


Issue Classification 	Application/Control No. 13354941	Applicant(s)/Patent Under Reexamination CHON ET AL.
	Examiner CHU CHUAN (JJ) LIU	Art Unit 3735

<input type="checkbox"/> Claims renumbered in the same order as presented by applicant																<input type="checkbox"/> CPA		<input type="checkbox"/> T.D.		<input type="checkbox"/> R.1.47	
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/CHU CHUAN (JJ) LIU/ Examiner.Art Unit 3735 (Assistant Examiner)	02/28/2017 (Date)	Total Claims Allowed: 46	
/ERIC WINAKUR/ Primary Examiner.Art Unit 3735 (Primary Examiner)	03/06/2017 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Ki H. Chon et al.
Application Number: 13/354,941
Filed: January 20, 2012
Title: PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE
COMMUNICATION DEVICE

Examiner: LIU, CHU CHUAN
Group Art Unit: 3735
Confirmation No. 9133

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Alexandria, VA 22313-1450

AMENDMENT UNDER 37 C.F.R. 1.312

Sir:

Applicants hereby submit the following amendments after a Notice of Allowance under 37 C.F.R. 1.312.

Amendments to the claims begin on page 2 of this paper.

Remarks begin on page 16 of this paper.

Electronic Acknowledgement Receipt

EFS ID:	28835343
Application Number:	13354941
International Application Number:	
Confirmation Number:	9133
Title of Invention:	PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE
First Named Inventor/Applicant Name:	Ki H. Chon
Customer Number:	26486
Filer:	Marlo Schepper Grolnic
Filer Authorized By:	
Attorney Docket Number:	30210-201
Receipt Date:	05-APR-2017
Filing Date:	20-JAN-2012
Time Stamp:	10:03:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		201Rule312.pdf	155793 <small>78b4439d4d4c9067cf90b9be93b7e20bc156d95e</small>	yes	16

Multipart Description/PDF files in .zip description			
Document Description		Start	End
Applicant Arguments/Remarks Made in an Amendment		16	16
Claims		2	15
Amendment after Notice of Allowance (Rule 312)		1	1

Warnings:

Information:

Total Files Size (in bytes):	155793
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Remarks

Applicants submit this amendment under 37 C.F.R. 1.312 to correct clerical and typographical errors in the claims. Applicants submit, therefore, that no new matter is added by this amendment. Consideration of this amendment under 37 C.F.R. 1.312 is appropriate since no substantial amount of additional work is needed, no additional search is required, and no more than a cursory review of the record is required by the Examiner. Therefore, Applicants respectfully request entry of this amendment under 37 C.F.R. 1.312.

Although no fees are believed to be required, the Director of Patents and Trademarks is hereby authorized to charge any underpayment of fees, or to credit any overpayments to Deposit Account 03-2410 (Order No. 30210-201).

Respectfully submitted,

Dated: April 5, 2017

By: /Marlo Schepper Grolnic/
Marlo Schepper Grolnic
Reg. No. 57,194
Agent for Patent Application Owner

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of the claims.

1. (Previously presented) A method for physiological parameter monitoring, the method comprising:

providing a physiological indicator signal to a handheld mobile communication device; the physiological indicator signal being obtained from one of an image acquisition component, a photoplethysmographic (PPG) sensor and an electrocardiogram sensor;

analyzing, using the handheld mobile communication device, the physiological indicator signal;

obtaining, from said analyzing, measurements of one or more physiological parameters; and

detecting, using the handheld mobile communication device and using only the measurements of one or more physiological parameters, effects of motion artifacts in the measurements of the one or more physiological parameters and deciding whether to retain the measurements based on detected effects of motion artifacts;

wherein detecting effects of motion artifacts in the measurements comprises:

a. bandpass filtering and detrending a segment from the measurement of one physiological parameter; wherein a bandpass filtered and detrended segment is hereinafter referred to as a preprocessed segment;

b. obtaining a value of at least one indicator of volatility, used in determining whether motion artifacts are present, for the preprocessed segment; the at least one indicator of volatility being at least Shannon entropy (SE) for the preprocessed segment;

where

$$SE = - \sum_{i=1}^k \frac{p(i) \cdot \log(p(i))}{\log(\frac{1}{k})}$$

and where i represents the bin number, and $p(i)$ is the probability distribution of the preprocessed segment;

- c. including the segment in analyses of physiological measurements, ~~if~~ when comparison of the value of the at least one indicator of volatility with a predetermined threshold indicates noise/motion artifacts are not present; and
 - d. selecting another segment of the signal from the physiological measurement and proceeding to step (a) when the value of the at least one indicator of volatility is less than a predetermined threshold and when another segment is available.
2. (Canceled)
3. (Previously presented) The method of claim 1 wherein said at least one indicator of volatility also comprises kurtosis.
- 4-5. (Canceled)
6. (Previously presented) The method of claim 1 wherein the predetermined threshold is determined using receiver operator characteristic (ROC) analysis.
7. (Previously presented) The method of claim 1 wherein providing a physiological indicator signal comprises:
 - placing a portion of a subject's body over an objective lens of a camera in a handheld mobile communication device; and
 - obtaining video images of the portion of the subject's body.
8. (Previously presented) The method of claim 1 wherein providing a physiological indicator signal comprises obtaining a signal from a physiological monitoring sensor.
9. (Previously presented) The method of claim 8 wherein the physiological monitoring sensor is a photoplethysmographic (PPG) sensor or an electrocardiogram sensor.
10. (Original) The method of claim 1 wherein the one or more physiological measurements comprise heart rate and heart rate variability.

