PATENT ASSIGNMENT COVER SHEET

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

CONVEYING PARTY DATA

| Name | Execution Date |
|-------------------|----------------|
| HAKAN BOYRAZ | 01/10/2019 |
| MARSHALL TAPPEN | 01/12/2019 |
| BAOYUAN LIU | 01/09/2019 |
| XIAOHAN NIE | 01/14/2019 |
| SHENG CHEN | 01/09/2019 |
| CHRISTOPHER BROWN | 01/10/2019 |

RECEIVING PARTY DATA

| Name: | AMAZON TECHNOLOGIES, INC. |
|-----------------|---------------------------|
| Street Address: | PO BOX 81226 |
| City: | SEATTLE |
| State/Country: | WASHINGTON |
| Postal Code: | 98108-1226 |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 16248516 |

CORRESPONDENCE DATA

Fax Number:

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Address Line 4: ROSELAND, NEW JERSEY 07068

| ATTORNEY DOCKET NUMBER: | 28946.42 (L0042) |
|-------------------------|-------------------|
| NAME OF SUBMITTER: | KEVIN O. GRANGE |
| SIGNATURE: | /Kevin O. Grange/ |
| DATE SIGNED: | 01/15/2019 |

Total Attachments: 9

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| U.S. Patent Appln. No. | Attorney Docket No. <u>28946.42 (L0042)</u> |
|---|--|
| Filing Date | Client Docket No. P63006-US01 |
| PARTIES TO THE ASSIGNMENT | |
| Assignor(s): | |
| Hakan Boyraz | Xiaohan Nie |
| 410 Terry Avenue North | 410 Terry Avenue North |
| Seattle, WA 98109-5210 | Seattle, WA 98109-5210 |
| Marshall Tappen | Sheng Chen |
| 410 Terry Avenue North | 410 Terry Avenue North |
| Seattle, WA 98109-5210 | Seattle, WA 98109-5210 |
| Baoyuan Liu | Christopher Brown |
| 410 Terry Avenue North | 410 Terry Avenue North |
| Seattle, WA 98109-5210 | Seattle, WA 98109-5210 |
| Assignee: Amazon Technologies, Inc. PO Box 81226 Seattle, WA 98108-1226 | |
| AGREEMENT | |
| | |
| WHEREAS, ASSIGNOR(S) (listed abo | ove) are inventor(s) of an invention entitled |
| "NAVIGATION DIRECTLY FROM PERCEPTION | I DATA WITHOUT PRE-MAPPING" (Invention) for which |
| a non-provisional application for United Sta | ates Letters Patent (Application): |
| was filed on and a | ccorded U.S. Application No; or |
| will be filed concurrently with t | the submission of this executed PATENT ASSIGNMENT |
| for recordation. | |
| ASSIGNOR(S) hereby authorizes and re- | quests ASSIGNEE'S legal representatives, of |
| Lowenstein Sandler LLP, associated with Cu | ustomer No. <u>14432</u> , to insert in the header above and |
| here in parentheses (U.S. Patent Application | n No filed) this application's |
| U.S. application number and filing date, wh | nen known. |

Page 1 of 9

U.S. Patent Appln. No. _____ Attorney Docket No. <u>28946.42 (L0042)</u>

Filing Date _____ Client Docket No. <u>P63006-US01</u>

Title of Invention: NAVIGATION DIRECTLY FROM PERCEPTION DATA WITHOUT PRE-MAPPING

Inventors: Hakan Boyraz, Marshall Tappen, Baoyuan Liu, Xiaohan Nie, Sheng Chen, Christopher Brown

WHEREAS, ASSIGNEE, a corporation of the State of Nevada, is desirous of acquiring the entire right, title and interest in and to the Invention and in and to any letters patent that may be granted therefor in the United States and in any and all foreign countries.

