

Search query (3): [SP]: priority claim[0001] this u.s. patent application claims priority under 35 u.s.c. 119 to: india application no. 201621016128, filed on may 9, 2016. the entire contents of the aforementioned application are incorporated herein by reference technical field[0002] the embodiments herein generally relates to the field of wireless sensor networks, and, more particularly, to a method and system for achieving auto-adaptive clustering in a sensor network in an energy efficient manner using end-user information-level attributes as a criteria for clustering. background of the invention[0003] a wireless sensor network is a technology that detects a behavior and an environment of a target by utilizing sensors disposed in a predetermined region, converting the detected information into data, and wirelessly transmitting the data to a sink node collecting data. generally, a sensor network consists of a set of physical nodes that monitor a geographical region for one or more parameters and send the sensed values to a central gateway (also called as a sink) that manages the network. clustering and data aggregation in a sensor networks have so far grouped sensor nodes based on physical characteristics such as location and mobility so that the sensed data could be aggregated and transmitted to the sink saving energy in the process. the sensor networks are getting integrated into the larger fabric of internet of things (iot) with a large number of target applications with varying requirements. existing clustering methods are not adaptive to the characteristics of the sensing objective. in order to solve the problems, research of the sensor network and a data aggregating technology for efficient deployment planning is being conducted.[0004] clustering in sensor networks and iot systems have so far primarily worked with physical parameters associated with clustering such as position and mobility. nodes in a typical sensor network deployment are redundant in number, and it is not essential that all sensor nodes are tasked for every sensing requirement. the requirement of more recent sensor network and iot applications is to monitor systems with a certain service level agreement (sla) for the sensing objective, for example, to monitor the variations in the values of a parameter across a region in an energy efficient manner.[0005] a lot of prior art techniques have been used in the part in the context of clustering in sensor networks and iot. they primarily use physical characteristics to perform clustering. some work on using application specific characteristics such as tags associated with data have been used to perform optimized data transmission. work in prior art have not reported to carry out application adaptive clustering and organization of sensor networks where precision of measurement levels are used as a basis for adaptation and organization of nodes in the network. summary of the invention[0006] the following presents a simplified summary of some embodiments of the disclosure in order to provide a basic understanding of the embodiments. this summary is not an extensive overview of the embodiments. it is not intended to identify key/critical elements of the embodiments or to delineate the scope of the embodiments. its sole purpose is to present some embodiments in a simplified form as a prelude to the more detailed description that is presented below.[0007] in view of the foregoing, an embodiment herein provides a system for achieving auto-adaptive clustering in a sensor network. the system comprises a set of sensor nodes, a user interface, a sink node, memory and a processor. the set of sensor nodes configured to measure a plurality of parameters, wherein each of the sensor nodes comprising a plurality of sensors present at a plurality of locations in an area. the user interface generates a request by a user to send the measured plurality of parameters. the sink node receives the plurality of parameters measured by the set of sensor nodes. the processor further comprises a first level clustering module, a second level clustering module, a designating module and a conveying module. the first level clustering module performs a first level clustering for grouping the set of sensor nodes into data level clusters based on the measured plurality of parameters. the second level clustering module performs a second level clustering for grouping the set of sensor nodes in the data level clusters into location level clusters based on the plurality of locations. the designating module designates a cluster head after the data and location level clustering to arrive at a clustering decision. the conveying module conveys the clustering decision back to the set of sensor nodes to adaptively rearrange them in clusters.[0008] in another aspect, a method for achieving auto-adaptive clustering in a sensor network is provided. initially in the method a plurality of parameters is measured by a set of sensor nodes, wherein each of the sensor nodes comprising a plurality of sensors present at a plurality of locations in an area. at the next step, a request is sent by a user interface, to the set of sensor nodes to send the plurality of parameters measured at a plurality of sensor nodes. further, the plurality of parameters are sent to a sink node in response to the request. at the next step, a first level clustering is performed by a processor, for grouping the set of sensor nodes into data level clusters based on the measured plurality of parameters. also, a second level clustering is performed by the processor, for grouping the set of sensor nodes in the data level clusters into location level clusters based on the plurality of locations. at the next step a node is designated by the processor for each of the clusters formed after the data level and location level clustering as a cluster head to arrive at a clustering decision. and finally, the clustering decision is conveyed back to the set of sensor nodes to adaptively rearrange the set of sensor nodes in clusters.[0009] in yet another aspect, a non-transitory computer-readable medium having embodied thereon a computer program for executing for achieving auto-adaptive clustering in a sensor network is provided. initially in the method a plurality of parameters is measured by a set of sensor nodes, wherein each of the sensor nodes comprising a plurality of sensors present at a plurality of locations in an area. at the next step, a request is sent by a user interface, to the set of sensor nodes to send the plurality of parameters measured at a plurality of sensor nodes. further, the plurality of parameters are sent to a sink node in response to the request. at the next step, a first level clustering is performed by a processor, for grouping the set of sensor nodes into data level clusters based on the measured plurality of parameters. also, a second level clustering is performed by the processor, for grouping the set of sensor nodes in the data level clusters into location level clusters based on the plurality of locations. at the next step a node is designated by the processor for each of the clusters formed after the data level and location level clustering as a cluster head to arrive at a clustering decision. and finally, the clustering decision is conveyed back to the set of sensor nodes to adaptively rearrange the set of sensor nodes in clusters.[0010] it should be appreciated by those skilled in the art that any block diagram herein represent conceptual views of illustrative systems embodying the principles of the present subject matter. similarly, it will be appreciated that any flow charts, flow diagrams, state transition diagrams, pseudo code, and the like represent various processes which may be substantially represented in computer readable medium and so executed by a computing device or processor, whether or not such computing device or processor is explicitly shown. brief description of the drawings[0011] the embodiments herein will be better understood from the following detailed description with reference to the drawings, in which:[0012] fig. 1 illustrates a block diagram for achieving auto-adaptive clustering in a sensor network according to an embodiment of the present disclosure[0013] fig. 2 illustrates a sensor network deployment setup according to an embodiment of the present disclosure and[0014] fig. 3 is a flowchart illustrating the steps involved for achieving auto-adaptive clustering in a sensor network according to an embodiment of the present disclosure. detailed description of embodiments[0015] the embodiments herein and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. the examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. accordingly, the examples should not be construed as limiting the scope of the embodiments herein. glossary-terms used in the embodiments[0016] the expression "sensor network" in the context of the present disclosure refers to a network of interconnected sensor used in any field of the invention. for example in farming, iot or any other technology.[0017] the expression "set of sensor nodes" or "sensor node" in the context of the present disclosure refers to particular location where plurality of sensors are present. the sensor node are chosen specifically depending on the area where the sensor network is deployed.[0018] the expression "sink node" in the context of the pres