11. (Original) The method of claim 10 wherein obtaining measurements of heart rate and heart rate variability comprise:
 - determining beats for the physiological indicator signal;
 - determining beat to beat intervals; and
 - applying a cubic spline algorithm to obtain a substantially continuous beat to beat interval signal indicative of heart rate.

12. (Original) The method of claim 1 wherein the one or more physiological measurements comprise respiratory rate.

13. (Original) The method of claim 12 wherein measurement of respiratory rate comprises:
 - obtaining time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM); and
 - obtaining respiratory rates by extracting a frequency component that has a largest amplitude for each time point at a heart rate frequency band.

14. (Original) The method of claim 1 wherein the one or more physiological measurements comprise a measure of oxygen saturation.

15. (Currently amended) The method of claim 14 wherein providing a physiological indicator signal comprises:
 - placing a portion of a subject’s body over an objective lens of a camera in a mobile communication device; and
 - obtaining video images of the portion of the subject’s body, [[and]]
 - wherein obtaining the measure of oxygen saturation comprises:
 - obtaining an average intensity of a red component and a blue component of the video images of the portion of the subject’s body; the average intensity of the red component and the average intensity of the blue component constituting DC_{RED} and DC_{BLUE} respectively;

obtaining a standard deviation of the red component and the blue component; the standard deviation of the red component and the blue component constituting AC_{RED} and AC_{BLUE} respectively; and

obtaining the measure of oxygen saturation (SpO_2) by

$$SpO_2 = A - B \frac{AC_{RED} / DC_{RED}}{AC_{BLUE} / DC_{BLUE}}.$$

16. (Original) The method of claim 1 wherein the one or more physiological measurements comprise a measure of blood loss.

17. (Original) The method of claim 16 wherein obtaining the measure of blood loss comprises:

obtaining time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM);

obtaining the amplitude modulation (AM) series from a set of the largest instantaneous amplitude at each time sample within the heart rate frequency band of the time–frequency spectrum; and

determining whether the amplitude modulation decreases; a decrease in the amplitude modulation indicating blood volume loss in subject.

18. (Previously presented) The method of claim 1 wherein the one or more physiological measurements comprise a measure of atrial fibrillation.

19. (Previously presented) A method for physiological parameter monitoring, the method comprising:

providing a physiological indicator signal to a handheld mobile communication device; the physiological indicator signal being obtained from one of an image acquisition component, a photoplethysmographic (PPG) sensor and an electrocardiogram sensor;

analyzing, using the handheld mobile communication device, the physiological indicator signal; wherein analysis does not include Independent Component Analysis;

obtaining, from said analyzing, measurements of one or more physiological parameters;
and

detecting, using the handheld mobile communication device and using only the measurements of one or more physiological parameters, effects of motion artifacts in the measurements of the one or more physiological parameters and deciding whether to retain the measurements based on effects of motion artifacts in the measurements;

wherein the one or more physiological measurements comprise a measure of atrial fibrillation;

wherein obtaining the measure of atrial fibrillation comprises:

obtaining a time-varying coherence function by multiplying two time-varying transfer functions (TVFTs), the two time-varying transfer functions obtained using two adjacent data segments, from the physiological indicator signal, one of the two adjacent data segment as an input signal and another of the two adjacent data segment as an output signal to produce a first TVTF; a second TVTF is produced by reversing the input and the output signals, using said another of the two adjacent data segment as the input signal and said one of the two adjacent data segment as the output signal; and

determining whether the time-varying coherence function is less than a predetermined quantity.

20. (Previously presented) The method of claim 19 wherein determining whether the time-varying coherence function is less than the predetermined quantity comprises:

obtaining one or more indicators of atrial fibrillation; and

determining whether the one or more indicators of atrial fibrillation exceed predetermined thresholds.

21. (Previously presented) The method of claim 20 wherein the one or more indicators of atrial fibrillation comprise a variance of the time-varying coherence function.

22. (Previously presented) The method of claim 21 wherein the one or more indicators of atrial fibrillation also comprise Shannon entropy.

23. (Previously presented) The method of claim 20 wherein the predetermined thresholds are determined using receiver operator characteristic (ROC) analysis.

