PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT5160730

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
KNUEDGE, INC.	08/20/2018

RECEIVING PARTY DATA

Name:	FRIDAY HARBOR LLC
Street Address:	200 LIBERTY STREET
Internal Address:	22ND FLOOR
City:	NEW YORK
State/Country:	NEW YORK
Postal Code:	10281

PROPERTY NUMBERS Total: 153

Property Type	Number
Patent Number:	9704506
Patent Number:	9858242
Patent Number:	9977745
Patent Number:	9942146
Patent Number:	10027583
Patent Number:	9910716
Patent Number:	9565124
Patent Number:	9959066
Patent Number:	9880784
Patent Number:	9576589
Patent Number:	9922668
Patent Number:	9870785
Patent Number:	9842611
Patent Number:	9548067
Patent Number:	9812148
Patent Number:	9864519
Patent Number:	9686191
Patent Number:	9691391
Patent Number:	9634901

Property Type	Number
Patent Number:	9552327
Patent Number:	9177561
Patent Number:	9177560
Patent Number:	9396740
Patent Number:	9614785
Patent Number:	9601119
Patent Number:	9620130
Patent Number:	9473866
Patent Number:	9485597
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Patent Number:	8473436
Application Number:	62663774
Application Number:	62663787
Application Number:	15962863
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Application Number:	15499773
Application Number:	15499796
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Application Number:	15480113

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Application Number:	15463930
Application Number:	15399681
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Application Number:	15200976
Application Number:	15183100
Application Number:	15181868
Application Number:	15181878
Application Number:	15177068
Application Number:	15173017
Application Number:	15157982
Application Number:	15157942
Application Number:	15143215
Application Number:	62328491
Application Number:	15140081
Application Number:	15131445
Application Number:	15098257
Application Number:	62320227
Application Number:	62320250
Application Number:	62320261
Application Number:	62320273
Application Number:	62320291
Application Number:	62320317
Application Number:	62320328
Application Number:	62320341
Application Number:	62320348
Application Number:	15010091
Application Number:	15000135
Application Number:	62275149
Application Number:	14962649
Application Number:	14953594
Application Number:	14950807
Application Number:	14946054
Application Number:	14943993

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Application Number:	14937437
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Application Number:	62112850
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Application Number:	61329703
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Application Number:	61329919

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PCT Number:	US2017029904
PCT Number:	US1726432
PCT Number:	US2016067972
PCT Number:	US2016055402
PCT Number:	US1616261
PCT Number:	US2016015483
PCT Number:	US1615078
PCT Number:	US1615064
PCT Number:	US1540320
PCT Number:	US2015030545
PCT Number:	US1412881
PCT Number:	US1373215
PCT Number:	US1352473
PCT Number:	US1249916
PCT Number:	US1249901
PCT Number:	US1249909
PCT Number:	US1249930
PCT Number:	US1230274
PCT Number:	US1230277
PCT Number:	US1042160

CORRESPONDENCE DATA

Fax Number: (858)509-3691

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Email: docketing@sheppardmullin.com
Correspondent Name: SHEPPARD MULLIN RICHTER & HAMPTON LLP
Address Line 1: 12275 EL CAMINO REAL
Address Line 2: SUITE 200
Address Line 4: SAN DIEGO, CALIFORNIA 92130

ATTORNEY DOCKET NUMBER:	64KY-285626
NAME OF SUBMITTER:	CINDY VARELA
SIGNATURE:	/Cindy Varela/
DATE SIGNED:	09/26/2018

Total Attachments: 20
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This PATENT ASSIGNMENT AGREEMENT ("**Assignment**"), dated as of August 20, 2018, is made by KnuEdge Incorporated, a Delaware corporation ("**Assignor**") and Friday Harbor LLC, a Delaware limited liability company ("**Assignee**").

WHEREAS, under the terms of the Strict Foreclosure Agreement among XL Innovate Fund, LP, 15th Street Investments, LLC, Candy Ventures SARL, the Dan Goldin Family Trust, Assignor and Assignee, dated as of the date hereof (the "**Foreclosure Agreement**"), Assignor has agreed to convey, transfer, and assign to Assignee, among other assets, all of the intellectual property of Assignor, and has agreed to execute and deliver this Assignment, for recording with the United States Patent and Trademark Office and corresponding entities or agencies in any applicable jurisdictions;

NOW THEREFORE, the parties agree as follows:

1.   **Assignment**. For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assignor hereby irrevocably conveys, transfers, and assigns to Assignee, and Assignee hereby accepts, all of Assignor's right, title, and interest in and to the following (the "**Assigned Patents**"):

