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(54) Title: CRYPTOGRAPHY-BASED PLATOONING MECHANISM FOR AUTONOMOUS VEHICLE FLEET MANAGEMENT

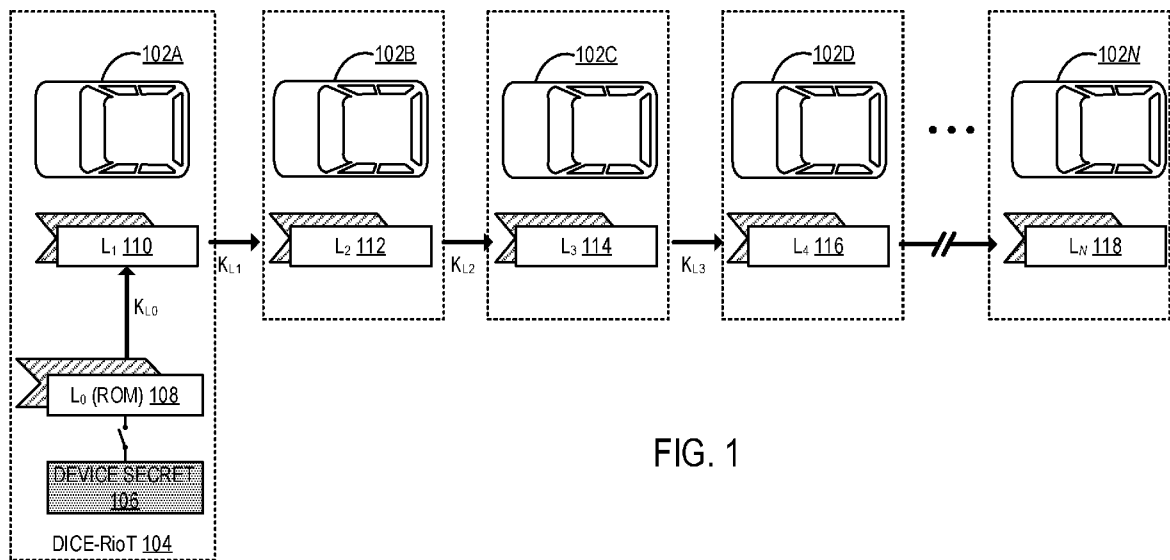


FIG. 1

(57) Abstract: Disclosed are techniques for managing a platoon of autonomous vehicles. In one embodiment, a method is disclosed comprising establishing a network connection between a plurality of autonomous vehicles, the plurality of autonomous vehicles operating as a platoon; receiving a request from a first autonomous vehicle to deviate from the platoon, the request comprising a digitally signed message from the first autonomous vehicle; assigning the first autonomous vehicle as a second master autonomous vehicle; permanently recording the assignment in a blockchain data structure; instantiating a new platoon path using the first autonomous vehicle as a head of the new platoon path; and disconnecting one or more autonomous vehicles associated with the new platoon path upon determining that the new platoon path is stable, the disconnecting causing the second master autonomous vehicle to manage the one or more autonomous vehicles using a second blockchain stored on the second master autonomous vehicle.

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A. CLASSIFICATION OF SUBJECT MATTER**G05D 1/02(2006.01)i**

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B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
G05D 1/02; G08G 1/00; G08G 1/123; H04W 4/46Documentation 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 modelsElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKOMPASS(KIPO internal) & keywords: platooning, vehicle, deviate, host, record, path, stable, disconnect, block chain, DICE-RIoT**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2018-0188746 A1 (BENDIX COMMERCIAL VEHICLE SYSTEMS LLC) 05 July 2018 paragraphs [0081], [0161]; claims 1-12; and figure 16	1-2, 8-9, 15-16
A		3-7, 10-14, 17-20
Y	HENRY HEXMOOR et al., 'BlockChain for Improved Platoon Security' , International Journal of Information Systems and Computer Sciences (IJISCS) (Vol.7, No. 2), 05 May 2018 [retrieved on 18 September 2020]. Retrieved from the Internet:<URL: http://paper.researchbib.com/view/paper/162871 > section 2.1; and figure 1	1-2, 8-9, 15-16
Y	US 2010-0268445 A1 (CHIEN CHEN et al.) 21 October 2010 claim 5	2, 9, 16
A	US 2018-0253976 A1 (TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)) 06 September 2018 paragraphs [0049]-[0172]; and figures 2-7	1-20
A	WO 2018-035145 A1 (PCMS HOLDINGS, INC.) 22 February 2018 paragraphs [0051]-[0067]; and figures 6-9	1-20

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

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2018-0188746 A1	05/07/2018	CN 110178165 A EP 3563364 A2 KR 10-2019-0103264 A US 10503176 B2 WO 2018-126103 A2 WO 2018-126103 A3	27/08/2019 06/11/2019 04/09/2019 10/12/2019 05/07/2018 02/08/2018
US 2010-0268445 A1	21/10/2010	TW 201037270 A TW I392847 B US 8170747 B2	16/10/2010 11/04/2013 01/05/2012
US 2018-0253976 A1	06/09/2018	CN 108353261 A EP 3351025 A1 EP 3351025 B1 WO 2017-048165 A1	31/07/2018 25/07/2018 08/04/2020 23/03/2017
WO 2018-035145 A1	22/02/2018	None	