Results: 14

1) Family number: 43384001 (US2009154395A)

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Title: WIRELESS SENSOR NETWORK HAVING HIERARCHICAL STRUCTURE AND ROUTING METHOD THEREOF
Priority: KR20070132708 20071217

Family:	Publication number	Publication date	Application number	Application date
	KR20090065230 A	20090622	KR20070132708	20071217
	US2009154395 AA	20090618	US20080256937	20081023
	US8223784 BB	20120717	US20080256937	20081023

Probable Assignee: ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST
Assignee(s):(std): FUMATE CO LTD ; KOREA ELECTRONICS TELECOMM ; WOO JEONG MAN ; PARK SANG JOON ; PARK HYEON ; HAM YOUNG HWAN ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST KOREA
Assignee(s): FUMATE CO ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INST ; ELECTRONICS AND TELECOMMUNICATIONS RESEARCH INSTITUTE
Inventor(s):(std): HAM YOUNG HWAN ; PARK HYEON ; PARK SANG JOON ; WOO JEONG MAN
Agent(s): CANTOR COLBURN LLP; KILE PARK GOEKJIAN REED AND MCMANUS PLLC
International class (IPC 8-9): H04L12/28 H04L12/56 H04W36/00 H04W4/00 H04W84/02 (Advanced/Invention); H04L12/28 H04W84/02 (Core/Invention)
CPC: H04W40/04 H04W40/16 H04W40/32 H04W40/12 H04W84/18 Y02D70/22 Y02D70/32 Y02D70/34
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US class: 370/328 370/328P 370/394 370/406 455/442

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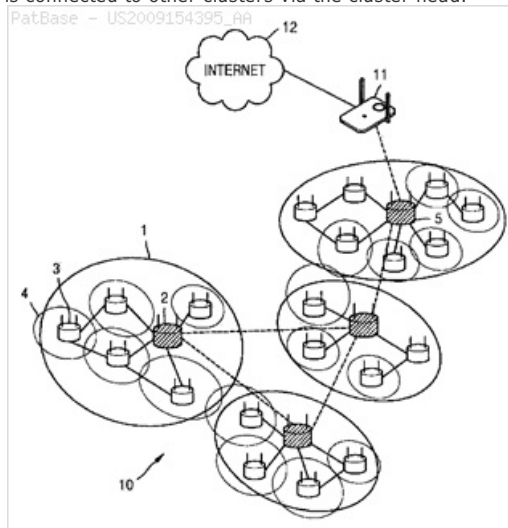
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Abstract:

A network having a hierarchical structure includes a plurality of clusters. Each of the clusters includes a plurality of nodes and a cluster head connected to the nodes in a mesh format. Each of the nodes is connected to other clusters via the cluster head.

**2) Family number: 67477137 (US2019141604A)**

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Title: METHOD AND SYSTEM FOR ACHIEVING AUTO ADAPTIVE CLUSTERING IN A SENSOR NETWORK

Priority: IN201621016128 20160509 WO2017IB52658 20170508

Family:

Publication number	Publication date	Application number	Application date
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CN109313841 A	20190205	CN201780028997	20170508
CO20180013181 A2	20190219	CO20180013181	20181205
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IN201621016128 A	20171110	IN201621016128	20160509
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WO17195089 A1	20171116	WO2017IB52658	20170508
ZA201807721 A	20190731	ZA20180007721	20181116

Probable Assignee: TATA CONSULTANCY SERVICES LTD

Assignee(s):(std): TATA CONSULTANCY SERVICES LTD

Inventor(s):(std): SRINIVASU PAPPULA ; SARANGI SANAT ; SANAT SARANGI ; PAPPULA SRINIVASU

Agent(s): MARHENDRA ARISTANTO SH MBA; KOSHAL AMIT ET AL

Designated states: AE AG AL AM AO AT AU AZ BA BB BE BF BG BH BJ BN BR BW BY BZ CA CF CG CH CI CL CM CN CO CR CU CY CZ DE DJ DK DM DO DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GT GW HN HR HU ID IE IL IN IR IS IT JP KE KG KH KM KN KP KR KW KZ LA LC LK LR LS LT LU LV LY MA MC MD ME MG MK ML MN MR MT MW MX MY MZ NA NE NG NI NL NO NZ OM PA PE PG PH PL PT QA RO RS RU RW SA SC SD SE SG SI SK SL SM SN ST SV SY SZ TD TG TH TJ TM TN TR TT TZ UA UG US UZ VC VN ZA ZM ZW

International class (IPC 8-9): G08B G08B26/00 G08C15/00 H04L H04L12/24 H04L12/28 H04L12/56 H04L29/06 H04W H04W4/38 H04W40/32 H04W52/02 H04W84/18 (Advanced/Invention)

International class (IPC 1-7): G08B26/00 H04L12/28

CPC: H04W40/32 H04W52/0251 H04W84/20 H04W84/18

US class: 1/1

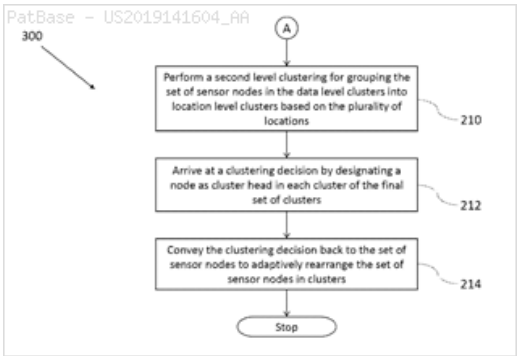
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WO06038163 A1, US8811188 BA, US8547982 BB, US7035240 BA, US2014047242 AA, US2013128786 AA, US2012014289 AA, US2009154395 AA, US2008253327 AA, JP2015192382 A2, CN1112703 A, CN105263149 A, CN104981002 A, CN101808289 A,

Abstract:

A system and method for achieving auto-adaptive clustering in a sensor network has been explained. The system performs a hierarchical clustering in sensor networks to maximize the lifetime of the network. The system includes a set of sensor nodes and a sink node. The clusters in sensor networks are formed automatically from a large number of deployed nodes where the cluster characteristics are driven by the measurement requirements defined by the end-user. The system also employs a clustering

algorithm to achieve adaptive clustering. The processor further includes a first level clustering module for grouping the set of sensor nodes into data level clusters based on the measurements. The processor further includes a second level clustering module for grouping the set of sensor nodes in the data level clusters into the location level clusters based on location. In another embodiment, that clustering can go on to more than two levels.