24. (Currently amended) A system for physiological parameter monitoring, the system comprising:

a physiological indicator signal sensing component; the physiological indicator signal sensing component being one of an image acquisition component, a photoplethysmographic (PPG) sensor and an electrocardiogram sensor; and a handheld mobile communication device comprising:

at least one processor; and

at least one computer usable medium, the computer usable medium having computer readable code embodied therein, the computer readable code causing the at least one processor to:

analyze the physiological indicator signal;

obtain, from results of analyzing, measurements of one or more physiological parameters;

and

detect effects of motion artifacts in the measurements of the one or more physiological parameters;

wherein the computer readable code, in causing the at least one processor to detect effects of motion artifacts, causes the at least one processor to:

a. bandpass filter and detrend a segment from the measurement of one physiological parameter; wherein a bandpass filtered and detrended segment is hereinafter referred to as a preprocessed segment;

b. obtain a value of at least one indicator of volatility, used in determining whether motion artifacts are present, for the preprocessed segment; the at least one indicator of volatility being at least Shannon entropy (SE) for the preprocessed segment;

where

$$SE = - \sum_{i=1}^k \frac{p(i) \cdot \log(p(i))}{\log(\frac{1}{k})}$$

and where i represents the bin number, and $p(i)$ is the probability distribution of the preprocessed segment;

c. include the segment in analyses of physiological measurements when comparison of the value of the at least one indicator of volatility with a predetermined threshold indicates noise/motion artifacts are not present; and

d. select another segment of the signal from the physiological measurement and proceeding to step (a) when the value of the at least one indicator of volatility is less than a predetermined threshold and another segment is available.

25-26. (Canceled)

27. (Previously presented) The system of claim 24 wherein said at least one indicator of volatility also comprises kurtosis.

28-29. (Canceled)

30. (Previously presented) The system of claim 24 wherein the predetermined threshold is determined using receiver operator characteristic (ROC) analysis.

31. (Currently amended) The system of claim 24 wherein the physiological indicator signal sensing component comprises an image acquisition component, said acquisition component capable of acquiring a number of frames, each frame acquired at a predetermined time.

32. (Previously presented) The system of claim 31 wherein the handheld mobile communications device comprises said image acquisition component.

33. (Previously presented) The system of claim 24 wherein the physiological indicator signal sensing component comprises a physiological monitoring sensor.

34. (Previously presented) The system of claim 33 wherein the physiological monitoring sensor is a photoplethysmographic (PPG) sensor or an electrocardiogram sensor.

35. (Previously presented) The system of claim 24 wherein the physiological indicator signal sensing component comprises an image acquisition component, said acquisition component capable of acquiring a number of frames, each frame acquired at a predetermined time; wherein said image acquisition component acquires a color image having red, green and blue components; wherein one or more physiological measurements comprise a measure of oxygen saturation; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain an average intensity of a red component and a blue component of the images of a portion of a subject's body; the average intensity of the red component and the average intensity of the blue component constituting DC_{RED} and DC_{BLUE} respectively;

obtain a standard deviation of the red component and the blue component; the standard deviation of the red component and the blue component constituting AC_{RED} and AC_{BLUE} respectively; and

obtain the measure of oxygen saturation by

$$SpO_2 = A - B \frac{AC_{RED}/DC_{RED}}{AC_{BLUE}/DC_{BLUE}}$$

36. (Previously presented) The system of claim 24 wherein the one or more physiological measurements comprise heart rate and heart rate variability; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

determine beats for the physiological indicator signal;

determine beat to beat intervals; and

apply a cubic spline algorithm to obtain a substantially continuous beat to beat interval signal indicative of heart rate.

37. (Previously presented) The system of claim 24 wherein the one or more physiological measurements comprise respiratory rate; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM); and

obtain respiratory rates by extracting a frequency component that has a largest amplitude for each time point at a heart rate frequency band.

38. (Previously presented) The system of claim 24 wherein the one or more physiological measurements comprise a measure of blood loss; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM);

obtain the amplitude modulation (AM) series from set of the largest instantaneous amplitude at each time sample within the heart rate frequency band of the time–frequency spectrum; and

determine whether the amplitude modulation decreases; a decrease in the amplitude modulation indicating blood volume loss in subject.

39. (Currently amended) A system for physiological parameter monitoring, the system comprising:

a physiological indicator signal sensing component; and a handheld mobile communication device comprising:

at least one processor; and

at least one computer usable medium, the computer usable medium having computer readable code embodied therein, the computer readable code causing the at least one processor to:

analyze the physiological indicator signal; the physiological indicator signal being obtained from one of an image acquisition component, a photoplethysmographic (PPG) sensor

and an electrocardiogram sensor; wherein analysis does not include Independent Component Analysis;

obtain, from results of analyzing, measurements of one or more physiological parameters;
and

detect effects of motion artifacts, using only the measurements of one or more physiological parameters, in the measurements of the one or more physiological parameters;

wherein the one or more physiological measurements comprise a measure of atrial fibrillation; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain a time-varying coherence function by multiplying two time-varying transfer functions (TVFTs), the two time-varying transfer functions obtained using two adjacent data segments $[[,]]$ from the physiological indicator signal, one of the two adjacent data segment as an input signal and another of the two adjacent data segment as an output signal to produce a first TVTF; a second TVTF is produced by reversing the input and the output signals, using said another of the two adjacent data segment as the input signal and said one of the two adjacent data segment as the output signal; and
determine whether the time-varying coherence function is less than a predetermined quantity.

40. (Previously presented) The system of claim 39 wherein the computer readable code, in causing the at least one processor to determine whether the time-varying coherence function is less than the predetermined quantity, causes the at least one processor to:

obtain one or more indicators of atrial fibrillation; and
determine whether the one or more indicators of atrial fibrillation exceed predetermined thresholds.

41. (Previously presented) The system of claim 40 wherein the one or more indicators of atrial fibrillation comprise a variance of the time-varying coherence function.

