# PATENT ASSIGNMENT COVER SHEET

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|---|---|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

**CONVEYING PARTY DATA**

| Name | Execution Date |
|---|---|
| LYFT, INC. | 03/14/2018 |
| MAGNA AUTONOMOUS SYSTEMS, LLC | 03/14/2018 |

**RECEIVING PARTY DATA**

| | |
|---|---|
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| Internal Address: | SUITE 5000 |
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| State/Country: | DELAWARE |
| Postal Code: | 19808 |

**PROPERTY NUMBERS Total: 119**

| Property Type | Number |
|---|---|
| Patent Number: | 10331128 |
| Patent Number: | 10782684 |
| Patent Number: | 10803743 |
| Patent Number: | 11047955 |
| Patent Number: | 10919464 |
| Application Number: | 16167061 |
| Application Number: | 16167170 |
| Patent Number: | 10659751 |
| Patent Number: | 10708557 |
| Application Number: | 16236865 |
| Patent Number: | 10768307 |
| Application Number: | 16237177 |
| Application Number: | 16237321 |

| Property Type | Number |
|---|---|
| Application Number: | 16237351 |
| Patent Number: | 11036986 |
| Application Number: | 16283529 |
| Patent Number: | 10992166 |
| Application Number: | 16363313 |
| Application Number: | 16422761 |
| Patent Number: | 11054826 |
| Application Number: | 16453840 |
| Application Number: | 16456472 |
| Patent Number: | 10909392 |
| Patent Number: | 11037328 |
| Patent Number: | D919461 |
| Application Number: | 16457653 |
| Application Number: | 16457678 |
| Application Number: | 16457683 |
| Application Number: | 16586496 |
| Application Number: | 16586906 |
| Application Number: | 16589110 |
| Application Number: | 16698307 |
| Application Number: | 16700914 |
| Application Number: | 16700945 |
| Application Number: | 16706307 |
| Application Number: | 16716482 |
| Application Number: | 16718024 |
| Application Number: | 16721604 |
| Application Number: | 16727710 |
| Application Number: | 16728741 |
| Application Number: | 16729123 |
| Application Number: | 16729124 |
| Application Number: | 16729263 |
| Application Number: | 16729266 |
| Application Number: | 16730719 |
| Application Number: | 16730738 |
| Application Number: | 16730759 |
| Application Number: | 16730774 |
| Application Number: | 16730787 |
| Application Number: | 16731933 |
| Application Number: | 16731951 |

| Property Type | Number |
| --- | --- |
| Application Number: | 16731972 |
| Application Number: | 16830100 |
| Application Number: | 16835068 |
| Application Number: | 16835078 |
| Application Number: | 16835085 |
| Application Number: | 16836666 |
| Application Number: | 16836803 |
| Application Number: | 16836805 |
| Application Number: | 16877295 |
| Application Number: | 16899252 |
| Application Number: | 16912481 |
| Application Number: | 16915901 |
| Application Number: | 16917562 |
| Application Number: | 16917879 |
| Application Number: | 16921596 |
| Application Number: | 16983599 |
| Application Number: | 17027001 |
| Application Number: | 17067585 |
| Application Number: | 17133302 |
| Application Number: | 17140662 |
| Application Number: | 17164477 |
| Application Number: | 17200474 |
| Application Number: | 17215733 |
| Application Number: | 17323461 |
| Application Number: | 29696683 |
| Application Number: | 29726074 |
| Application Number: | 62676833 |
| PCT Number: | US2019025929 |
| PCT Number: | US2019026004 |
| PCT Number: | US2019044240 |
| PCT Number: | US2019056714 |
| PCT Number: | US2019057273 |
| PCT Number: | US2019064746 |
| PCT Number: | US2019064758 |
| PCT Number: | US2019067294 |
| PCT Number: | US2020062463 |
| PCT Number: | US2020062716 |
| PCT Number: | US2020062724 |