3) Family number: 53752144 (US2013128786A) © PatBase

Title: WIRELESS SENSOR NETWORK WITH ENERGY EFFICIENT PROTOCOLS

Priority: US20110304201 20111123

Family:

Publication number	Publication date	Application number	Application date
US2013128786 AA	20130523	US20110304201	20111123
US8547982 BB	20131001	US20110304201	20111123

Probable Assignee: KING ABDULAZIZ CITY FOR SCIENCE AND TECHNOLOGY

Assignee(s):(std): AL ABSI MUNIR A KULAIB ; KING ABDULAZIA CITY FOR SCIENCE AND TECHNOLOGY ; SHAFI AHMAR ; SULTAN FAROOQ ; ZUMMO SALAM A ; UNIV KING FAHD PET AND MINERALS

Assignee(s): KING FAHD UNIVERSITY OF PETROLEUM AND MINERALS ; KING ABDULAZIZ CITY FOR SCIENCE AND TECHNOLOGY ; KING FAHD UNIV OF PETROLEUM AND MINERALS

Inventor(s):(std): AL ABSI MUNIR A KULAIB ; SHAFI AHMAR ; SULTAN FAROOQ ; ZUMMO SALAM A

Agent(s): RICHARD C

International class (IPC 8-9): H04L12/28 H04W52/02 (Advanced/Invention)

CPC: H04W52/0238 Y02D70/142 Y02D70/144 Y02D70/162 Y02D70/22 Y02D70/00

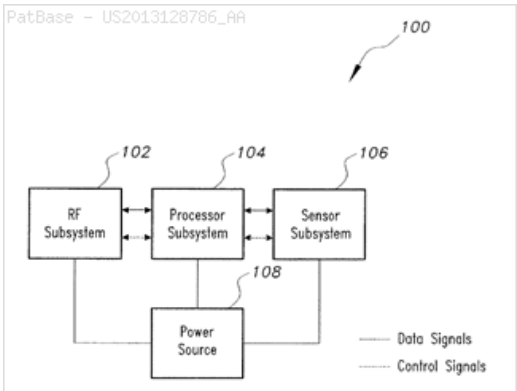
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Forward Citations: WO20064840, WO19158974, WO17195089, WO17165510, WO16175905, WO16017995, US9992281, US9986034, US9980116, US9977809, US9954795, US9954678, US9946743, US9930146, US9929935, US9916457, US9912776, US9888438, US9888082, US9882964, US9854551, US9836540, US9832291, US9832123, US9800637, US9743370, US9736791, US9729662, US9729616, US9706495, US9699198, US9681267, US9660825, US9651472, US9626413, US9621354, US9609014, US9590948, US9590887, US9553812, US9480013, US9462631, US9456416, US9426615, US8918130, US2018270843, US2017171889, US2017013424, US2016353368, US2016241988, US2016157177, US2016095063, US2016073443, US2016072715, US2015296024, US2015103694, US2015098388, US2015036570, US2014192695, US2014047108, US2014025825, US2012244896, US2012036242, US10660035, US10630778, US10630528, US10582521, US10581967, US10454820, US10447805, US10445380, US10440161, US10425503, US10419345, US10404537, US10375170, US10367871, US10355999, US10348865, US10341963, US10333840, US10320760, US10313227, US10305968, US10305864, US10296950, US10278197, US10277484, US10264099, US10263965, US10257271, US10250685, US10243851, US10237189, US10237075, US10230807, US10225103, US10212261, US10212248, US10210561, US10158656, US10142817, US10136388, US10135948, US10104041, US10098051, US10097346, US10091330, US10091012, US10075402, US10075401, US10069933, US10067948, US10067090, US10063414, US10051663, US10051071, US10043016, US10033642, US10021537, US10003520, EP3289807, CN109313841, CN107431644, CN105828287, CN105828287, CN105682141, CN105682141, CN104768149, CN104768149, CN103974367, CN103974367, CN103841020,

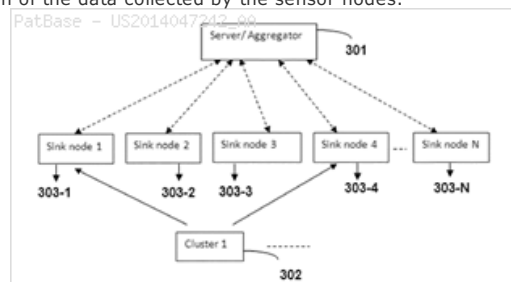
Abstract: The wireless sensor network with energy efficient protocols includes a network of external sensors in communication with a data sink. The network utilizes an algorithm integrating a modified S-MAC (an algorithm for medium access control) protocol for decreasing energy usage in operating the node and associated sensors. A routing protocol is further integrated into the algorithm, the routing protocol being based upon cluster head rotation.



Title:	METHOD AND SYSTEM FOR PRESERVING PRIVACY DURING DATA AGGREGATION IN A WIRELESS SENSOR NETWORK																																																																
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Inventor(s):(std):	UKIL ARIJIT ; SEN JAYDIP																																																																
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Agent(s):	PEGASUS IP; IP SOLVED ANZ PTY LTD; POTTER CLARKSON LLP; FINNEGAN HENDERSON FARABOW GARRETT AND DUNNER LLP; GUPTA PRIYANK																																																																
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Forward Citations:	WO17203488, WO17195089, WO16099839, US9609517, US9571164, US9564054, US9344489, US9182231, US2016112535, US2015156109, US2015070164, US2014215212, US10524101, US10334442, US10313137, CN108616568, CN105871571, CN105871571,																																																																

Abstract:

A computer-based system and method for secured privacy preservation scheme while data aggregation in a non-hierarchical wireless sensor network that lacks peer-to-peer communication between the communicating sensor nodes is disclosed. The method and system adopts formation of self-adaptive efficient cluster formation for robust privacy preservation in the network by grouping the multiple sensor nodes in the network to form multiple clusters that enables low computation overhead and high scalability in the network. The method and system of the invention discloses an effective twin-key management scheme that provides establishment of secure communication among the sensor nodes and the secure communication between at least one sensor node with the sever node performing the function data aggregation of the data collected by the sensor nodes.