(a)   all of the patents and patent applications held by Assignor, including those set forth on Schedule 1 hereto and all issuances, divisions, continuations, continuations-in-part, reissues, extensions, reexaminations, renewals and all foreign equivalents thereof (the "**Patents**");

(b)   all rights to apply for, prosecute and obtain patents in respect of any of the inventions disclosed in the Patents in any country of the world;

(c)   any and all royalties, fees, income, payments, and other proceeds now or hereafter due or payable with respect to any and all of the foregoing; and

(d)   any and all claims and causes of action, with respect to any of the foregoing, whether accruing before, on, or after the date hereof, including all rights to and claims for damages, restitution, and injunctive and other legal and equitable relief for past, present, and future infringement, whether committed before or after the date of this Assignment, with the right but no obligation to sue for such legal and equitable relief and to collect, or otherwise recover, any such damages.

2.   **Recordation and Further Actions**. Assignor hereby authorizes the Commissioner for Patents in the United States Patent and Trademark Office and the officials of corresponding entities or agencies in any applicable jurisdictions to record and register this Assignment upon request by Assignee. Following the date hereof, Assignor shall take such steps and actions, and provide such cooperation and assistance to Assignee and its successors, assigns, and legal representatives, including the execution and delivery of any affidavits, declarations, oaths, exhibits, assignments, powers of attorney, or other documents, as may be necessary to effect, evidence, or perfect the assignment of the Assigned Patents to Assignee, or any assignee or successor thereto.

3.   **Terms of the Foreclosure Agreement**. The parties hereto acknowledge and agree that this Assignment is entered into pursuant to the Foreclosure Agreement, to which

reference is made for a further statement of the rights and obligations of Assignor and Assignee with respect to the Assigned Patents. The representations, warranties, covenants, agreements, and indemnities contained in the Foreclosure Agreement shall not be superseded hereby but shall remain in full force and effect to the full extent provided therein. In the event of any conflict or inconsistency between the terms of the Foreclosure Agreement and the terms hereof, the terms of the Foreclosure Agreement shall govern.

4.   **Counterparts**. This Assignment may be executed in counterparts, each of which shall be deemed an original, but all of which together shall be deemed one and the same agreement. A signed copy of this Assignment delivered by facsimile, e-mail, or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this Assignment.

5.   **Successors and Assigns**. This Assignment shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns.

6.   **Governing Law**. This Assignment and any claim, controversy, dispute, or cause of action (whether in contract, tort, or otherwise) based upon, arising out of, or relating to this Assignment and the transactions contemplated hereby shall be governed by, and construed in accordance with, the laws of the United States and the State of New York, without giving effect to any choice or conflict of law provision or rule (whether of the State of New York or any other jurisdiction).

(signature page follows)

IN WITNESS WHEREOF, Assignor has duly executed and delivered this Assignment as of the date first above written.

KNUEDGE INCORPORATED

By: _____
     Name: Daniel Goldin
     Title: CEO

AGREED TO AND ACCEPTED:
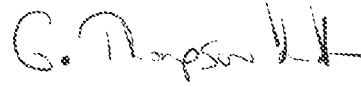
FRIDAY HARBOR LLC

By: _____
     Name:
     Title:

IN WITNESS WHEREOF, Assignor has duly executed and delivered this Assignment as of the date first above written.
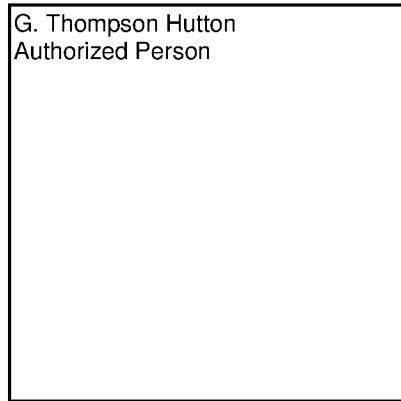
KNUEDGE INCORPORATED

By: _____

     Name:

     Title:

AGREED TO AND ACCEPTED:

FRIDAY HARBOR LLC

By: _____

     Name: G. Thompson Hutton

     Title: Authorized Person

Schedule 1

ASSIGNED PATENTS AND PATENT APPLICATIONS

PATENTS[1,2]