NOW, THEREFORE, in exchange for good and valuable consideration, the receipt of which is hereby acknowledged, ASSIGNOR(S) hereby sell, assign and transfer unto ASSIGNEE its successors and assigns, the entire right, title and interest in and to said Invention and any improvements thereto, said Application and any and all letters patent which may be granted for said Invention in the United States of America and its territorial possessions and in any and all foreign countries, and in any and all provisional, divisions, reissues, re-examinations and continuations thereof, including the right to file foreign applications directly in the name of ASSIGNEE and to claim priority rights deriving from said Application to which said foreign applications are entitled by virtue of international convention, treaty or otherwise, said Invention, Application and all letters patent on said Invention to be held and enjoyed by ASSIGNEE and its successors and assigns for their use and benefit and of their successors and assigns as fully and entirely as the same would have been held and enjoyed by ASSIGNOR(S) had this assignment, transfer and sale not been made. ASSIGNOR(S) hereby authorize and request the Commissioner of Patents and Trademarks, as well as all other applicable patent offices throughout the world, to issue all letters patent on said Invention to ASSIGNEE. ASSIGNOR(S) agree to execute all instruments and documents required for the making and prosecution of applications for United States and foreign letters patent on said Invention, for litigation regarding said letters patent, or for the purpose of protecting title to said Invention or letters patent therefor.

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U.S. Patent Appln. No. _____

PATENT ASSIGNMENT AND DECLARATION (37 CFR 1.63)

Attorney Docket No. 28946.42 (L0042)

Filing Date _____ Client Docket No. <u>P63006-US01</u>

Title of Invention: NAVIGATION DIRECTLY FROM PERCEPTION DATA WITHOUT PRE-MAPPING

Inventors: Hakan Boyraz, Marshall Tappen, Baoyuan Liu, Xiaohan Nie, Sheng Chen, Christopher

Brown

AND ASSIGNOR(S) DOES HEREBY sell, assign, transfer, and convey to ASSIGNEE, its

successors, legal representatives, and assigns all claims for damages and all remedies arising out

of any violation of the rights assigned hereby that may have accrued prior to the date of

assignment to ASSIGNEE, or may accrue hereafter, including, but not limited to, the right to sue

for, collect, and retain damages for past infringements of said letters patent before or after

issuance.

AND ASSIGNOR(S) DOES HEREBY covenant and agree that ASSIGNOR(S) will communicate

to ASSIGNEE, its successors, legal representatives and assigns, any facts known to ASSIGNOR

respecting the Invention or said Application, and testify in any legal proceeding, assist in the

preparation of any other patent property relating to the Application and the Invention or any

improvements made thereto, sign/execute all lawful papers, provide all requested documents,

execute and make all rightful oaths and/or declarations in connection with the Application and

the Invention including any improvements made thereto, any patent applications filed therefrom,

and any continuing application filed from any of the aforementioned applications, and generally

do everything possible to aid ASSIGNEE, its successors, legal representatives and assigns, to obtain

and enforce proper patent protection for the Invention in all countries. These provisions are

binding upon ASSIGNOR's heirs, legal representatives, administrators, and assigns.

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| U.S. Patent Appln. No | Attorney Docket No. <u>28</u> | 946.42 (L0042) |
|---|-----------------------------------|-----------------------|
| Filing Date | Client Docket No | o. <u>P63006-US01</u> |
| Title of Invention: NAVIGATION DIRECTLY FROM PER | CEPTION DATA WITHOUT PRE-I | <u>MAPPING</u> |
| Inventors: Hakan Boyraz, Marshall Tappen, Baoyua Brown | an Liu, Xiaohan Nie, Sheng Che | en, Christopher |
| DECLARATION As a below named inventor, I hereby declare that: | | |
| This declaration is directed to: | | |
| the attached application; or | | |
| United States Patent Application number | er filed on | ; or |
| PCT International Application number _ | filed on | |
| The above-identified application was made or authoric | orized to be made by me. | |
| I believe that I am the original inventor or an original application. | al joint inventor of a claimed In | evention in the |
| I have reviewed and understand the contents of the | above-identified application, | and |
| acknowledge the duty to disclose to the US Patent | & Trademark Office all informa | tion known to |
| me to be material to the patentability as defined in | 37 CFR 1.56. | |
| I hereby acknowledge that any willful false stateme | nt made in this declaration is p | ounishable |
| under 18 USC 1001 by fine or imprisonment of not | more than five (5) years, or bot | th. |
| | | |
| | | |
| January 10, 2019 | | |
| Date | | |