| Property Type | Number |
|---|---|
| PCT Number: | US2020063436 |
| PCT Number: | US2020065258 |
| PCT Number: | US2020065421 |
| PCT Number: | US2020065987 |
| PCT Number: | US2020066480 |
| PCT Number: | US2020066487 |
| PCT Number: | US2020066659 |
| PCT Number: | US2020066690 |
| PCT Number: | US2020066718 |
| PCT Number: | US2020066915 |
| PCT Number: | US2020066925 |
| PCT Number: | US2020067024 |
| PCT Number: | US2020067031 |
| PCT Number: | US2020067033 |
| PCT Number: | US2020067034 |
| PCT Number: | US2020067360 |
| PCT Number: | US2020067371 |
| PCT Number: | US2020067374 |
| PCT Number: | US2020067562 |
| PCT Number: | US2021023956 |
| PCT Number: | US2021024367 |
| PCT Number: | US2021024707 |
| PCT Number: | US2021024713 |
| PCT Number: | US2021025004 |
| PCT Number: | US2021025233 |
| PCT Number: | US2021025237 |
| PCT Number: | US2021028777 |
| PCT Number: | US2021028923 |
| PCT Number: | US2021028951 |
| PCT Number: | US2020066872 |

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| **DATE SIGNED:** | 07/12/2021 |

**Total Attachments: 10**
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## Joint Patent Ownership Statement

With respect to each of the Patents and Patent Applications listed in **Exhibit A**, such Patents and Patent Applications might be jointly co-owned by Magna Autonomous Systems LLC and Lyft, Inc. with each having an undivided one-half interest, if and only if, the Patent or Patent Application is found to qualify as "Project IP" as defined in and pursuant to that certain Strategic Development, License and Procurement Agreement (aka "Joint Collaboration Agreement") executed on March 14, 2018 by and among Magna Autonomous Systems LLC, Magna Electronics Technology, Inc., and Lyft, Inc.

I declare that, to the best of my knowledge and belief, the information herein is true and complete. I understand this statement is made for use as evidence in court and is subject to penalty for perjury.

**LYFT, INC.**

Signature

___Carl Bowers / Director, Intellectual Property___
Name / Title

___July 9, 2021_____
Date

## Exhibit A

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| SECURE COMMUNICATION BETWEEN VEHICLE COMPONENTS VIA BUS GUARDIANS | 4/20/18 | 15/959,130 | 10,782,684 |
| CONTROL REDUNDANCY | 4/20/18 | 15/959,129 | 10,331,128 |
| MONITORING AMBIENT LIGHT FOR OBJECT DETECTION | 5/2/18 | 15/969,693 | 10,803,743 |
| ADAPTIVE WAVELENGTH LIDAR | 5/25/18 | 62/676,833 | |
| CALIBRATING A RADAR ANTENNA | 7/6/18 | 16/029,473 | 11,047,955 |
| SUPERCAPACITOR POWER BUFFER FOR VEHICLE POWER SYSTEM | 7/31/18 | 16/051,130 | 10,919,464 |
| SYSTEMS AND METHODS FOR AUTOMATED IMAGE LABELING FOR IMAGES CAPTURED FROM VEHICLES | 10/22/18 | 16/167,170 | |
| SYSTEMS AND METHODS FOR EFFICIENT VEHICLE CONTROL | 10/22/18 | 16/167,061 | |
| MULTISPECTRUM, MULTI-POLARIZATION (MSMP) FILTERING FOR IMPROVED PERCEPTION OF DIFFICULT TO PERCEIVE COLORS | 12/14/18 | 16/221,414 | 10,708,557 |
| MULTICHANNEL, MULTI-POLARIZATION IMAGING FOR IMPROVED PERCEPTION | 12/14/18 | 16/221,406 | 10,659,751 |
| SYSTEMS AND METHODS FOR ESTIMATING VEHICLE SPEED BASED ON RADAR | 12/31/18 | 16/237,153 | 10,768,307 |
| SYSTEMS AND METHODS FOR COMPONENT FAULT DETECTION | 12/31/18 | 16/237,177 | |
| DETERMINING VEHICLE DATA INTEGRITY | 12/31/18 | 16/236,865 | |
| SYSTEMS AND METHODS FOR IMPLEMENTING ROBOTICS FRAMEWORKS | 12/31/18 | 16/237,351 | |
| APPROACHES FOR DETERMINING SENSOR CALIBRATION | 12/31/18 | 16/237,321 | |
| SYSTEMS AND METHODS FOR ALIGNING MAP DATA | 2/8/19 | 16/271,526 | 11,036,986 |
| INTEGRATED MOVEMENT MEASUREMENT UNIT | 2/22/19 | 16/283,529 | |
| VEHICLE REDUNDANT ENERGY SYSTEM | 3/22/19 | 16/362,429 | 10,992,166 |
| SYSTEMS AND METHODS FOR IMPLEMENTING ROBOTICS FRAMEWORKS | 3/25/19 | 16/363,313 | |