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
China	62/663,774	6/25/2018		Pending	REGISTER COMMUNICATION IN A NETWORK-ON-A-CHIP ARCHITECTURE
United States	62/663,787	4/27/2018		Pending	HEARING AIDS: PROPOSAL FOR A NEW TECHNOLOGY
United States	15/962,863	4/25/2018		Pending	KEYWORD DETECTION
				Pending	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
European Patent Office	16857989.4	4/23/2018		Pending	REGISTER COMMUNICATION IN A NETWORK-ON-A-CHIP ARCHITECTURE
United States	15/498,201	4/27/2017		Published	Machine Learning Aggregation
World Intellectual Property Organization	PCT/US2017/029904	4/27/2017		Pending	Machine Learning Aggregation
United States	15/499,773	4/27/2017		Allowed	Inclusion Monitors
United States	15/499,796	4/27/2017		Allowed	Exclusion Monitors
World Intellectual Property Organization	PCT/US17/26432	4/6/2017		Abandoned	Estimating Pitch of Harmonic Signals
United States	15/481,403	4/6/2017		Abandoned	SEGMENTATION USING PRIOR DISTRIBUTIONS
United States	15/480,113	4/5/2017		Abandoned	CLASSIFYING SIGNALS USING MUTUAL

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1 In some instances, IP assets marked as abandoned reflect a decision by the Company to abandon the IP, but these IP assets may not yet be formally abandoned with the corresponding IP office. It may be possible to pursue or revive some of these IP assets.

2 IP assets may be listed with informal titles, and the status of IP assets may not be up to date.

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	INFORMATION TITLE
United States	15/463,930	3/20/2017		Published	Estimating Pitch of Harmonic Signals
United States	15/401,608	1/9/2017	9704506	Issued	Harmonic feature processing for reconstruction (aka figure-ground separation)
World Intellectual Property Organization	PCT/US2016/067972	12/21/2016		Pending	Disjointed virtual memory scheme with block bypass
United States	15/399,681	1/5/2017		Allowed	AFFINITY DATA COLLECTION IN A COMPUTING SYSTEM
United States	15/372,205	12/7/2016		Published	BCR spectrum for use in segmentation (Frantic Peanut)
United States	15/369,954	12/6/2016	9858242	Issued	Memory Controller for a Network on a Chip Device
World Intellectual Property Organization	PCT/US2016/055402	10/5/2016		Pending	REGISTER COMMUNICATION IN A NETWORK-ON-A-CHIP ARCHITECTURE
United States	15/280,015	9/29/2016		Published	H2000: Disjointed virtual memory scheme with block bypass
United States	15/276,232	9/26/2016		Published	H2000: N-ary FIFO
United States	15/265,297	9/14/2016		Published	H2000: L1 buffer management
United States	15/265,211	9/14/2016	9977745	Issued	H2000: Flow control through L1 router
United States	15/232,629	8/9/2016		Published	Network Processor Inter-Device Packet Source ID Tagging for Domain Security
United States	15/226,384	8/2/2016		Pending	Distributed asychronous trap handling mechanisms
United States	15/226,833	8/2/2016	9942146	Issued	H2000: L1 router path creation/selection in a single clock
United States	15/200,976	7/1/2016		Published	Application Domain Security Via Router Ingress Filtering
United States	15/183,100	6/15/2016		Published	Low Latency Overhead Frameless MAC-PCS
United States	15/181,868	6/14/2016		Pending	Speaker verification using correlation classifier
United States	15/181,878	6/14/2016		Abandoned	Voice-on Boundary Estimation Using Cumulative Sum of Stripe Function
United States	15/177,068	6/8/2016		Pending	Object barrier synchronization using events

