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(54) Title: ASSESSMENT AND PREDICTION OF CARDIOVASCULAR STATUS DURING CARDIAC ARREST AND THE POST-RESUSCITATION PERIOD USING SIGNAL PROCESSING AND MACHINE LEARNING

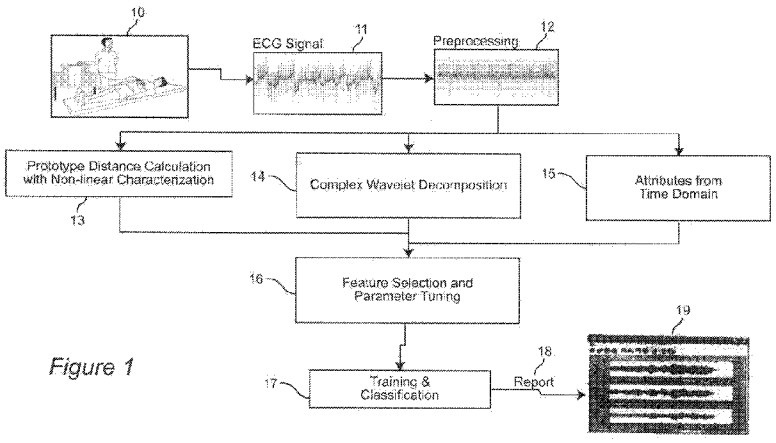

Figure 1

(57) Abstract: Real-time, short-term analysis of ECG, by using multiple signal processing and machine learning techniques, is used to determine counter shock success in defibrillation. Combinations of measures when used with machine learning algorithms readily predict successful resuscitation, guide therapy and predict complications. In terms of guiding resuscitation, they may serve as indicators and when to provide counter shocks and at what energy levels they should be provided as well as to serve as indicators of when certain drugs should be provided (in addition to their doses). For cardiac arrest, the system is meant to run in real time during all current resuscitation procedures including post-resuscitation care to detect deterioration for guiding care such as therapeutic hypothermia.

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INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: ECG signal, machine learning, shock, predict
www.google.com & Keywords: predict, shock, signal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SHARAD SHANDILYA et al., Prediciting defibrillation success with a multiple-domain model using machine learning, Proceedings of the 2011 IEEE/ICME International Complex Medical Engineering, 22-25 May 2011, pages 9-14 See abstract, pages 9-13, and figures 1,3.	1-6
A	US 2005-0256415 A1 (QING TAN et al.) 17 November 2005 See abstract and claim 1.	1-6
A	US 2004-0230105 A1 (GEVA AMIR et al.) 18 November 2004 See abstract and claim 1.	1-6
A	ANDREAS NEURAUTER et al., Prediction of countershock success using single features from multiple ventricular fibrillation frequency bands and feature combinations using neural networks, Resuscitation, 2007, 73, pages 253-263 See abstract and page 255, lines 31-37, page 256, lines 19-21, and page 262, lines 42-53.	1-6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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