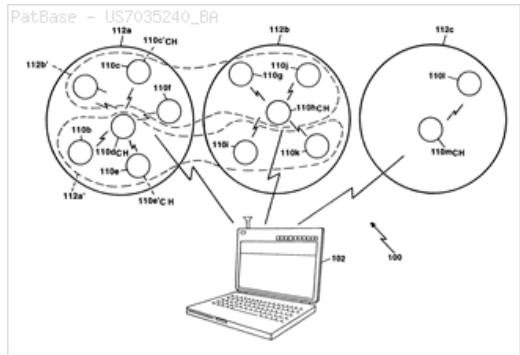
Title:	METHOD FOR LOW-ENERGY ADAPTIVE CLUSTERING HIERARCHY							
Priority:	US20000749332 20001227							
Family:	<table><tr><th>Publication number</th><th>Publication date</th><th>Application number</th><th>Application date</th></tr></table>				Publication number	Publication date	Application number	Application date
Publication number	Publication date	Application number	Application date					

Probable Assignee: MASSACHUSETTS INST OF TECHNOLOGY
Assignee(s):(std): MASSACHUSETTS INST TECHNOLOGY
Assignee(s): MASSACHUSETTS INST OF TECHNOLOGY ; MASSACHUSETTS INST ; AIR FORCE UNITED STATES ; MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Inventor(s):(std): HEINZELMAN WENDI B ; CHANDRAKASAN ANANTHA P ; BALAKRISHNAN HARI
Agent(s): DALY CROWLEY MOFFORD AND DURKEE LLP
International class
(IPC 8-9): H04Q7/24 H04W84/18 (Advanced/Invention);
H04W48/08 H04W52/02 H04W72/12 H04W84/20 H04W84/22 H04W92/10 (Advanced/Non-invention);
H04W84/18 (Core/Invention);
H04W48/00 H04W52/00 H04W72/00 H04W92/00 (Core/Non-invention)
CPC: H04W52/0219 H04W52/0245 H04W52/0261 H04W84/18 H04W48/08 H04W74/04 H04W84/20 H04W84/22
H04W92/10 Y02D70/142 Y02D70/164 Y02D70/22
European class: H04W284/18 H04W50/08 T04W24/04 T04W248/08 T04W252/02 T04W26/02 T04W272/12 T04W284/20
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T04W74/04 T04W84/20 T04W84/22 T04W92/10
US class: 370/328 370/337 370/338 709/224

[Classification Explorer](#)

Cited documents: WO9907113 A2, US6831904 BA, US6735630 BA, US6636499 BA, US6304556 BA, US6028857 A, US5946317 A, US5850592 A, US5515509 A,
Forward Citations: WO17195089, WO14155028, WO13015500, WO11095884, WO11053146, WO10006099, WO09112937, WO08064033, WO08064033, US9992623, US9985839, US9984350, US9984349, US9984348, US9974042, US9974041, US9973391, US9936439, US9930635, US9930569, US9913240, US9913228, US9904902, US9854556, US9788297, US9775126, US9769786, US9769785, US9710537, US9706495, US9686046, US9674858, US9674812, US9602573, US9591593, US9438504, US9420564, US9380638, US9313828, US9276823, US9232482, US9201488, US9167472, US9136918, US8982857, US8964500, US8879980, US8862704, US8762754, US8719384, US8717887, US8707075, US8645514, US8634329, US8605694, US8532002, US8521428, US8520587, US8498224, US8468374, US8438249, US8386122, US8345693, US8306002, US8300577, US8295280, US8243620, US8228954, US8194655, US8194571, US8189536, US8189494, US8149102, US8144197, US8131839, US8115593, US8085686, US8059629, US8040828, US8019549, US8005108, US8000468, US7979098, US7979096, US7961673, US7961664, US7961651, US7957222, US7952961, US7881757, US7881239, US7873043, US7835384, US7760109, US7742446, US7715887, US7705729, US7697458, US7685630, US7675410, US7668201, US7657766, US7653075, US7529217, US7457973, US7433691, US7386417, US7277414, US7176808, US7120681, US2018198680, US2015264668, US2015156254, US2015063325, US2014289251, US2014286178, US2014194132, US2014192695, US2014185503, US2013267239, US2013039281, US2013003631, US2012300632, US2012195228, US2012093098, US2012063436, US2012036242, US2011211513, US2011149844, US2011130162, US2011122796, US2010254378, US2010214871, US2010202335, US2010161784, US2010145622, US2010013933, US2010011244, US2010011231, US2010010899, US2009290511, US2009285140, US2009141898, US2009129321, US2009122797, US2009103456, US2009097359, US2009092002, US2009085769, US2009037570, US2008307075, US2008285582, US2008252446, US2008172191, US2008164997, US2008151801, US2008114914, US20080869008, US2007291689, US2007261101, US2007260716, US2007223403, US2007160016, US2007124616, US2007086396, US2007025308, US2007019569, US2006268932, US2006229086, US2006221904, US2006221873, US2006220843, US2006172756, US2006165012, US2006029061, US2006029060, US2005226203, US2005213612, US2005177537, US2005135321, US2005063337, US2005047343, US2005003794, US2004179498, US2003063585, US2002103893, US10660035, US10644940, US10616067, US10614034, US10608875, US10592845, US10588139, US10579954, US10572851, US10554382, US10524308, US10521759, US10506663, US10491479, US10484820, US10453023, US10412783, US10313199, US10305744, US10271166, US10271165, US10229382, US10187748, US10157363, US10111137, US10102494, US10078811, US10074069, US10057722, US10057133, US10033594, NL2003736, NL2003736, KR102086490, KR101507720, KR100962411, KR100953866, KR100951893, KR100933681, KR100881112, KR100872348, GB2526738, GB2526738, ES2321152, EP2557892, EP2426975, EP2282602, EP2165468, DE102012103924, DE102012103924, DE102009033553, DE102009030108, DE102009030108, CN107926074, CN107204877, CN107204877, CN105430048, CN105430048, CN104093196, CN104093196, CN101753241,

Abstract:
A method and network architecture for implementing an energy efficient network. The network includes a plurality of nodes that collect and transmit data that are ultimately routed to a base station. The network nodes form a set of clusters with a single node acting as a cluster-head. The cluster-head advertises for nodes to join its cluster, schedules the collection of data within a cluster, and then transmits the data to the base station. A cluster can intelligently combine data from individual nodes. After a period of operation, the clusters are reformed with a different set of nodes acting as cluster-heads. The network provides an increased system lifetime by balancing the energy use of individual nodes.