PATENT
REEL: 047156 FRAME: 0594

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	15/173,017	6/3/2016		Published	Task queues for a network on a chip
United States	15/157,982	5/18/2016		Published	H2000: Tuple Spaces
United States	15/157,942	5/18/2016		Abandoned	H2000: Low overhead communication and synchronization for threaded SIMD compute engines
United States	15/143,215	4/29/2016		Published	Distributed contiguous read
United States	62/328,491	4/27/2016		Expired	Machine Learning Aggregation
United States	15/140,081	4/27/2016		Abandoned	Estimating Clean Speech Features Using Manifold Modeling
United States	15/131,445	4/18/2016		Published	SYSTEMS AND METHODS FOR PACKET ROUTING
United States	15/098,257	4/13/2016		Abandoned	Asynchronous Interface For Communications Between Computing Resources That Are In Different Clock Domains
United States	62/320,227	4/8/2016		Expired	CLASSIFICATION WITH MUTUAL INFORMATION
United States	62/320,250	4/8/2016		Expired	HEARING AIDS: PROPOSAL FOR A NEW TECHNOLOGY
United States	62/320,261	4/8/2016		Expired	PRE-PITCH SEGMENTATION USING DISTRIBUTIONS ON STACK TIMING
United States	62/320,273	4/8/2016		Expired	FRANTIC PEANUT ALGORITHM
United States	62/320,291	4/8/2016		Expired	AUTO-STRIPING
United States	62/320,317	4/8/2016		Expired	TENSION PATH ANALYSIS (TPA) AS A FULL REPLACEMENT FOR PITCH-BASED HARMONIC DETECTION
United States	62/320,328	4/8/2016		Expired	SPEECH SEGMENTATION
United States	62/320,341	4/8/2016		Expired	KEYWORD DETECTION
United States	62/320,348	4/8/2016		Expired	VOICE BOUNDARIES USING EMPIRICAL CDF OF A STRIPE FUNCTION
United States	15/077,772	3/22/2016	10027583	Issued	H1000: Generalized Flit Chaining
United States	15/068,166	3/11/2016	9910716	Issued	FAST SYSTEM-WIDE SYNCHRONIZATION
United States	15/068,407	3/11/2016	9565124	Issued	Low-Latency Network Interface
United States	15/045,014	2/16/2016		Abandoned	Text-driven synthesis of acoustic models for text-dependent speaker verification
United States	15/043,000	2/12/2016	9959066	Issued	Memory-Attached Computing Resource in Network

PATENT
REEL: 047156 FRAME: 0595

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	15/017,426	2/5/2016	9880784	Issued	Data Routing and Buffering in a Processing System on a Chip Architecture
United States	15/016,801	2/5/2016	9576589	Issued	Harmonic feature processing for reconstruction (aka figure-ground separation)
World Intellectual Property Organization	PCT/US16/16261	2/3/2016		Abandoned	DETERMINING FEATURES OF HARMONIC SIGNALS
China	2016800176646	2/3/2016		Abandoned	DETERMINING FEATURES OF HARMONIC SIGNALS
European Patent Office	16706703.2	2/3/2016		Abandoned	DETERMINING FEATURES OF HARMONIC SIGNALS
United States	15/010,091	1/29/2016		Published	DRAIN SYNCHRONIZATION
World Intellectual Property Organization	PCT/US2016/015483	1/28/2016		Pending	SYNCHRONIZATION IN A MULTI-PROCESSOR COMPUTING SYSTEM
World Intellectual Property Organization	PCT/US16/15078	1/27/2016		Pending	Uniform System Wide Addressing for a Computing System
World Intellectual Property Organization	PCT/US16/15064	1/27/2016		Pending	Mapping Processes to Processors in a Network on a Chip Computing System
China		1/27/2016		Pending	Uniform System Wide Addressing for a Computing System
European Patent Office	16704521	1/27/2016		Pending	Uniform System Wide Addressing for a Computing System
Republic of Korea	10-2017-7024045	1/27/2016		Pending	Uniform System Wide Addressing for a Computing System
China		1/27/2016		Pending	Mapping Processes to Processors in a Network on a Chip Computing System
European	16709162.8	1/27/2016		Pending	Mapping Processes to Processors in a Network on a

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
Patent Office Republic of Korea	10-2017-7023869	1/27/2016		Pending	Mapping Processes to Processors in a Network on a Chip Computing System
United States	15/000,135	1/19/2016		Abandoned	Speaker verification using trajectory classifier
United States	62/275,149	1/5/2016		Expired	LAMDBAFABRIC: A SCALE-INVARIANT COMPUTING INTERCONNECT SCHEME
United States	14/969,036	12/15/2015	9922668	Issued	ESTIMATING FRACTIONAL CHIRP RATE WITH MULTIPLE FREQUENCY REPRESENTATIONS
United States	14/969,029	12/15/2015	9870785	Issued	DETERMINING FEATURES OF HARMONIC SIGNALS
United States	14/969,038	12/15/2015	9842611	Issued	ESTIMATING PITCH USING PEAK-TO-PEAK DISTANCES
United States	14/969,022	12/15/2015	9548067	Issued	ESTIMATING PITCH USING SYMMETRY CHARACTERISTICS
United States	14/962,649	12/8/2015		Published	Bit manipulation instructions
United States	14/953,594	11/30/2015		Allowed	SMART DMA ENGINE
United States	14/950,807	11/24/2015		Abandoned	MULTIPLE PROCESSOR ACCESS TO SHARED PROGRAM MEMORY
United States	14/946,054	11/19/2015		Abandoned	COUNTED AIP INTERFACE
United States	14/943,993	11/17/2015		Allowed	AGGREGATED WRITE OPERATION
United States	14/937,437	11/10/2015		Published	EVENT SIGNALING
United States	14/921,377	10/23/2015		Published	REGISTER COMMUNICATION IN A NETWORK-ON-A-CHIP ARCHITECTURE
United States	14/860,999	9/22/2015	9812148	Issued	ESTIMATION OF NOISE CHARACTERISTICS
United States	14/834,249	8/24/2015	9864519	Issued	Performing Write Operations In A Network On A Chip Device
United States	14/832,654	8/21/2015	9686191	Issued	APPENDED READ COMMAND
European Patent Office	15747284.6	7/14/2015		Abandoned	ACCESS CODE OBFUSCATION USING SPEECH INPUT
World Intellectual Property Organization	PCT/US15/40320	7/14/2015		Abandoned	ACCESS CODE OBFUSCATION USING SPEECH INPUT

