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(54) **Title:** SWARM INTELLIGENCE BASED METHODS TO ENABLE COOPERATIVE COMMUNICATION IN A MESH NETWORK

(57) **Abstract:** A method and device are described for determining at a node in a mesh network, cooperation with other nodes in forwarding messages and packets in a mesh network in an independent and distributed manner without real time handshake.

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2011/042419

**A. CLASSIFICATION OF SUBJECT MATTER**

*H04W 40/02(2009.01)i, H04W 84/18(2009.01)i, H04L 12/56(2006.01)i*

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
IPC :H04L 40/02; H04L 12/56; ECLA H04W40/24D, H04L12/56C105, H04W84/18, H04L1  
US Class : 370/248, 370/351, 370/406

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Korean utility models and applications for utility models  
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
eKOMPASS(KIPO internal) & Keywords:creat routing plan, routing table, probability forwarding

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DK SUNG, Telecommunication Networks, KAIST, Spring 2000 See slides 79-99.	1-3,5-6,9-13,16-17 ,19,20
A	See whole document.	4,7-8,14-15,18
Y	BRAVO et al. "Cooperative relay communications in mesh networks," IEEE 10th Workshop on Signal Processing Advances in Wireless Communications, pp. 499-503, 21-24 June 2009 See abstract; fig. 1; page 500, left col., lines 14-24.	1-3,9-12,16-17,19 ,20
A	See whole document.	4,7-8,14-15,18
Y	KEJUN LIU et al. "An Acknowledgment-Based Approach for the Detection of Routing Misbehavior in MANETs," IEEE Transactions on Mobile Computing, vol. 6, no. 5, pp. 536-550, May 2007 See page 544, left col., lines 47-57; page 539, right col., line 1- page 540, left col., line 19).	5-6,13
A	See page 544, left col., lines 47-57; page 539, right col., line 1- page 540, left col., line 19).	4,7-8,14-15,18
A	US 2004-0156345 A1 (DAVID STEER et al.) 12 August 2004 See whole document.	1-20
A	US 5359600 A (UEDA; HIROMI et al.) 25 October 1994 See col. 2, lines 50-61.	1-20

Further documents are listed in the continuation of Box C.  See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means



"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search 02 APRIL 2012 (02.04.2012)	Date of mailing of the international search report <b>08 MAY 2012 (08.05.2012)</b>
Name and mailing address of the ISA/KR  Korean Intellectual Property Office Government Complex-Daejeon, 189 Cheongsu-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Lee Seoung Young Telephone No. 82-42-481-8591 

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2011/042419**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0156345 A1	12.08.2004	None	
US 5359600 A	25.10.1994	JP 05-244187 A	21.09.1993