6) Family number: 61463339 (CN105263149A)

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Title:	ADAPTIVE DISTRIBUTED NODE RE-CLUSTERING METHOD IN MOBILE WIRELESS SENSOR NETWORK			
Priority:	CN201510638551 20150929			
Family:	Publication number	Publication date	Application number	Application date
	CN105263149 A	20160120	CN201510638551	20150929

Probable Assignee: UNIV SHANGHAI JIAOTONG
Assignee(s):(std): SHANGHAI JIAO TONG UNIV ; UNIV SHANGHAI JIAOTONG
Inventor(s):(std): XU CHAOJIE ; YU HUI ; XIA JUN ; LIU ZHONGLING
International class (IPC 8-9): H04W16/24 H04W24/00 H04W40/00 H04W84/18 (Advanced/Invention)
CPC: H04W16/24 H04W24/00 H04W40/00 H04W84/18
[Classification Explorer](#)
Cited documents: CN102711210 A, CN101639535 A,
Forward Citations: CN109313841, CN106507275, CN106507275,

Abstract:

The invention provides an adaptive distributed node re-clustering method in a mobile wireless sensor network. The method comprises steps that, in a clustered mobile wireless sensor network, the position of a node at each time in a movement process is accurately estimated by the node itself by utilizing a track reckoning method and a particle filtering algorithm according to data of an inertia sensor; at the beginning of each re-clustering period, the position of the node at the next time is reasonably predicted according to a motion model followed by the node and the position of the present time, a non cluster head node at a boundary portion in each cluster is permitted to re-cluster according to position information of other nodes in the network, so the node in a movement process is guaranteed to constantly be in a proper cluster, namely, a communication distance between the node and a cluster head node of the present location cluster is kept to be in a reasonable scope, a relatively high data transmission rate between the two nodes during communication can be realized, and thereby service quality of the mobile wireless sensor network can be guaranteed.

**7) Family number: 8563402 (US5602374A)**

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Title: Fire receiver in fire alarm system**Priority:** JP19940079616 19940325**Family:**

Publication number	Publication date	Application number	Application date
AU199514997 A1	19951019	AU19950014997	19950322
AE199514997 B2	19981105	AU19950014997	19950322
CN1039262 C	19980722	CN19951003565	19950325
CN1112703 A	19951129	CN19951003565	19950325
DE69511142 D1	19990909	DE19956011142	19950313
DE69511142 T2	20000302	DE19956011142T	19950313
EP0675470 A1	19951004	EP19950103557	19950313
EP0675470 B1	19990804	EP19950103557	19950313
JP3293998 B2	20020617	JP19940079616	19940325
JP7272175 A2	19951020	JP19940079616	19940325
US5602374 A	19970211	US19950407666	19950321

Probable Assignee: NOHMI BOSAI LTD**Assignee(s):(std):** NOHMI BOSAI LTD**Assignee(s):** NOHMI BOSAI LTD TOKIO TOKYO**Inventor(s):(std):** TSUMUJI AKIO ; HISHINO KOUICHI ; TSUMIJI AKIO ; HISHINO KOICHI ; TSUMUJI AKIO C O NOHMI BOSAI L ; SEIJI AKIO**Inventor(s):** KOICHI HISHINO ; AKIO TSUMIJI ; KOUICHI HISHINO ; AKIO TSUMUJI ; TSUMUJI AKIO C O NOHMI BOSAI LTD**Agent(s):** GRIFFITH HACK**Designated states:** CH DE FR GB LI NL

International class (IPC 8-9): G08B17/00 G08B23/00 G08B26/00 (Advanced/Invention);
 G08B17/00 G08B23/00 (Advanced/Non-invention);
 G08B17/00 G08B23/00 G08B26/00 (Core/Invention)

International class G06F17/00 G08B17/00 G08B23/00 G08B26/00 G08B29/00 H04B1/59 H04L12/403

(IPC 1-7):

CPC: G08B26/001
European class: G08B26/00B
US class: 235/375 235/380

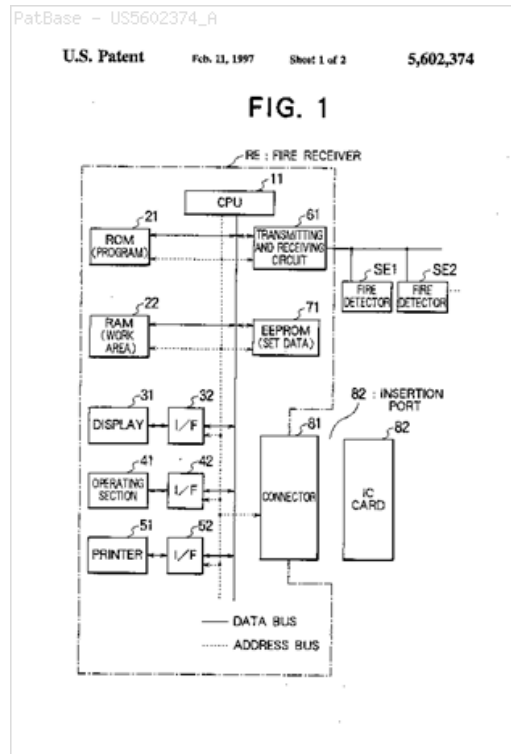
[Classification Explorer](#)

Cited documents: US4988988 A, JP63254599, JP63249298, JP63178393, JP59157795, JP520587, JP5020587, JP348394, JP3048394, JP2226951, GB2224144 A1, EP0583084 A1, DE3616019 A1, DE2600551 A1, CN1103750 A,

Forward Citations: CN109313841,

Abstract:

A fire receiver enables a fire alarm system to be reliably set up while the work for installing the fire alarm system is simplified, even if an IC card storing necessary data cannot be prepared or even at a time when the operation of connecting all terminal devices to the fire receiver is not completed. When a connection of the IC card to a card reader is detected when power supply to the fire receiver is turned on, data stored in the IC card is fetched and the terminal devices are operated on the basis of the fetched data. When no connection of the IC card to the card reader is detected when the power supply is turned on, predetermined data is fetched from the terminal devices by polling the terminal devices, and the terminal devices are operated by the data fetched by polling.