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	14/798,343	7/13/2015		Published	ACCESS CODE OBFUSCATION USING SPEECH INPUT
United States	14/718,823	5/21/2015	9691391	Issued	Clustering of Audio Files Using Graphs
World Intellectual Property Organization	PCT/US2015/030545	5/13/2015		Pending	SYSTEMS AND METHODS FOR IMPLEMENTING A PLATFORM FOR PROCESSING STREAMS OF INFORMATION
European Patent Office	15166470.3	5/5/2015		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
United States	62/131,611	3/11/2015		Expired	PCS LOW LATENCY
United States	62/128,212	3/4/2015		Expired	SYSTEMS AND METHODS FOR ESTIMATING FLOOR NOISE IN AUDIO SIGNALS
United States	62/114,119	2/10/2015		Expired	AUTOMATIC SPEAKER CLUSTERING
United States	62/112,791	2/6/2015		Expired	FLOOR NOISE ESTIMATION
United States	62/112,796	2/6/2015		Expired	PITCH VELOCITY ESTIMATION
United States	62/112,824	2/6/2015		Expired	HARMONIC SECTIONING
United States	62/112,806	2/6/2015		Expired	LATERAL EXCITATION SMOOTHING
United States	62/112,827	2/6/2015		Expired	MUTUAL CONTENT
United States	62/112,832	2/6/2015		Expired	PEAK INTERVAL PITCH ESTIMATION
United States	62/112,846	2/6/2015		Expired	UNBIASED SMOOTHING
United States	62/112,836	2/6/2015		Expired	SMT3 OVERVIEW
United States	62/112,839	2/6/2015		Expired	TIME STRIPING
United States	62/112,850	2/6/2015		Expired	PITCH FROM SYMMETRY CHARACTERISTICS
United States	14/608,505	1/29/2015		Published	Mapping Processes to Processors in a Network on a Chip Computing System
United States	14/608,670	1/29/2015	9634901	Issued	Topology Discovery in a Computing System
United States	14/608,515	1/29/2015	9552327	Issued	Memory Controller for a Network on a Chip Device
United States	14/608,489	1/29/2015		Allowed	Uniform System Wide Addressing for a Computing System
United States	14/608,693	1/29/2015		Abandoned	Synchronization in a Computing System with Multi-Core Processing Devices
United States	14/593,238	1/9/2015	9177561	Issued	SYSTEMS AND METHODS FOR RECONSTRUCTING AN AUDIO SIGNAL FROM

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	14/579,197	12/22/2014	9177560	Issued	TRANSFORMED AUDIO INFORMATION
United States	14/502,844	9/30/2014	9396740	Issued	SYSTEMS AND METHODS FOR RECONSTRUCTING AN AUDIO SIGNAL FROM TRANSFORMED AUDIO INFORMATION
United States	14/500,694	9/29/2014	9614785	Issued	SYSTEMS AND METHODS FOR ESTIMATING PITCH IN AUDIO SIGNALS BASED ON SYMMETRY CHARACTERISTICS INDEPENDENT OF HARMONIC AMPLITUDES
United States	14/481,918	9/10/2014	9601119	Issued	I/O DATA INTERFACE FOR PACKET PROCESSORS
United States	14/331,183	7/14/2014		Allowed	SYSTEMS AND METHODS FOR SEGMENTING AND/OR CLASSIFYING AN AUDIO SIGNAL FROM TRANSFORMED AUDIO INFORMATION
United States	14/320,556	6/30/2014	9620130	Issued	SYSTEM AND METHODS FOR PERSONAL IDENTIFICATION NUMBER AUTHENTICATION AND VERIFICATION
United States	14/290,876	5/29/2014		Published	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
World Intellectual Property Organization	PCT/US14/12881	1/24/2014		Published	SYSTEMS AND METHODS FOR IMPLEMENTING A PLATFORM FOR PROCESSING STREAMS OF INFORMATION
World Intellectual Property Organization	PCT/US13/73215	12/5/2013		Expired	SYSTEMS AND METHODS FOR PACKET ROUTING
United States	14/089,729	11/25/2013	9473866	Issued	SMART MEMORY
United States	14/040,418	9/27/2013	9485597	Issued	SYSTEM AND METHOD FOR TRACKING SOUND PITCH ACROSS AN AUDIO SIGNAL USING HARMONIC ENVELOPE
					SYSTEM AND METHOD OF PROCESSING A