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| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| CONTROL REDUNDANCY | 4/5/19 | PCT/US2019/025929 | |
| SECURE COMMUNICATION BETWEEN VEHICLE COMPONENTS VIA BUS GUARDIANS | 4/5/19 | PCT/US2019/026004 | |
| ADAPTIVE LIDAR SYSTEM | 5/24/19 | 16/422,761 | |
| CONTROL REDUNDANCY | 6/24/19 | 16/450,517 | 11,054,826 |
| APPROACHES FOR DETERMINING TRAFFIC LIGHT STATE | 6/26/19 | 16/453,840 | |
| SENSOR COMPONENT COVER | 6/28/19 | 29/696,684 | D919,461 |
| DYNAMIC OBJECT DETECTION MODEL BASED ON STATIC MAP COLLECTION DATA | 6/28/19 | 16/457,653 | |
| SUBJECTIVE ROUTE COMFORT MODELING AND PREDICTION | 6/28/19 | 16/457,678 | |
| SYSTEMS AND METHODS FOR AUTOMATED TRAJECTORY PREDICTION | 6/28/19 | 16/456,472 | |
| SENSOR ARRAY ENCLOSURE | 6/28/19 | 29/696,683 | |
| SYSTEMS AND METHODS FOR NAVIGATING VEHICLES WITH REDUNDANT NAVIGATION SYSTEMS | 6/28/19 | 16/457,683 | |
| SUPERCAPACITOR POWER BUFFER FOR VEHICLE POWER SYSTEM | 7/30/19 | PCT/US2019/044240 | |
| SENSOR ARRANGEMENT VALIDATION USING SIMULATED ENVIRONMENTS | 9/27/19 | 16/586,496 | |
| UNIFIED AUTOMOTIVE THERMAL MANAGEMENT NETWORK | 9/28/19 | 16/586,906 | |
| ENERGY HARVESTING SYSTEM FOR ACTIVE COOLING OF AUTOMOTIVE SENSING DEVICES | 9/30/19 | 16/589,110 | |
| SYSTEMS AND METHODS FOR EFFICIENT VEHICLE CONTROL | 10/17/19 | PCT/US2019/056714 | |
| SYSTEMS AND METHODS FOR AUTOMATED IMAGE LABELING FOR IMAGES CAPTURED FROM VEHICLES | 10/21/19 | PCT/US2019/057273 | |
| SYSTEMS AND METHODS FOR IMPROVING VEHICLE PREDICTIONS USING POINT REPRESENTATIONS OF SCENE | 11/27/19 | 16/698,307 | |
| SAFETY-ENHANCED STORAGE SYSTEM FOR AUTONOMOUS VEHICLE COMPUTE UNITS | 12/2/19 | 16/700,945 | |
| SIMULATION ARCHITECTURE FOR ON-VEHICLE TESTING AND VALIDATION | 12/2/19 | 16/700,914 | |