8) Family number: 33090405 (US2008253327A)

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Title: ENERGY EFFICIENT WIRELESS SENSOR NETWORK, NODE DEVICES FOR THE SAME AND A METHOD FOR ARRANGING COMMUNICATIONS IN A WIRELESS SENSOR NETWORK

Priority: FI20040001653 20041222 EP20050821516 20051221 EP20150184190 20051221
WO2005FI00543 20051221

Family:	Publication number	Publication date	Application number	Application date
	CY1117028 T1	20170405	CY20151101122T	20151209
	DE602005047485 D1	20151022	DE200560047485T	20051221
	DE602005056042 D1	20190801	DE200560056042T	20051221
	DK1829291 T3	20151221	DK20050821516T	20051221
	DK2991393 T3	20191014	DK20150184190T	20051221
	EP1829291 A1	20070905	EP20050821516	20051221
	EP1829291 A4	20140312	EP20050821516	20051221
	EP1829291 B1	20150909	EP20050821516	20051221
	EP2991393 A1	20160302	EP20150184190	20051221
	EP2991393 B1	20190710	EP20150184190	20051221
	ES2555958 T3	20160111	ES20050821516T	20051221
	ES2745717 T3	20200303	ES20150184190T	20051221
	FI118291 B	20070914	FI20040001653	20041222
	FI20041653 A	20060623	FI20040001653	20041222
	FI20041653 A0	20041222	FI20040001653	20041222
	HU027442 T2	20160928	HU20050821516T	20051221
	LT2991393 T	20190812	LT20150184190T	20051221
	PL1829291 T3	20160429	PL20050821516T	20051221
	PL2991393 T3	20200331	PL20150184190T	20051221
	PT1829291 T	20160108	PT20050821516T	20051221
	PT2991393 T	20191001	PT20150184190T	20051221
	SI1829291 T1	20160229	SI20050032027T	20051221
	TR201515644 T4	20151221	TR20150015644T	20051221
	TR201915410 T4	20191021	TR20190015410T	20051221

US2008253327 AA	20081016	US20050793840	20051221
US7830838 BB	20101109	US20050793840	20051221
WO06067271 A1	20060629	WO2005FI00543	20051221

Probable Assignee: WIREPAS OY

Assignee(s):(std): WIREPAS OY ; KOHVAKKA MIKKO ; HANNIKAINEN MARKO ; HAMALAINEN TIMO D ; HAENNIKAEINEN MARKO ; HAEMAELAEINEN TIMO D

Inventor(s):(std): HAEMAELAEINEN TIMO D ; HAENNIKAEINEN MARKO ; KOHVAKKA MIKKO ; TIMO D HAEMAELAEINEN ; MIKKO KOHVAKKA ; MARKO HAENNIKAEINEN ; HANNIKAINEN MARKO ; HAMALAINEN TIMO D

Agent(s): OFFICE FREYLINGER SA; BERGGREN OY AB; BERGGREN OY HELSINKI AND OULU; CARPINTERO MARIO; MARIO CARPINTERO CARPINTERO; MURAT CEVAHIR COSKUN; WOOD PHILLIPS KATZ CLARK AND MORTIMER

Designated states: AE AG AL AM AT AU AZ BA BB BE BF BG BJ BR BW BY BZ CA CF CG CH CI CM CN CO CR CU CY CZ DE DK DM DZ EC EE EG ES FI FR GA GB GD GE GH GM GN GQ GR GW HR HU ID IE IL IN IS IT JP KE KG KM KN KP KR KZ LC LI LK LR LS LT LU LV LY MA MC MD MG MK ML MN MR MW MX MZ NA NE NG NI NL NO NZ OM PG PH PL PT RO RU SC SD SE SG SI SK SL SM SN SY SZ TD TG TJ TM TN TR TT TZ UA UG US UZ VC VN YU ZA ZM ZW

International class (IPC 8-9): G08C17/02 H04B7/26 H04L12/28 H04L12/56 H04L29/08 H04Q7/00 H04W16/14 H04W52/02 H04W64/00 (Advanced/Invention); H04W52/02 H04W72/02 H04W74/00 H04W74/04 H04W84/18 (Advanced/Non-invention); G08C17/00 H04B7/26 H04L12/28 H04L12/56 H04L29/00 H04L29/08 H04Q7/00 H04W16/00 H04W52/00 (Core/Invention); H04W52/00 H04W72/00 H04W74/00 H04W84/18 (Core/Non-invention); H04B (Subclass/Invention)

CPC: H04L67/04 H04L67/12 H04W16/14 H04W52/0216 H04W52/0219 H04W56/00 H04W72/02 H04W74/00 H04W74/04 H04W84/18

European class: H04L29/08N11 H04L29/08N3 H04W16/14 H04W216/14 H04W8/08 T04W252/02 T04W26/02 T04W272/02 T04W274/00 T04W274/04 T04W284/18 T04W36/02S T04W36/08 T04W36/12 T04W50/08 T04W50/089 T04W52/02 T04W56/00 T04W72/02 T04W74/00 T04W74/04 T04W84/18

US class: 370/330 370/330P

[Classification Explorer](#)

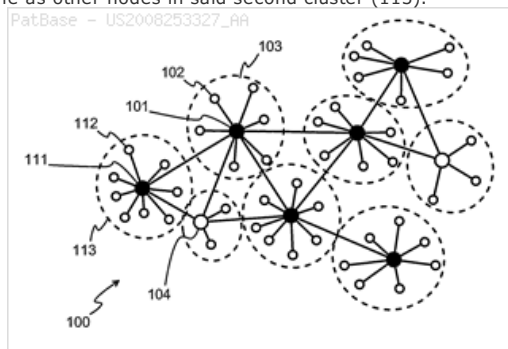
Cited documents: WO03061175 A2, WO0169279 A2, WO0169279, WO0155865 A1, WO0126329 A2, WO0126329, US6512462 BA, US6304556 BA, US6304556 BA, US6226601 BA, US6208247 BA, US6208247 BA, US5883884 A, US2010110930 AA, US2004100917 AA, US2004100917 AA, US2004042434 AA, US2004042434 AA, US2003152041 AA, US2003152041 AA, US2003012168 AA, US2003012168 AA, US2002071395 AA, US2002044533 AA, US2002044533 AA, US2002018451 AA, CA2311245 AA, CA2311245 AA,

