

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DECLARATION OF DR. MAJID SARRAFZADEH

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Qualifications.....	3
III.	Legal Principles	5
IV.	Background and State of the Art.....	10
A.	Wearable Technology	16
B.	Communication.....	19
C.	Noise Artifacts	20
D.	Adaptive Filtering Techniques.....	24
V.	The '941 Patent.....	27
A.	Summary of the Prosecution History.....	28
B.	Level of Ordinary Skill of a Person in the Art.....	29
C.	Claim Construction	30
1.	“a body”	30
2.	“headset”	30
3.	“housing”	31
4.	“chipset”	32
5.	“window”	33
VI.	Ground 1: Claims 14–15 and 21 are unpatentable under pre-AIA 35 U.S.C. § 103(a) over Kosuda in view of Maekawa.....	34
A.	Overview of Kosuda	34
B.	Overview of Maekawa.....	39
C.	Claim 14.....	42
	[14.P] A wearable device	42
	[14.1] a housing.....	43
	[14.2] a chipset enclosed within the housing	43
	[14.3] at least one PPG sensor.....	45
	[14.4] at least one motion sensor.....	47
	[14.5] at least one signal processor configured to process signals from the at least one motion sensor and signals from the at least one PPG sensor to reduce motion artifacts from the PPG signals	47

[14.6] the housing comprises at least one window that optically exposes the at least one PPG sensor to a body of a subject wearing the device	50
[14.7] the housing comprises non-air light transmissive material in optical communication with the at least one PPG sensor and the window.....	51
D. Claim 15	54
E. Claim 21	55
VII. Ground 2: Claims 18–20 are unpatentable under pre-AIA 35 U.S.C. § 103(a) over Kosuda in view of Maekawa and Han.....	56
F. Claims 18-20.....	56
1. Overview of Han.....	58
G. Rationale to Combine the Teachings of Kosuda, Maekawa, and Han ..	62
VIII. Ground 3: Claims 14-19 and 21 are unpatentable under pre-AIA 35 U.S.C. § 103(a) over Aceti in view of Fricke.	63
A. Overview of Aceti.....	63
B. Overview of Fricke	66
C. Claim 14.....	71
[14.P] A wearable device	71
[14.1] a housing.....	72
[14.2] a chipset enclosed within the housing	72
[14.3] at least one PPG sensor.....	74
[14.4] at least one motion sensor.....	75
[14.5] at least one signal processor configured to process signals from the at least one motion sensor and signals from the at least one PPG sensor to reduce motion artifacts from the PPG signals	75
[14.6] the housing comprises at least one window that optically exposes the at least one PPG sensor to a body of a subject wearing the device	78
[14.7] the housing comprises non-air light transmissive material in optical communication with the at least one PPG sensor and the window.....	79
D. Claim 15	79

E.	Claims 16 and 17	80
F.	Claims 18 and 19	80
G.	Claim 21	85
IX.	Ground 4: Claim 20 is unpatentable under pre-AIA 35 U.S.C. § 103(a) over Aceti in view of Fricke and Comtois.....	85
A.	Overview of Comtois.....	85
B.	Rationale to Combine the Teachings of Aceti, Fricke, and Comtois	88
X.	Conclusion	88

EXHIBIT LIST

Exhibit No.	Description
1001	U.S. Patent No. 8,923,941 to LeBoeuf <i>et al.</i> , issued December 30, 2014
1002	U.S. Patent No. 8,923,941 File History
1004	<i>Curriculum Vitae</i> of Dr. Majid Sarrafzadeh
1006	U.S. Patent Application Publication No. 2005/0209516 to Fraden, published September 22, 2005
1008	U.S. Patent Application Publication No. 2008/0081972 to Debreczeny, published April 3, 2008
1009	Japanese Patent Application Publication No. 2005/040261 A to Numaga <i>et al.</i> , published February 17, 2005
1010	Certified English-language translation of Japanese Patent Application Publication No. 2005/040261 A to Numaga <i>et al.</i> , published February 17, 2005
1011	U.S. Patent Application Publication No. 2003/0065269 to Vetter <i>et al.</i> , published April 3, 2003
1016	U.S. Patent Application Publication No. 2009/0105556 to Fricke <i>et al.</i> , published April 23, 2009
1018	U.S. Patent No. 3,704,706 to Herczfeld <i>et al.</i> , issued December 5, 1972
1019	U.S. Patent No. 5,297,548 to Pologe, issued March 29, 1994
1020	Med. Sci. Series, Int'l Fed'n for Med. and Biological Eng'g and the Int'l Org. for Med. Physics, Design of Pulse Oximeters (J.G. Webster ed., Inst. of Physics Publ'g 1997)
1021	John Allen, <i>Photoplethysmography and its application in clinical physiological measurement</i> , Physiological Measurement 28 (2007)
1022	U.S. Patent Application Publication No. 2008/0132798 to Hong <i>et al.</i> , published June 5, 2008
1023	U.S. Patent Application Publication No. 2008/0177162 to Bae, published July 24, 2008
1024	U.S. Patent No. 5,807,267 to Bryars <i>et al.</i> , issued September 15, 1998
1025	Hyonyoung Han <i>et al.</i> , <i>Development of a wearable health monitoring device with motion artifact reduced algorithm</i> , International Conference on Control, Automation and Systems, IEEE (2007)
1026	Excerpt from Merriam Webster's Collegiate Dictionary,

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.