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| MULTICHANNEL, MULTI-POLARIZATION IMAGING FOR IMPROVED PERCEPTION | 12/5/19 | PCT/US2019/064758 | |
| MULTISPECTRUM, MULTI-POLARIZATION (MSMP) FILTERING FOR IMPROVED PERCEPTION OF DIFFICULT TO PERCEIVE COLORS | 12/5/19 | PCT/US2019/064746 | |
| SYSTEMS AND METHODS FOR DETERMINING VEHICLE TRAJECTORIES DIRECTLY FROM DATA INDICATIVE OF HUMAN-DRIVING BEHAVIOR | 12/6/19 | 16/706,307 | |
| SYSTEMS AND METHODS FOR INJECTING FAULTS INTO AN AUTONOMY SYSTEM | 12/16/19 | 16/716,482 | |
| SYSTEMS AND METHODS FOR FILTERING SENSOR DATA TO REMOVE DATA POINTS ASSOCIATED WITH EPHEMERAL OBJECTS | 12/17/19 | 16/718,024 | |
| SYSTEMS AND METHODS FOR COMPONENT FAULT DETECTION | 12/18/19 | PCT/US2019/067294 | |
| GEOLOCALIZED MODELS FOR PERCEPTION, PREDICTION, OR PLANNING | 12/19/19 | 16/721,604 | |
| SYSTEMS AND METHODS FOR SEMANTIC MAP-BASED ADAPTIVE AUTO-EXPOSURE | 12/26/19 | 16/727,710 | |
| SYSTEMS AND METHODS FOR COMPUTER-BASED LABELING OF SENSOR DATA CAPTURED BY A VEHICLE | 12/27/19 | 16/729,264 | 10,909,392 |
| SYSTEMS AND METHODS FOR PRESENTING A RECONSTRUCTED REPRESENTATION OF A MOVING OBJECT DETECTED IN A SCENE | 12/27/19 | 16/729,266 | |
| RESOURCE PRIORITIZATION BASED ON TRAVEL PATH RELEVANCE | 12/27/19 | 16/729,124 | |
| MITIGATING MULTIPATH EFFECT ON RADARS FOR EFFECTIVE TARGET DETECTION | 12/27/19 | 16/729,123 | |
| SYSTEMS AND METHODS FOR APPROPRIATE SPEED INFERENCE | 12/27/19 | 16/729,263 | |
| SEQUENTIAL CLUSTERING | 12/27/19 | 16/728,741 | |
| SYSTEMS AND METHODS FOR ADAPTIVE GATING IN INITIALIZATION OF RADAR TRACKING | 12/30/19 | 16/730,759 | |
| SYSTEMS AND METHODS FOR ADAPTIVE CLUTTER REMOVAL FROM RADAR SCANS | 12/30/19 | 16/730,738 | |
| SYSTEMS AND METHODS FOR BLIND ONLINE CALIBRATION OF RADAR SYSTEMS ON A VEHICLE | 12/30/19 | 16/730,719 | |
| SYSTEMS AND METHODS FOR AUTOMOBILE RADIATOR COOLING CONTROL | 12/30/19 | 16/730,787 | |

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| SYSTEMS AND METHODS FOR ENHANCED DE-GAS SYSTEM IN A VEHICLE | 12/30/19 | 16/730,774 | |
| OVERHEAD VIEW IMAGE GENERATION | 12/31/19 | 16/731,902 | 11,037,328 |
| MAP FEATURE EXTRACTION USING OVERHEAD VIEW IMAGES | 12/31/19 | 16/731,933 | |
| OVERHEAD VIEW IMAGE GENERATION | 12/31/19 | 16/731,951 | |
| GENERATING TRAINING DATA FROM OVERHEAD VIEW IMAGES | 12/31/19 | 16/731,972 | |
| SENSOR ASSEMBLY | 2/28/20 | 29/726,074 | |
| GROUND MAP GENERATION | 3/25/20 | 16/830,100 | |
| MODULAR SENSOR ASSEMBLY FOR VEHICLES | 3/30/20 | 16/835,068 | |
| SYSTEMS AND METHODS FOR CAPTURING PASSIVELY-ADVERTISED ATTRIBUTE INFORMATION | 3/30/20 | 16/835,085 | |
| SYSTEMS AND METHODS FOR DERIVING PLANNED PATHS FOR VEHICLES USING PATH PRIORS | 3/30/20 | 16/835,078 | |
| MANUAL CURATION TOOL FOR MAP DATA USING AGGREGATED OVERHEAD VIEWS | 3/31/20 | 16/836,805 | |
| MAPPING PIPELINE OPTIMIZATION USING AGGREGATED OVERHEAD VIEW RECONSTRUCTION | 3/31/20 | 16/836,803 | |
| SYSTEMS AND METHODS FOR PREDICTING AGENT TRAJECTORY | 3/31/20 | 16/836,666 | |
| MULTICHANNEL, MULTI-POLARIZATION IMAGING FOR IMPROVED PERCEPTION | 5/18/20 | 16/877,295 | |
| SYSTEMS AND METHODS FOR DISENGAGEMENT PREDICTION AND TRIAGE ASSISTANT | 6/11/20 | 16/899,252 | |
| SYSTEMS AND METHODS FOR MANIPULATING VIRTUAL SHAPES IN THREE-DIMENSIONAL SPACE | 6/25/20 | 16/912,481 | |
| SYSTEMS AND METHODS FOR OPTIMIZING TRAJECTORY PLANNER BASED ON HUMAN DRIVING BEHAVIORS | 6/29/20 | 16/915,901 | |
| INDEPENDENT TRAJECTORY VALIDATION SYSTEM FOR VEHICLES | 6/30/20 | 16/917,562 | |