Forward Citations: WO19192683, WO19124614, WO18125233, WO18064059, WO17195089, WO17149354, WO16123249, WO15171740, WO15062689, WO15018939, WO14165403, WO14040432, WO13142733, WO13130063, WO13106738, WO13046069, WO13040437, WO11128725, WO11104296, WO11088115, WO11085394, WO11085394, WO10135281, WO10135281, WO10097772, WO10096127, WO10072799, WO10035157, WO09129602, WO09129601, WO09030292, WO09009347, WO08056023, US9992658, US9942932, US9942931, US9936439, US9918329, US9913214, US9907115, US9881071, US9867040, US9819466, US9762547, US9762342, US9743350, US9743315, US9723653, US9723552, US9699724, US9693217, US9634995, US9626698, US9591673, US9560591, US9544797, US9526102, US9526062, US9503974, US9491607, US9479278, US9467808, US9462631, US9432925, US9408171, US9408170, US9398437, US9380119, US9369955, US9357472, US9357371, US9356761, US9319933, US9301246, US9251699, US9204244, US9177157, US9172517, US9148849, US9143956, US9137670, US9128202, US9094916, US9086499, US9084075, US9078212, US9063743, US9049644, US9043178, US8994556, US8966046, US8954562, US8954502, US8929246, US8923226, US8892704, US8887158, US8849926, US8848622, US8817813, US8811377, US8811372, US8805528, US8792932, US8787954, US8787266, US8781517, US8780885, US8767598, US8756030, US8681674, US8681671, US8605694, US8601295, US8600560, US8576812, US8571064, US8565169, US8549174, US8547920, US8538584, US8514760, US8509238, US8503343, US8488503, US8477716, US8462737, US8428067, US8427992, US8379589, US8351454, US8331264, US8315237, US8307070, US8305946, US8295491, US8295179, US8275404, US8274928, US8228934, US8228785, US8217803, US8179837, US8126005, US8102799, US8085134, US8046611, US8040828, US8031605, US8009602, US7996510, US7983702, US7948945, US7768950, US7742435, US7729336, US2018176936, US2018091989, US2018063784, US2017311264, US2017207896, US2017190543, US2017055205, US2017034823, US2016330649, US2016255578, US2016212684, US2016192176, US2016149781, US2016014690, US2015264657, US2015236940, US2015181520, US2015172031, US2015103694, US2015071158, US2015043568, US2014362848, US2014355502, US2014355499, US2014334398, US2014328199, US2014327300, US2014302787, US2014233464, US2014192793, US2014177656, US2014092763, US2014036751, US2014025825, US2013337855, US2013215757, US2013182637, US2013138792, US2012303788, US2012275361, US2012224537, US2012158343, US2012131561, US2012109404, US2012093087, US2012036198, US2012034948, US2012028674, US2011299426, US2011270578, US2011261738, US2011243267, US2011206022, US2011130162, US2011055424, US2011051644, US2010272039, US2010249881, US2010195515, US2010150122, US2010144383, US2010142375, US2010135494, US2010131644, US2010085969, US2010073686, US2010034191, US2010008256, US2009310571, US2009296704, US2009290518, US2009285140, US2009279465, US2009251297, US2009245280, US2009245159, US2009235354, US2009228883, US2009204354, US2009185547, US2009168670, US2009154407, US2009141185, US2009097460, US2009089410, US2009089300, US2009063879, US2009059828, US2009028118, US2009016262, US2008310350, US2008240073, US2008130565, US2008108300, US2008080420, US2008049744, US2008031199, US2007239862, US10660035, US10659332, US10652953, US10652808, US10652214, US10638399, US10630528, US10614034, US10606290, US10594828, US10536901, US10524337, US10516589, US10492068, US10455663, US10455441, US10455368, US10448272, US10356494, US10333642, US10306664, US10219286, US10212573, US10200836, US10194486, US10194395, US10149370, US10117087, US10098037, US10079664, US10051454, US10050948, US10035476, US10028278, US10026504, US10015829, US10015802, US10009783, US10004033, US10001791, TWI441494, TWI419514, TWI405435, TWI398127, KR20190074635, KR20140116484, KR102058439, KR101650862, KR101400859, KR101349182, KR101151067, KR101088178, JP6644902, JP2019508975, JP2008283673, EP3591942, EP3251426, EP3251425, EP3244510, EP3141079, EP3031251, EP2869645, EP2869645, EP2828950, EP2828950, EP2803234, EP2756654, EP2539841, EP2401729, EP2342930, EP2211575, EP2211575, EP2203009, EP2165441, EP2080320, EP2076974, EP2076974, EP2034629, EP1976165, EP1976165, EP1971055, EP1971055, DE102012205015, CN107613413, CN107455010, CN107018575, CN106922020, CN105684523, CN105072673, CN104429122, CN104427621, CN104427621, CN104321950, CN104137642, CN103814614, CN103814614, CN103781147, CN103781147, CN103501523, CN103501523, CN102983948, CN102983948, CN102835176, CN102835176, CN102821398, CN102821398, CN102713918, CN102598796, CN102598796, CN102461262, CN102461262, CN102427597, CN102014398, CN101689950, AU2017258941, AU2016210603,

Abstract:

A wireless sensor network, a node device thereof and a method for arranging communications therein are presented. A first frequency is used in wireless communication of information between a headnode and subnodes of a first cluster (103) using a

time slotted channel access scheme. A headnode of a second cluster (113) known the first frequency and selects a second, different frequency for use in wireless communication of information within said second cluster (113) using a time slotted channel access scheme. The headnode of the first cluster (103) is informed about the second frequency selected for the second cluster (113). Information from the headnode of said first cluster (103) to the headnode of said second cluster (113) is communicated on said second frequency, using the same time slotted channel access scheme as other nodes in said second cluster (113).