42. (Previously presented) The system of claim 41 wherein the one or more indicators of atrial fibrillation also comprise Shannon entropy.

43. (Previously presented) The system of claim 41 wherein the predetermined thresholds are determined using receiver operator characteristic (ROC) analysis.

44. (Currently amended) A non-transitory computer usable medium having computer readable code embodied therein, the computer readable code causing at least one processor to:

analyze a physiological indicator signal; the physiological indicator signal being obtained from one of an image acquisition component, a photoplethysmographic (PPG) sensor and an electrocardiogram sensor;

obtain, from said analyzing, measurements of one or more physiological parameters; and detect, using only the measurements of one or more physiological parameters, effects of motion artifacts in the measurements of the one or more physiological parameters;

wherein the computer readable code, in causing the at least one processor to detect effects of motion artifacts, causes the at least one processor to:

- a. bandpass filter and detrend a segment from the measurement of one physiological parameter; wherein a bandpass filtered and detrended segment is hereinafter referred to as a preprocessed segment;
- b. obtain a value of at least one indicator of volatility, used in determining whether motion artifacts are present, for the preprocessed segment; the at least one indicator of volatility being at least Shannon entropy (SE) for the preprocessed segment; where

$$SE = - \sum_{i=1}^k \frac{p(i) \cdot \log(p(i))}{\log\left(\frac{1}{k}\right)}$$

and where i represents the bin number, and $p(i)$ is the probability distribution of the preprocessed segment;

- c. include the segment in analyses of physiological measurements when comparison of the value of the at least one indicator of volatility with a predetermined threshold indicates noise/motion artifacts are not present; and
- d. select another segment of the signal from the physiological measurement and proceeding to step (a) when the value of the at least one indicator of volatility is less than a predetermined threshold and another segment is available.

45. (Original) The computer usable medium of claim 44 wherein the physiological indicator signal comprises a video color image having red, green and blue components, the video color image being an image obtained from a portion of a subject's body; wherein the measurements of one or more physiological parameters comprise a measure of oxygen saturation; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain an average intensity of the red component and a blue component of the video color image of a portion of a subject's body; the average intensity of the red component and the average intensity of the blue component constituting DC_{RED} and DC_{BLUE} respectively;

obtain a standard deviation of the red component and the blue component; the standard deviation of the red component and the blue component constituting AC_{RED} and AC_{BLUE} respectively; and

obtain the measure of oxygen saturation by

$$SpO_2 = A - B \frac{AC_{RED} / DC_{RED}}{AC_{BLUE} / DC_{BLUE}}$$

46. (Original) The computer usable medium of claim 44 wherein the one or more physiological measurements comprise heart rate and heart rate variability; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

determine beats for the physiological indicator signal;

determine beat to beat intervals; and

apply a cubic spline algorithm to obtain a substantially continuous beat to beat interval signal indicative of heart rate.

47. (Original) The computer usable medium of claim 44 wherein the one or more physiological measurements comprise respiratory rate; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM); and

obtain respiratory rates by extracting a frequency component that has a largest amplitude for each time point at a heart rate frequency band.

48. (Original) The computer usable medium of claim 44 wherein the one or more physiological measurements comprise a measure of blood loss; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain time–frequency spectrum of the physiological indicator signal utilizing variable frequency complex demodulation (VFCDM);

obtain the amplitude modulation (AM) series from set of the largest instantaneous amplitude at each time sample within the heart rate frequency band of the time–frequency spectrum; and

determine whether the amplitude modulation decreases; a decrease in the amplitude modulation indicating blood volume loss in subject.

49. (Previously presented) A non-transitory computer usable medium having computer readable code embodied therein, the computer readable code causing at least one processor to:

analyze the physiological indicator signal; the physiological indicator signal being obtained from one of an image acquisition component, a photoplethysmographic (PPG) sensor and an electrocardiogram sensor; wherein analysis does not include Independent Component Analysis;

obtain, from said analyzing, measurements of one or more physiological parameters; and detect, using only the measurements of one or more physiological parameters, effects of motion artifacts in the measurements of the one or more physiological parameters;

wherein the one or more physiological measurements comprise a measure of atrial fibrillation; and wherein the computer readable code, in causing the at least one processor to analyze the physiological indicator signal, causes the at least one processor to:

obtain a time-varying coherence function by multiplying two time-varying transfer functions (TVFTs), the two time-varying transfer functions obtained using two

adjacent data segments, from the physiological indicator signal, one of the two adjacent data segment as an input signal and another of the two adjacent data segment as an output signal to produce a first TVTF; a second TVTF is produced by reversing the input and the output signals, using said another of the two adjacent data segment as the input signal and said one of the two adjacent data segment as the output signal; and

determine whether the time-varying coherence function is less than a predetermined quantity.

50. (Previously presented) The non-transitory computer usable medium of claim 49 wherein the computer readable code, in causing the at least one processor to determine whether the time-varying coherence function is less than the predetermined quantity, causes the at least one processor to:

obtain one or more indicators of atrial fibrillation; and

determine whether the one or more indicators of atrial fibrillation exceed predetermined thresholds.

51. (Previously presented) The non-transitory computer usable medium of claim 50 wherein the one or more indicators of atrial fibrillation comprise a variance of the time-varying coherence function.