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| VEHICLE PROCESSING COMPONENT COOLING SYSTEMS AND METHODS | 6/30/20 | 16/917,879 | |
| MULTISPECTRUM, MULTI-POLARIZATION (MSMP) FILTERING FOR IMPROVED PERCEPTION OF DIFFICULT TO PERCEIVE COLORS | 7/6/20 | 16/921,596 | |
| SYSTEMS AND METHODS FOR ESTIMATING VEHICLE SPEED BASED ON RADAR | 8/3/20 | 16/983,599 | |
| SECURE COMMUNICATION BETWEEN VEHICLE COMPONENTS VIA BUS GUARDIANS | 9/21/20 | 17/027,001 | |
| MONITORING AMBIENT LIGHT FOR OBJECT DETECTION | 10/9/20 | 17/067,585 | |
| SYTEMS AND METHODS FOR IMPROVING VEHICLE PREDICTIONS USING POINT REPRESENTATIONS OF SCENE | 11/26/20 | PCT/US2020/062463 | |
| SAFETY-ENHANCED STORAGE SYSTEM FOR AUTONOMOUS VEHICLE COMPUTE UNITS | 12/1/20 | PCT/US2020/062724 | |
| SIMULATION ARCHITECTURE FOR ON-VEHICLE TESTING AND VALIDATION | 12/1/20 | PCT/US2020/062716 | |
| SYSTEMS AND METHODS FOR DETERMINING VEHICLE TRAJECTORIES DIRECTLY FROM DATA INDICATIVE OF HUMAN-DRIVING BEHAVIOR | 12/4/20 | PCT/US2020/063436 | |
| SYSTEMS AND METHODS FOR FILTERING SENSOR DATA TO REMOVE DATA POINTS ASSOCIATED WITH EPHEMERAL OBJECTS | 12/16/20 | PCT/US2020/065421 | |
| SYSTEMS AND METHODS FOR INJECTING FAULTS INTO AN AUTONOMY SYSTEM | 12/16/20 | PCT/US2020/065258 | |
| GEOLOCALIZED MODELS FOR PERCEPTION, PREDICTION, OR PLANNING | 12/18/20 | PCT/US2020/065987 | |
| RESOURCE PRIORITIZATION BASED ON TRAVEL PATH RELEVANCE | 12/21/20 | PCT/US2020/066487 | |
| SYSTEMS AND METHODS FOR SEMANTIC MAP-BASED ADAPTIVE AUTO-EXPOSURE | 12/21/20 | PCT/US2020/066480 | |
| SEQUENTIAL CLUSTERING | 12/22/20 | PCT/US2020/066690 | |
| SYSTEMS AND METHODS FOR APPROPRIATE SPEED INFERENCE | 12/22/20 | PCT/US2020/066659 | |