9) Family number: 50537411 (US8107397B)

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Title: PROTOCOL FOR SECURE AND ENERGY-EFFICIENT REPROGRAMMING OF WIRELESS MULTI-HOP SENSOR NETWORKS

Priority: US20060810962P 20060605 US20070910533P 20070406 US20070758636 20070605
US20120361639 20120130

Family:	Publication number	Publication date	Application number	Application date
	US8107397 BA	20120131	US20070758636	20070605
	US8811188 BA	20140819	US20120361639	20120130

Probable Assignee: PURDUE RESEARCH FOUNDATION

Assignee(s):(std): BAGCHI SAURABH ; KHALIL ISSA M I ; KRASNIEWSKI MARK D ; KROGMEIER JAMES V ; PURDUE RESEARCH FOUNDATION ; PANTA RAJESH K ; SHROFF NESS B

Assignee(s): NATIONAL SCIENCE FOUNDATION

Inventor(s):(std): KHALIL ISSA M I ; KRASNIEWSKI MARK D ; SHROFF NESS B ; BAGCHI SAURABH ; PANTA RAJESH K ; KROGMEIER JAMES V

Agent(s): WILLIAM F; MAGINOT MOORE AND BECK LLP

International class G06F9/445 H04L12/26 H04L12/28 H04L12/56 H04W52/02 H04W84/02 (Advanced/Invention)
(IPC 8-9):

CPC: H04L67/12 H04L9/0822 H04L9/0833 H04L9/0836 H04L9/0891 H04L63/06 H04L2209/805 H04W24/02 H04W84/18 H04W84/02 G06F8/65 H04W52/02 H04L45/02 H04L67/34 Y02D70/142 Y02D70/164 Y02D70/166 Y02D70/22 Y02D70/26 H04W4/38 H04W4/90

European class: H04L29/08N11 H04L29/08N33 H04L63/06 H04L9/08F2B H04L9/08F2H2 H04L9/08F2H2B H04L9/08T H04W4/00M2 T04L209/80A T04W24/02 T04W84/18

US class: 370/241 370/254 370/310 370/465 380/278 717/172 717/177

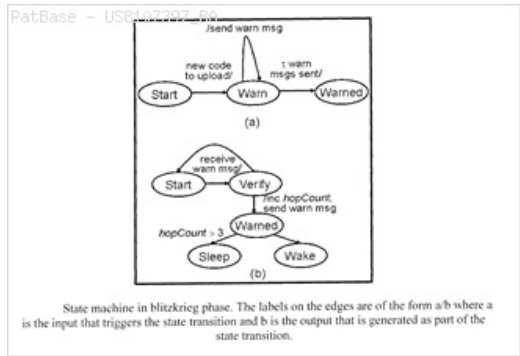
[Classification Explorer](#)

Cited documents: US2007258508 AA, US2006077918 AA, US2004039925 AA, US2003233538 AA,

Forward Citations: WO19038765, WO17195089, WO15192919, USRE47841, US9998945, US9993207, US9967292, US9912644, US9893897, US9792059, US9743216, US9706490, US9692533, US9658841, US9621523, US9461944, US9432311, US9338147, US9319923, US9246675, US9177081, US9176838, US9154476, US9152969, US9087109, US9078214, US8903084, US8850043, US8849926, US8792341, US8667481, US8572600, US8516252, US8509923, US8416949, US2018352456, US2018270843, US2018139099, US2016170737, US2015359429, US2015097840, US2015067336, US2015011206, US2014286171, US2014068587, US2013138831, US2013114582, US2012317242, US2012233364, US2012131239, US2012106329, US2012096270, US2012036198, US2012023564, US2012008515, US2012004782, US2011312285, US2011252121, US2011145578, US2011138023, US2010332831, US2010262706, US2010205596, US2010153088, US2009119510, US10582521, US10554739, US10512436, US10476673, US10439882, US10437995, US10397269, US10368259, US10354504, US10341889, US10335033, US10326741, US10291424, US10219706, US10213108, US10188296, US10146840, US10078507, US10042627, EP3111588, CN106911433, CN105228157, CN104994497, CN104199661, CN104199661, CN104104688, CN104104688, CN104010328,

Abstract:

A protocol for optimizing the energy for code upload to sensors in a wireless sensor network and speeding up the dissemination if multiple sources of code are available. Energy optimization is achieved by equipping each node with limited non-local topology information, which it uses to determine the time when it can go to sleep since code is not being distributed in its vicinity. Another aspect of the invention is a protocol that facilitates secure upload of code in the wireless sensor network. The secure communication protocol divides the sensor field into control groups each with a control node, and manages data exchange between nodes within a control group through the mediation of a control head which provides the common key. The keys are refreshed periodically and the control nodes are changed periodically to enhance security. The protocol facilitates secure communication between sensor nodes despite the compromise of any number of other nodes in the network.



10) Family number: 46673670 (CN101808289A)

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Title: METHOD FOR ACQUIRING DATA OF WIRELESS SENSOR NETWORK BASED ON MOBILE SINK NODE

Priority: CN201010139821 20100407

Family:	Publication number	Publication date	Application number	Application date
	CN101808289 A	20100818	CN201010139821	20100407
	CN101808289 B	20120905	CN201010139821	20100407

Probable Assignee: UNIV SHANGHAI JIAOTONG

Assignee(s):(std): SHANGHAI JIAO TONG UNIV ; UNIV SHANGHAI JIAOTONG

Assignee(s): SHANGHAI JIAO TONG UNIVERSITY

Inventor(s):(std): CAILIAN CHEN ; CHENGNIAN LONG ; LI SUN ; XINPING GUAN

Inventor(s): LONG CHENGNIAN ; SUN LI ; GUAN XINPING ; CHEN CAILIAN

International class (IPC 8-9): H04W4/06 H04W52/02 H04W84/18 (Advanced/Invention); H04W4/06 H04W52/00 H04W84/18 (Core/Invention)

CPC: Y02D70/00

[Classification Explorer](#)

Cited documents: US2004198339 AA, CN101662841 A, CN101534470 A,

Forward Citations: WO13071478, WO12167644, US9161255, EP2680636, CN109313841, CN108645769, CN107211237, CN106412958, CN106412958, CN106303979, CN106303979, CN103686855, CN103686855, CN103596222, CN103596222, CN103533625, CN103533625, CN102594509, CN102594509, CN102448067, CN102111799,

Abstract:

The invention discloses a method for acquiring data of a wireless sensor network based on a mobile sink node in the technical field of wireless sensor networks. The method comprises the following steps that: wireless sensor nodes which detect the same event perform local data fusion and generate a source node; the source node distributes state data packets in a predetermined direction in a unicast mode and selects a data distributing node; a sink node selects a proxy node and forwards a query data packet in the direction vertical to the predetermined direction in a multicast mode; the data distributing node which receives the query data packet prepares event data and transmits the event data to the proxy node; and the proxy node transmits the event data to the sink node. By using the method, non-valid data generated by the mobile sink node in the process of acquiring the data of the wireless sensor network can be reduced effectively and energy consumption of the wireless sensor network can be reduced, so that the service life of the wireless sensor network is prolonged.