52. (Previously presented) The non-transitory computer usable medium of claim 51 wherein the one or more indicators of atrial fibrillation also comprise Shannon entropy.

53. (Previously presented) The computer usable medium of claim 50 wherein the predetermined thresholds are determined using receiver operator characteristic (ROC) analysis.

OK TO ENTER: /C.L/

PATENT APPLICATION
Attorney Docket No. 30210-201

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants: Ki H. Chon et al.
Application Number: 13/354,941
Filed: January 20, 2012
Title: PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE
COMMUNICATION DEVICE

Examiner: LIU, CHU CHUAN
Group Art Unit: 3735
Confirmation No. 9133

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AMENDMENT UNDER 37 C.F.R. 1.312

Sir:

Applicants hereby submit the following amendments after a Notice of Allowance under 37 C.F.R. 1.312.

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Remarks begin on page 16 of this paper.



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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO.
13/354,941 01/20/2012 Ki H. Chon 30210-201 9133

26486 7590 04/14/2017
BURNS & LEVINSON, LLP
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BOSTON, MA 02110

EXAMINER

LIU, CHU CHUAN

ART UNIT PAPER NUMBER

3735

NOTIFICATION DATE DELIVERY MODE

04/14/2017

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@burnslev.com

Response to Rule 312 Communication	Application No.	Applicant(s)
	13/354,941	CHON ET AL.
	Examiner	Art Unit
	CHU CHUAN (JJ) LIU	3735

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. The amendment filed on 05 April 2017 under 37 CFR 1.312 has been considered, and has been:

- a) entered.
- b) entered as directed to matters of form not affecting the scope of the invention.
- c) disapproved because the amendment was filed after the payment of the issue fee.

Any amendment filed after the date the issue fee is paid must be accompanied by a petition under 37 CFR 1.313(c)(1) and the required fee to withdraw the application from issue.

- d) disapproved. See explanation below.
- e) entered in part. See explanation below.

Amendments were made to correct clerical and typographical errors in the claims.

/Eric Winakur/
Primary Examiner, Art Unit 3735



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13/354,941 01/20/2012 Ki H. Chon 30210-201 9133

26486 7590 04/18/2017
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EXAMINER

LIU, CHU CHUAN

ART UNIT PAPER NUMBER

3735

NOTIFICATION DATE DELIVERY MODE

04/18/2017

ELECTRONIC

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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UNITED STATES PATENT AND TRADEMARK OFFICE

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www.uspto.gov

Application No. : 13354941
Applicant : Chon
Filing Date : 01/20/2012
Date Mailed : 04/18/2017

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reasons below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The informalities requiring correction are indicated in the attachment(s). If the informality pertains to the abstract, specification (including claims) or drawings, the informality must be corrected with an amendment in compliance with 37 CFR 1.121 (or, if the application is a reissue application, 37 CFR 1.173). Such an amendment may be filed after payment of the issue fee if limited to correction of informalities noted herein. See Waiver of 37 CFR 1.312 for Documents Required by the Office of Patent Publication, 1280 Off. Gaz. Patent Office 918 (March 23, 2004). In addition, if the informality is not corrected until after payment of the issue fee, for purposes of 35 U.S.C. 154(b)(1)(iv), "all outstanding requirements" will be considered to have been satisfied when the informality has been corrected. A failure to respond within the above-identified time period will result in the application being ABANDONED.

See attachment(s).

*A copy of this notice **MUST** be returned with the reply. Please address response to
"Mail Stop Issue Fee, Commissioner for Patents,
P.O. Box 1450, Alexandria, VA 22313-1450".*

/Stephanie Smart/
Publication Branch
Office of Data Management
(571) 272-4200

IDENTIFICATION OF DRAWING DEFICIENCIES

- There is a hole or the image thereof within the illustration. FIG(s)
- The illustration is penetrated or traversed by a solid or broken line that is not intended to be part of the drawing, such as a dark line caused by a flaw in the copying process. FIG(s)
- An ink stamp or the image thereof obscures part of the illustration. FIG(s)
- The drawing is marred by black smudges, obliterations, or fax/copier marks (for example, speckles or dots in a substantial portion of the drawing). FIG(s)
- Figure numbers are duplicated or missing. FIG(s)
- Drawing sheet or figure is missing. FIG(s)
- Numbers, letters, or reference characters in the drawing have been crossed out or are illegibly handwritten. FIG(s)
- The character of the lines, numbers, and letters is poor. FIG(s)
- The drawing's background shows that the original drawing was made on graph paper or other paper with a pattern or decoration. FIG(s) 5
- The FIG. number label is placed in a location that causes the drawing to be read upside down. FIG(s)
- Data, a reference number, or part of the drawing is truncated or missing, or a lead line has no reference number. FIG(s)
- The drawing and/or the FIG. label contain(s) foreign language. FIG(s)
- This utility application contains a photograph of a view that is capable of being illustrated as a line drawing. FIG(s)
- A petition under 37 CFR 1.84(a)(2) to accept color drawings has been granted, but the brief description of the drawings in the specification does not contain (or has not been amended to contain) the paragraph required by 37 CFR 1.84(a)(2)(iii).
- This reissue application contains added and/or amended drawings that are not labeled as "New" or "Amended" or "Canceled" as required by 37 CFR 1.173(b)(3). FIG(s)
- This Design reissue application contains a drawing that is labeled as "Canceled" but is not surrounded by brackets, or a drawing that is surrounded by brackets but is not labeled as "Canceled." See 37 CFR 1.173(b)(3). FIG(s)
- OTHER:
- COMMENTS:

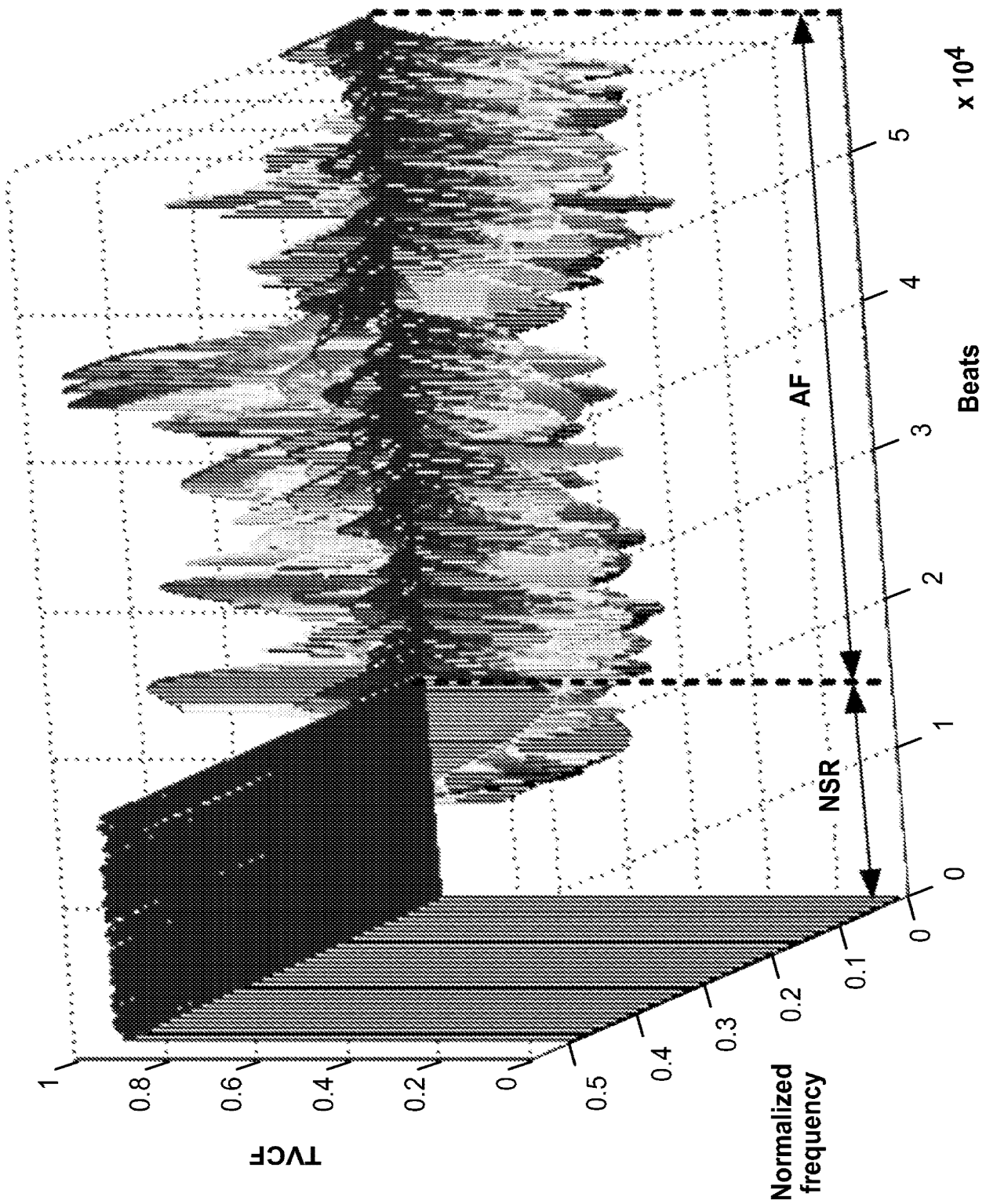


FIG. 5

Electronic Acknowledgement Receipt

EFS ID:	29350578
Application Number:	13354941
International Application Number:	
Confirmation Number:	9133
Title of Invention:	PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE
First Named Inventor/Applicant Name:	Ki H. Chon
Customer Number:	26486
Filer:	Orlando Lopez/Susan Jones Oujli
Filer Authorized By:	Orlando Lopez
Attorney Docket Number:	30210-201
Receipt Date:	31-MAY-2017
Filing Date:	20-JAN-2012
Time Stamp:	10:46:04
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	Response.pdf	78303 <small>55f1d1fa25705902ff001e4b3da48e20129343f4</small>	no	1

Warnings:

Petitioner Ex-1004, 0791

Information:					
2	Drawings-other than black and white line drawings	Fig5.pdf	2849558	no	1
			851f6f1cc4fe4d690b2fde0f76b5d5db069a2a93		
Warnings:					
Information:					
Total Files Size (in bytes):				2927861	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