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| MITIGATING MULTIPATH EFFECT ON RADARS FOR EFFECTIVE TARGET DETECTION | 12/22/20 | PCT/US2020/066718 | |
| FAULT DETECTION AND ISOLATION SYSTEM FOR VEHICLES | 12/23/20 | 17/133,302 | |
| SYSTEMS AND METHODS FOR COMPUTER-BASED LABELING OF SENSOR DATA CAPTURED BY A VEHICLE | 12/23/20 | PCT/US2020/066915 | |
| SYSTEMS AND METHODS FOR BLIND ONLINE CALIBRATION OF RADAR SYSTEMS ON A VEHICLE | 12/23/20 | PCT/US2020/066872 | |
| SYSTEMS AND METHODS FOR PRESENTING A RECONSTRUCTED REPRESENTATION OF A MOVING OBJECT DETECTED IN A SCENE | 12/23/20 | PCT/US2020/066925 | |
| SYSTEMS AND METHODS FOR ENHANCED DE-GAS SYSTEM IN A VEHICLE | 12/24/20 | PCT/US2020/067033 | |
| SYSTEMS AND METHODS FOR ADAPTIVE GATING IN INITIALIZATION OF RADAR TRACKING | 12/24/20 | PCT/US2020/067031 | |
| SYSTEMS AND METHODS FOR AUTOMOBILE RADIATOR COOLING CONTROL | 12/24/20 | PCT/US2020/067034 | |
| SYSTEMS AND METHODS FOR ADAPTIVE CLUTTER REMOVAL FROM RADAR SCANS | 12/24/20 | PCT/US2020/067024 | |
| MAP FEATURE EXTRACTION USING OVERHEAD VIEW IMAGES | 12/29/20 | PCT/US2020/067360 | |
| IMPROVEMENTS TO OVERHEAD VIEW IMAGE GENERATION | 12/29/20 | PCT/US2020/067371 | |
| GENERATING TRAINING DATA FROM OVERHEAD VIEW IMAGES | 12/29/20 | PCT/US2020/067374 | |
| OVERHEAD VIEW IMAGE GENERATION | 12/30/20 | PCT/US2020/067562 | |
| SUPERCAPACITOR POWER BUFFER FOR VEHICLE POWER SYSTEM | 1/4/21 | 17/140,662 | |
| SYSTEMS AND METHODS FOR COMPUTER-BASED LABELING OF SENSOR DATA CAPTURED BY A VEHICLE | 2/1/21 | 17/164,477 | |

| TITLE | FILING DATE | APPLICATION NO. | REGISTRATION NO. |
|---|---|---|---|
| VEHICLE REDUNDANT ENERGY SYSTEM | 3/12/21 | 17/200,474 | |
| GROUND MAP GENERATION | 3/24/21 | PCT/US2021/023956 | |
| MODULAR SENSOR ASSEMBLY FOR VEHICLES | 3/26/21 | PCT/US2021/024367 | |
| OVERHEAD VIEW IMAGE GENERATION | 3/29/21 | 17/215,733 | |
| SYSTEMS AND METHODS FOR CAPTURING PASSIVELY-ADVERTISED ATTRIBUTE INFORMATION | 3/29/21 | PCT/US2021/024707 | |
| SYSTEMS AND METHODS FOR DERIVING PLANNED PATHS FOR VEHICLES USING PATH PRIORS | 3/29/21 | PCT/US2021/024713 | |
| SYSTEMS AND METHODS FOR PREDICTING AGENT TRAJECTORY | 3/30/21 | PCT/US2021/025004 | |
| MANUAL CURATION TOOL FOR MAP DATA USING AGGREGATED OVERHEAD VIEWS | 3/31/21 | PCT/US2021/025233 | |
| MAPPING PIPELINE OPTIMIZATION USING AGGREGATED OVERHEAD VIEW RECONSTRUCTION | 3/31/21 | PCT/US2021/025237 | |
| INDEPENDENT TRAJECTORY VALIDATION SYSTEM FOR VEHICLES | 4/23/21 | PCT/US2021/028923 | |
| SYSTEMS AND METHODS FOR OPTIMIZING TRAJECTORY PLANNER BASED ON HUMAN DIVING BEHAVIORS | 4/23/21 | PCT/US2021/028777 | |
| SYSTEMS AND METHODS FOR DISENGAGEMENT PREDICTION AND TRIAGE ASSISTANT | 4/23/21 | PCT/US2021/028951 | |
| SYSTEMS AND METHODS FOR ALIGNING MAP DATA | 5/18/21 | 17/323,461 | |

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