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COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	13/961,811	8/7/2013	9208794	Issued	SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
European Patent Office	13847475.4	7/29/2013		Pending	PROVIDING SOUND MODELS OF AN INPUT SIGNAL USING CONTINUOUS AND/OR LINEAR FITTING
World Intellectual Property Organization	PCT/US13/52473	7/29/2013		Expired	NEURAL PROCESSING ENGINE AND ARCHITECTURE USING THE SAME
Canada	2879531	7/29/2013		Abandoned	NEURAL PROCESSING ENGINE AND ARCHITECTURE USING THE SAME
United States	13/945,731	7/18/2013	9530434	Issued	REDUCING OCTAVE ERRORS DURING PITCH DETERMINATION FOR NOISY AUDIO SIGNALS
United States	13/944,750	7/17/2013	9484044	Issued	VOICE ENHANCEMENT AND/OR SPEECH FEATURES EXTRACTION ON NOISE AUDIO SIGNALS USING SUCCESSIVELY REFINED TRANSFORMS
United States	13/899,264	5/21/2013	9058820	Issued	IDENTIFYING SPEECH PORTIONS OF A SOUND MODEL USING VARIOUS STATISTICS THEREOF
United States	13/749,402	1/24/2013	9350656	Issued	SYSTEMS AND METHODS FOR PACKET ROUTING
United States	13/749,558	1/24/2013	8848726	Issued	I/O DATA INTERFACE FOR PACKET PROCESSORS
United States	13/705,999	12/5/2012	9185057	Issued	SMART MEMORY
China	201280049465.5	8/8/2012	CN2493084	Issued	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
Germany	12822218.9	8/8/2012	2742435	Issued	SYSTEM AND METHOD OF PROCESSING A

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
France	12822218.9	8/8/2012	2742435	Issued	SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
United Kingdom	12822218.9	8/8/2012	2742435	Issued	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
France	12821868.2	8/8/2012	2742331	Issued	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Germany	12821868.2	8/8/2012	2742331	Issued	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
United Kingdom	12821868.2	8/8/2012	2742331	Issued	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Hong Kong	14112603.8	8/8/2012	2742331	Issued	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
European Patent Office	12822218.9	8/8/2012	2742435	Expired	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
European Patent Office	12821868.2	8/8/2012	2742331	Expired	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
World Intellectual Property Organization	PCT/US12/49916	8/8/2012		Expired	SYSTEM AND METHOD FOR TRACKING SOUND PITCH ACROSS AN AUDIO SIGNAL USING HARMONIC ENVELOPE