SCORE Placeholder Sheet for IFW Content

Application Number: 13354941

Document Date: 05/31/2017

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or **Fax (571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the **ISSUE FEE** and **PUBLICATION FEE** (if required). Blocks 1 through 3 should be completed where appropriate. All further correspondence (including the Patent, advance orders and notification of maintenance fees) will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

26486 7596 03/10/2017
BURNS & LEVINSON, LLP
 125 SUMMER STREET
 BOSTON, MA 02110

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

_____ (Depositor's name)
_____ (Signature)
_____ (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/354,941	01/20/2012	KI H. CHOI	30210-261	9133

TITLE OF INVENTION: **PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE**

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	\$480	\$0	\$0	\$480	06/12/2017

EXAMINER	ART UNIT	CLASS-SUBCLASS
LIU, CHU CHUAN	3735	600-323666

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47, Rev 03-92 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
- (2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1. **Burns & Levinson LLP**
 2. **Orlando Lopez**
 3. _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Worcester Polytechnic Institute

Worcester, Massachusetts

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are submitted:

- Issue Fee
- Publication Fee (No small entity discount permitted)
- Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first resupply any previously paid issue fee shown above)

- A check is enclosed.
- Payment by credit card. Form PTO-2038 is attached.
- The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number **032410** (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- Applicant certifying micro entity status. See 37 CFR 1.29
- Applicant asserting small entity status. See 37 CFR 1.27
- Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature /Marlo Schepper Grolnic/
 Typed or printed name Marlo Schepper Grolnic

Date June 9, 2017
 Registration No. 57,194

Electronic Patent Application Fee Transmittal

Application Number:	13354941
Filing Date:	20-Jan-2012
Title of Invention:	PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE
First Named Inventor/Applicant Name:	Ki H. Chon
Filer:	Marlo Schepper Grolnic
Attorney Docket Number:	30210-201

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	480	480

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Total in USD (\$)				480

Electronic Acknowledgement Receipt

EFS ID:	29446969
Application Number:	13354941
International Application Number:	
Confirmation Number:	9133
Title of Invention:	PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE
First Named Inventor/Applicant Name:	Ki H. Chon
Customer Number:	26486
Filer:	Marlo Schepper Grolnic
Filer Authorized By:	
Attorney Docket Number:	30210-201
Receipt Date:	09-JUN-2017
Filing Date:	20-JAN-2012
Time Stamp:	12:19:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	\$480
RAM confirmation Number	060917INTEFSW00009670032410
Deposit Account	032410
Authorized User	Marlo Grolnic

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

37 CFR 1.21 (Miscellaneous fees and charges)

Petitioner Ex-1004, 0797

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	201IssueFee.pdf	144712	no	1
			47ed14db80d474a386117655f7e7d162faa0669c		

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30599	no	2
			523f2b7f9a0256159bc312dd88533e46816db033		

Warnings:

Information:

Total Files Size (in bytes):	175311
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/354,941	07/25/2017	9713428	30210-201	9133

26486 7590 07/03/2017
BURNS & LEVINSON, LLP
125 SUMMER STREET
BOSTON, MA 02110

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 94 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Ki H. Chon, Worcester, MA;
Jinseok Lee, Worcester, MA;
Nandakumar Selvaraj, Worcester, MA;

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Ki H. Chon et al. Examiner: LIU, CHU CHUAN
Serial Number: 13/354,941 Group Art Unit: 3735
Filed: January 20, 2012 Confirmation No. 9133
Patent No. 9,713,428 B2 Issued: July 25, 2017
Title: PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE
COMMUNICATION DEVICE

BURNS & LEVINSON, LLP
125 Summer Street
Boston, MA 02110
(617) 345-3000

To: Attention Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR A CERTIFICATE OF CORRECTION UNDER 37 CFR 1.322

Sir:

In the matter of U.S. Patent No. 9,713,428 B2 issued July 25, 2017, a comparison of same against the files of the attorney of record indicates that the errors described in the attached Form PTO/SB/44 were made by the U.S. Patent and Trademark Office (the "Office").

More specifically, the following errors, corrected in Form PTO/SB/44, are of a clerical/typographical nature:

In column 19, line 51 (claim 8), "The method of claim 1," should read -- The method of claim 7 --

In column 22, line 57 (claim 28), "ACRED and ACBLUE" should read -- AC_{RED} and AC_{BLUE} --

In column 25, line 16 (claim 38), "ACRED and ACBLUE" should read -- AC_{RED} and AC_{BLUE} --

REMARKS

Under 35 U.S.C. 254, whenever a mistake in a patent, incurred through fault of the Office, is clearly disclosed by the records of the Office, the Director may issue a certificate of correction stating the fact and nature of such mistake, under seal, without charge. The portions of the claims in question were disclosed in the Rule 312 Amendment filed by Applicants on April 5, 2017. Since the changes were clearly disclosed by the records filed with the Office, Applicants respectfully request a Certificate of Correction.

No fee is believed to be required for submitting this request. However, we authorize the charging of any additional fees and crediting any overpayment to our Deposit Account No. 03-2410 (Order No. 30210-201).

