ABSTRACT BOOK ABSTRACTS



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DERMOSCOPY AND SKIN IMAGING

MACHINE-LEARNING MONITORING OF SKIN MOLES AND SKIN-CANCER DETECTION

Fabio Mangini⁽¹⁾ - Carmen Cantisani⁽²⁾ - Franca Cantoresi⁽³⁾ - Lorenzo Dinia⁽⁴⁾ - Raffaella Marino⁽⁵⁾ - Francesca Ponti⁽⁶⁾ - Patrizio Simeoni⁽⁷⁾ - Maurizio Troiano⁽⁷⁾ - Fabrizio Frezza⁽⁷⁾

Sapienza University, Department Of Information Engineering, Electronics And Telecommunications, Rome, Italy⁽¹⁾ - Umberto I Hospital, sapienza Medical School, Uoc Of Dermatology, Rome, Italy⁽²⁾ - Sapienza Medical School University, Department Of Dermatology, Rome, Italy⁽³⁾ - Sapienza University, Department Of Information Engineering, Electronics And Telecommunications, Rome, Italy⁽⁴⁾ - Ferrara University, Medical Science, U.o.I. Medo-legal Medicine, Ferrara, Italy⁽⁵⁾ - Sapienza University, 2department Of Information Engineering, Electronics And Telecommunications, Rome, Italy⁽⁶⁾ - Sapienza University, Department Of Information Engineering, Electronics And Telecommunications, Rome, Italy⁽⁷⁾

Introduction:Melanoma is a malignant tumor that arises from uncontrolled proliferation of melanocytes—pigment-producing cells. It is less common than other skin cancers (<5%), but due to its ability to rapidly grow and spread it represents the most lethal form of skin cancer. Its increasing incidence is a considerable burden to public health; the annual costs of melanoma management are substantial, therefore early diagnosis is mandatory.In recent years, the technology of neural networks has become more and more established in many research fields, especially in dermatology. In this paper, a new methodology to monitor human-skin mole changing by image processing based on neural networks, is presented.

Objective: The aim is to obtain a computer-aided diagnosis tool for the determination of skin diseases, from appropriately preprocessed videodermoscopy images provided to neural networks.

Materials and Methods: We classified dermoscopic images of skin extracting the skin mole (segmentation) through the elaboration of the discrete wavelet transform. From each of the sub-bands obtained, the relevant statistic is extracted and used to correctly label the probability of illness at that time. Subsequently, a neural network has been designed to differentiate between healthy and unhealthy cells. In this specific case, the neural network was constructed by: an input layer, constituted by as many nodes as the values of the statistical functions; 2 hidden layers of 10 nodes each; and an output layer of 2 nodes needed for the two-bit coding of the result.

Results and Conclusions: The learning algorithm used is the Back-Propagation one: once











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the network has been created, and the mean-square error between the predicted and actual values has been minimized, the Receiver Operating Characteristics curve has been extracted; from this curve a value of 0.9 of Under-Curve Area has been obtained; therefore the network performs a highly accurate classification.



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