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
World Intellectual Property Organization	PCT/US12/49901	8/8/2012		Expired	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
World Intellectual Property Organization	PCT/US12/49909			Expired	SYSTEM AND METHOD FOR TRACKING SOUND PITCH ACROSS AN AUDIO SIGNAL
World Intellectual Property Organization	PCT/US12/49930			Expired	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
Canada	2847686	8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Hong Kong	14112924	8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
India	465/KOLNP/2014	8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Japan		8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Republic of Korea	10-2014-7006338	8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
Canada	2847689	8/8/2012		Abandoned	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
Hong Kong	14112602.9	8/8/2012		Abandoned	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
Hong Kong	14112926.8	8/8/2012		Abandoned	A FREQUENCY-CHIRP DOMAIN SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
India	467/KOLNP/2014	8/8/2012		Abandoned	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
Japan		8/8/2012		Abandoned	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
Republic of Korea	10-2014-7006310	8/8/2012		Abandoned	SYSTEM AND METHOD OF PROCESSING A SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
China	201280049487.1	8/8/2012		Abandoned	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
China	201280025281.5	3/23/2012	ZL201280002 5281	Issued	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
Japan	2014-501266	3/23/2012	6027087	Issued	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
World Intellectual Property Organization	PCT/US12/30274	3/23/2012		Expired	SYSTEMS AND METHODS FOR RECONSTRUCTING AN AUDIO SIGNAL FROM TRANSFORMED AUDIO INFORMATION
World Intellectual Property Organization	PCT/US12/30277	3/23/2012		Expired	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
Canada	2831264	3/23/2012		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
European Patent Office	12763782.5	3/23/2012		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
Hong Kong	14107660.8	3/23/2012		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
India	3158/KOLNP/2013	3/23/2012		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
Republic of Korea	10-2013-7027811	3/23/2012		Abandoned	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
World Intellectual Property Organization	PCT/US12/29863	3/21/2012		Expired	AUDIO CLASSIFICATION
United States	13/205,483	8/8/2011	9183850	Issued	SYSTEM AND METHOD FOR TRACKING SOUND PITCH ACROSS AN AUDIO SIGNAL
United States	13/205,492	8/8/2011	9142220	Issued	SYSTEMS AND METHODS FOR RECONSTRUCTING AN AUDIO SIGNAL FROM TRANSFORMED AUDIO INFORMATION
United States	13/205,507	8/8/2011	8849663	Issued	SYSTEMS AND METHODS FOR SEGMENTING AND/OR CLASSIFYING AN AUDIO SIGNAL FROM TRANSFORMED AUDIO INFORMATION
United States	13/205,424	8/8/2011	8767978	Issued	SYSTEM AND METHOD FOR PROCESSING SOUND SIGNALS IMPLEMENTING A SPECTRAL MOTION TRANSFORM
United States	13/205,521	8/8/2011	8620646	Issued	SYSTEM AND METHOD FOR TRACKING SOUND PITCH ACROSS AN AUDIO SIGNAL USING HARMONIC ENVELOPE
United States	13/205,535	8/8/2011	8548803	Issued	SYSTEM AND METHOD OF PROCESSING A

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COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	13/205,455	8/8/2011		Abandoned	SOUND SIGNAL INCLUDING TRANSFORMING THE SOUND SIGNAL INTO A FREQUENCY-CHIRP DOMAIN
United States	13/097,627	4/29/2011	8897461	Issued	SYSTEM AND METHOD FOR ANALYZING AUDIO INFORMATION TO DETERMINE PITCH AND/OR FRACTIONAL CHIRP RATE
United States	13/097,615	4/29/2011	8626700	Issued	DENOISING AN AUDIO SIGNAL USING LOCAL FORMANT INFORMATION
United States	13/097,620	4/29/2011	8543402	Issued	CONTEXT AWARE DEVICE EXECUTION FOR SIMULATING NEURAL NETWORKS IN COMPUTE UNIFIED DEVICE ARCHITECTURE
United States	13/097,633	4/29/2011	8756265	Abandoned	SPEAKER SEGMENTATION IN NOISE CONVERSATIONAL SPEECH
United States	61/467,493	3/25/2011		Expired	AUDIO FILTER BANK DESIGN
United States	61/466,080	3/22/2011		Expired	SPECTRAL MOTION TRANSFORM
United States	61/466,087	3/22/2011		Expired	AUDIO FEATURE ENHANCEMENT USING LOCAL STATISTICAL SIGNAL MODELS
				Expired	COMPETITIVE GAUSSIAN MIXTURES MODELS FOR SOUND SOURCE SEGMENTATION: APPLICATIONS TO SPEAKER DIARIZATION AND DISTANCE MEASUREMENTS
United States	61/454,756	3/21/2011		Expired	AUDIO CLASSIFICATION
United States	61/454,871	3/21/2011		Expired	CEPSTRAL RESIDUAL VOICE SOURCE FEATURES FOR SPEAKER IDENTIFICATION
United States	61/448,449	3/2/2011		Expired	GENETIC ALGORITHM FOR MULTI-SPEAKER CONVERSATION SEGMENTATION AND CONFIDENCE MEASUREMENT
United States	61/447,968	3/1/2011		Expired	SYSTEMS AND METHODS FOR SPEAKER DIARIZATION IN CONVERSATIONAL SPEECH
United States	61/447,977	3/1/2011		Expired	ROBUST FEATURES FOR SPEAKER RECOGNITION
United States	12/883,313	9/16/2010	8543526	Issued	SYSTEMS AND METHODS USING NEURAL NETWORKS TO REDUCE NOISE IN AUDIO