Dated: September 6, 2017

Respectfully submitted,

By: /Marlo Schepper Grolnic/
Marlo Schepper Grolnic
Reg. No. 57,194
Agent for Patent Owner

4831-1783-9896.1

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**Page 1 of 1

PATENT NO. : 9,713,428 B2

APPLICATION NO.: 13/354,941

ISSUE DATE : July 25, 2017

INVENTOR(S) : Ki H. Chon et al.

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In column 19, line 51 (claim 8), "The method of claim 1," should read -- The method of claim 7 --

In column 22, line 57 (claim 28), "ACRED and ACBLUE" should read -- AC *RED* and AC *BLUE* --

In column 25, line 16 (claim 38), "ACRED and ACBLUE" should read -- AC *RED* and AC *BLUE* --

MAILING ADDRESS OF SENDER (Please do not use customer number below):

Burns & Levinson LLP
125 Summer Street
Boston, MA 02110

This collection of information is required by 37 CFR 1.322, 1.323, and 1.324. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1.0 hour to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	30279451
Application Number:	13354941
International Application Number:	
Confirmation Number:	9133
Title of Invention:	PHYSIOLOGICAL PARAMETER MONITORING WITH A MOBILE COMMUNICATION DEVICE
First Named Inventor/Applicant Name:	Ki H. Chon
Customer Number:	26486
Filer:	Marlo Schepper Grolnic
Filer Authorized By:	
Attorney Docket Number:	30210-201
Receipt Date:	06-SEP-2017
Filing Date:	20-JAN-2012
Time Stamp:	11:25:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Request for Certificate of Correction	201RFCOC.pdf	120820 6069d6a306917d2499a2bb68090355e62052cf1d	no	3

Warnings:

Petitioner Ex-1004, 0803

Information:

Total Files Size (in bytes):	120820
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,713,428 B2
APPLICATION NO. : 13/354941
DATED : July 25, 2017
INVENTOR(S) : Ki H. Chon et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

In Column 19, Line 51 (Claim 8), "The method of claim 1," should read -- The method of claim 7 --

In Column 22, Line 57 (Claim 28), "ACRED and ACBLUE" should read -- AC_{RED} and AC_{BLUE} --

In Column 25, Line 16 (Claim 38), "ACRED and ACBLUE" should read -- AC_{RED} and AC_{BLUE} --

Signed and Sealed this
Tenth Day of October, 2017



Joseph Matal
*Performing the Functions and Duties of the
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office*

AO 120 (Rev. 08/10)

TO: <p style="text-align: center;">Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450</p>	<p>REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK</p>
--	--

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

Trademarks or Patents. (the patent action involves 35 U.S.C. § 292.):

DOCKET NO. 2:23-cv-00141	DATE FILED 4/3/2023	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF THE RESEARCH FOUNDATION FOR THE STATE UNIVERSITY OF NEW YORK, ET AL		DEFENDANT SAMSUNG ELECTRONICS CO., LTD., ET AL
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 8,417,326	4/9/2013	The Research Foundation for The State University of New York
2 8,718,753	5/6/2014	Worcester Polytechnic Institute
3 9,408,576	8/9/2016	Worcester Polytechnic Institute
4 9,713,428	7/25/2017	Plaintiff's
5 9,872,652	1/23/2018	Worcester Polytechnic Institute

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
2		
3		
4		
5		

In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
-------	-------------------	------

Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy

AO 120 (Rev. 08/10)

TO: <p style="text-align: center;">Mail Stop 8 Director of the U.S. Patent and Trademark Office P.O. Box 1450 Alexandria, VA 22313-1450</p>	REPORT ON THE FILING OR DETERMINATION OF AN ACTION REGARDING A PATENT OR TRADEMARK
--	---

In Compliance with 35 U.S.C. § 290 and/or 15 U.S.C. § 1116 you are hereby advised that a court action has been filed in the U.S. District Court Eastern District of Texas on the following

Trademarks or Patents. (the patent action involves 35 U.S.C. § 292.):

DOCKET NO. Case No. 2:23-cv-141	DATE FILED 4/3/2023	U.S. DISTRICT COURT Eastern District of Texas
PLAINTIFF THE RESEARCH FOUNDATION FOR THE STATE UNIVERSITY OF NEW YORK, ET AL		DEFENDANT SAMSUNG ELECTRONICS CO., LTD., ET AL
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1 9,986,921	6/5/2018	Worcester Polytechnic Institute
2 10,278,647	5/7/2019	University of Connecticut
3 10,285,601	5/14/2019	Worcester Polytechnic Institute
4 10,653,362	5/19/2020	Worcester Polytechnic Institute
5		

In the above—entitled case, the following patent(s)/ trademark(s) have been included:

DATE INCLUDED	INCLUDED BY <input type="checkbox"/> Amendment <input type="checkbox"/> Answer <input type="checkbox"/> Cross Bill <input type="checkbox"/> Other Pleading	
PATENT OR TRADEMARK NO.	DATE OF PATENT OR TRADEMARK	HOLDER OF PATENT OR TRADEMARK
1		
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In the above—entitled case, the following decision has been rendered or judgement issued:

DECISION/JUDGEMENT

CLERK	(BY) DEPUTY CLERK	DATE
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Copy 1—Upon initiation of action, mail this copy to Director Copy 3—Upon termination of action, mail this copy to Director
 Copy 2—Upon filing document adding patent(s), mail this copy to Director Copy 4—Case file copy