima dei segnali PPG ed ECG



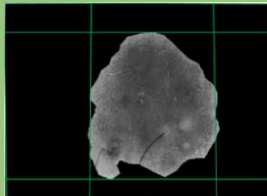
- Coppia LED-SiPM
- Filtraggio dei segnali (FIR)
- Cellular Neural System e cross-correlazione per la stima dei segnali
- Estrazione di parametri medici

Stima della pressione sanguigna



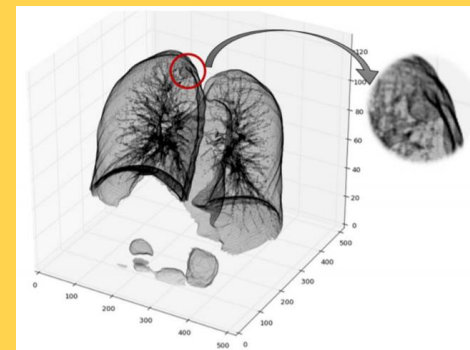
- Stima segnali PPG/ECG
- 42 hand-crafted features
- Utilizzo di due reti neurali:
 - 1) Modified Self-Organizing Map
 - 2) MLP con Polak-Ribiere back propagation

Classificazione di melanomi



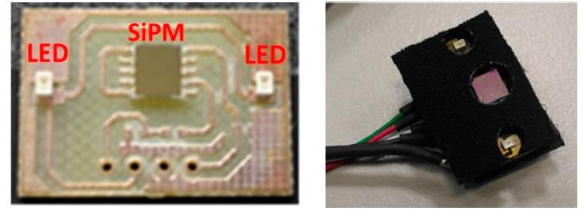
- State-Controlled Cellular Neural Network
- Levenberg-Marquardt neural network
- Stacked Autoencoders

Discriminazione di cancro ai polmoni



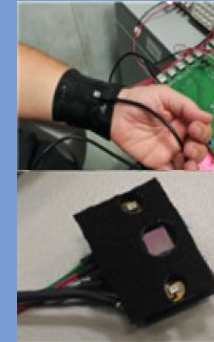
- Analisi di immagini TC e PET
- Analisi di immagini multi-slice mediante una 3D Convolutional Neural Network

Stima dei segnali PPG ed ECG



- Accuratezza oltre il 97%
- Sistema di monitoraggio della stanchezza del guidatore basato sull'analisi PPG/ECG (brevetto)

Stima della pressione sanguigna

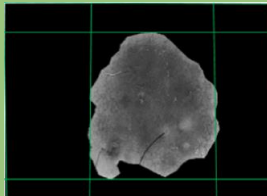


- Approccio cuff-less
- Accuracy del 97%
- Errore ~ 2 mmHg corrispondente al 10-15% della misura reale

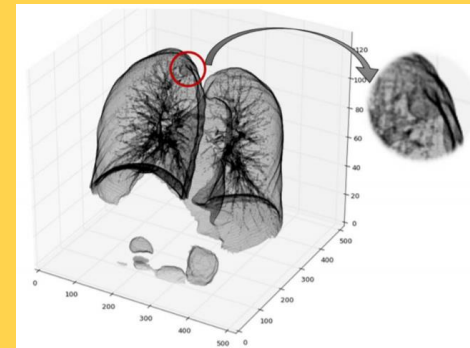
Classificazione di melanomi



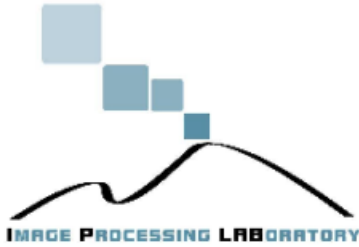
- 98% di Sensibility e Specificity
- Classificazione in 2,5 sec (in MATLAB su un PC)



Discriminazione di cancro ai polmoni



- La pipeline proposta è oggetto di brevetto industriale



Algoritmi Avanzati per la Diagnostica

F. Rundo, A. Ortis, G. L. Banna, S. Battiato, S. Conoci



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- Rundo, F., Fallica, P., Conoci, S., Petralia, S., and Mazzillo, M. PROCESSING OF ELECTROPHYSIOLOGICAL SIGNALS, IT Patent Nr. 102017000081018, 18 July 2017.
- Rundo, F., Fallica, P., and Conoci, S. A METHOD OF PROCESSING ELECTRO-PHYSIOLOGICAL SIGNALS, CORRESPONDING SYSTEM, VEHICLE AND COMPUTER PROGRAM PRODUCT, IT Patent Nr. 102017000120714, 24 October 2017.
- Vinciguerra, V., Ambra, E., Maddiona, L., Oliveri, S., Romeo, M. F., Mazzillo, M., Rundo, F., and Fallica, G. (2017, September). Progresses towards a processing pipeline in photoplethysmogram (PPG) based on SiPMs. In Circuit Theory and Design (ECCTD), 2017 European Conference on (pp. 1-5). IEEE.
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- Rundo, F., Conoci, S., Banna, G. L., Ortis, A., Stanco, F., & Battiato, S. (2018). Evaluation of Levenberg–Marquardt neural networks and stacked autoencoders clustering for skin lesion analysis, screening and follow-up. *IET Computer Vision*, 12(7), 957-962.
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- F. Rundo, S. Conoci, G.L. Banna, Deep Learning Motion Algorithm for Lung Cancer Early Detection in Embedded Systems Accepted IT Nr. 102018000010833, 05.12.2018;