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COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	12/853,939	8/10/2010	9183494	Issued	COMPETITIVE BCM LEARNING RULE FOR IDENTIFYING FEATURES SIGNALS
United States	12/850,352	8/4/2010	8521671	Issued	NEURAL NETWORK FOR CLUSTERING INPUT DATA BASED ON A GAUSSIAN MIXTURE MODEL
United States	12/836,839	7/15/2010	8504499	Issued	CONSTANT MEMORY IMPLEMENTATION OF A NETWORK OF PHASE MODELS OF NEURONS
World Intellectual Property Organization	PCT/US10/42160	7/15/2010		Expired	CONSTANT MEMORY IMPLEMENTATION OF A NETWORK OF PHASE MODELS OF NEURONS
United States	61/329,816	4/30/2010		Expired	COMPETITIVE BCM LEARNING RULE FOR IDENTIFYING FEATURES
United States	61/329,749	4/30/2010		Expired	DENOISING AN AUDIO SIGNAL USING LOCAL FORMANT INFORMATION
United States	61/330,042	4/30/2010		Expired	AUDIO FILTER BANK DESIGN
United States	61/329,739	4/30/2010		Expired	CONSTANT MEMORY IMPLEMENTATION OF A PHASE-MODEL NEURAL NETWORK
United States	61/329,995	4/30/2010		Expired	CONTEXT AWARE DEVICE EXECUTION FOR SIMULATING NEURAL NETWORKS IN COMPUTE UNIFIED DEVICE ARCHITECTURE
United States	61/329,703	4/30/2010		Expired	SPEAKER SEGMENTATION IN NOISE CONVERSATIONAL SPEECH
United States	61/330,036	4/30/2010		Expired	NOISE CLEANUP
United States	61/329,919	4/30/2010		Expired	NEURAL NETWORK FOR CLUSTERING INPUT DATA BASED ON A GAUSSIAN MIXTURE MODEL
United States	61/329,929	4/30/2010		Expired	NEURAL NETWORK THAT IMPLEMENTS AN ONLINE K-MEANS AND GAUSSIAN MIXTURE MODEL
United States	61/329,401	4/29/2010		Expired	MODIFIED BCM LEARNING RULE FOR IDENTIFYING CLUSTERS

COUNTRY	APPLICATION NO.	FILING DATE	PATENT NO.	STATUS	TITLE
United States	12/621,243	11/18/2009	8473436	Issued	NEURAL SEGMENTATION OF AN INPUT SIGNAL AND APPLICATIONS USING SIMULATED NEURONS, AND A PHASE MODULATOR
United States	61/251,878	10/15/2009		Expired	VISUAL IDENTIFICATION OF OBJECTS IN A COMPLEX ENVIRONMENT USING A NEURONAL MODEL TRAINING
United States	61/251,831	10/15/2009		Expired	EFFICIENT METHOD FOR BBD NEURAL MODEL
United States	61/251,872	10/15/2009		Expired	COMPLEX SITUATIONAL AWARENESS AND TACTICAL MAP DEVICE FOR ROBOTIC OPERATIONS UTILIZING NEURONAL MODEL
United States	61/251,866	10/15/2009		Expired	METHOD FOR MULTI-MODAL COMMUNICATIONS USING NEURONAL MODEL
United States	61/225,748	7/15/2009		Expired	CONSTANT MEMORY IMPLEMENTATION OF A NETWORK OF PHASE MODELS OF NEURONS
United States	61/105,875	10/16/2008		Expired	COGNITIVE PATTERN MATCHING SYSTEM WITH BUILT-IN CONFIDENCE MEASURE
United States	61/105,873	10/16/2008		Expired	METHOD AND APPARATUS FOR IMAGING IN THE VERY LONG WAVE INFRA-RED
United States	61/105,611	10/15/2008		Expired	EFFICIENT METHOD FOR BBD NEURAL TRAINING
United States	61/105,609	10/15/2008		Expired	VISUAL IDENTIFICATION OF OBJECTS IN A COMPLEX ENVIRONMENT USING A NEURONAL MODEL
United States	61/105,608	10/15/2008		Expired	COMPLEX SITUATIONAL AWARENESS AND TACTICAL MAP DEVICE FOR ROBOTIC OPERATIONS UTILIZING NEURONAL MODEL
United States	61/105,603	10/15/2008		Expired	METHOD FOR MULTI-MODAL COMMUNICATIONS USING NEURONAL MODEL

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