| U.S. Patent Appln. No | Attorney Docket No. <u>28946.42 (L0042)</u> |
|---|--|
| Filing Date | Client Docket No. <u>P63006-US01</u> |
| Title of Invention: <u>NAVIGATION DIRECTLY F</u> | ROM PERCEPTION DATA WITHOUT PRE-MAPPING |
| Inventors: Hakan Boyraz, Marshall Tappel Brown | n, Baoyuan Liu, Xiaohan Nie, Sheng Chen, Christopher |
| DECLARATION | |
| As a below named inventor, I hereby decla | are that: |
| This declaration is directed to: | |
| igstyle igytyle igstyle igstyle igytyle igstyle igytyle | |
| United States Patent Application | on number filed on; or |
| PCT International Application r | number filed on |
| The above-identified application was mad- | e or authorized to be made by me. |
| I believe that I am the original inventor or application. | an original joint inventor of a claimed Invention in the |
| I have reviewed and understand the conte | nts of the above-identified application, and |
| acknowledge the duty to disclose to the U | S Patent & Trademark Office all information known to |
| me to be material to the patentability as d | efined in 37 CFR 1.56. |
| I hereby acknowledge that any willful false | e statement made in this declaration is punishable |
| under 18 USC 1001 by fine or imprisonme | nt of not more than five (5) years, or both. |
| Marshall Tappen/ | |
| January 12, 2019 | |
| Date | |

| U.S. Patent Appln. No | Attorney Docket No. <u>28946.42 (L0042)</u> |
|---|--|
| Filing Date | Client Docket No. <u>P63006-US01</u> |
| Title of Invention: NAVIGATION DIRECTLY FROM PERC | EPTION DATA WITHOUT PRE-MAPPING |
| Inventors: Hakan Boyraz, Marshall Tappen, Baoyuan Brown | Liu, Xiaohan Nie, Sheng Chen, Christopher |
| <u>DECLARATION</u> | |
| As a below named inventor, I hereby declare that: | |
| This declaration is directed to: | |
| $igstyle{igstyle}$ the attached application; or | |
| United States Patent Application number | filed on; or |
| PCT International Application number | filed on |
| The above-identified application was made or author | ized to be made by me. |
| I believe that I am the original inventor or an original application. | joint inventor of a claimed Invention in the |
| I have reviewed and understand the contents of the a | above-identified application, and |
| acknowledge the duty to disclose to the US Patent $\&$ | Trademark Office all information known to |
| me to be material to the patentability as defined in 3 | 7 CFR 1.56. |
| I hereby acknowledge that any willful false statement | t made in this declaration is punishable |
| under 18 USC 1001 by fine or imprisonment of not m | ore than five (5) years, or both. |
| DocuSigned by: | |
| Baoquan Liu | |
| ‱09C1D027A74841C Baoyuan Liu | |
| January 9, 2019 | |
| Date | |

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| U.S. Patent Appln. No | Attorney Docket No. <u>28946.42 (L0042)</u> |
|---|--|
| Filing Date | Client Docket No. <u>P63006-US01</u> |
| Title of Invention: NAVIGATION DIRECTLY | FROM PERCEPTION DATA WITHOUT PRE-MAPPING |
| Inventors: Hakan Boyraz, Marshall Tappe Brown | n, Baoyuan Liu, Xiaohan Nie, Sheng Chen, Christopher |
| DECLARATION | |
| As a below named inventor, I hereby decl | are that: |
| This declaration is directed to: | |
| igstyle igstyle igstyle the attached application; or | |
| United States Patent Applicati | on number filed on; or |
| PCT International Application | number filed on |
| The above-identified application was mad | e or authorized to be made by me. |
| I believe that I am the original inventor or application. | an original joint inventor of a claimed Invention in the |
| I have reviewed and understand the conte | ents of the above-identified application, and |
| acknowledge the duty to disclose to the U | IS Patent & Trademark Office all information known to |
| me to be material to the patentability as o | defined in 37 CFR 1.56. |
| I hereby acknowledge that any willful fals | e statement made in this declaration is punishable |
| under 18 USC 1001 by fine or imprisonme | ent of not more than five (5) years, or both. |
| | |
| /Xiaolian Me/ | |
| F26C183D14F54B4 Xiaohan Nie | |
| | |
| January 14, 2019 | |
| Date | |

| U.S. Patent Appln. No | Attorney Docket No. <u>28946.42 (L0042)</u> |
|--|--|
| Filing Date | Client Docket No. P63006-US01 |
| Title of Invention: NAVIGATION DIRECTLY FROM PE | RCEPTION DATA WITHOUT PRE-MAPPING |
| Inventors: Hakan Boyraz, Marshall Tappen, Baoyu Brown | an Liu, Xiaohan Nie, Sheng Chen, Christopher |
| <u>DECLARATION</u> | |
| As a below named inventor, I hereby declare that: | |
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| The above-identified application was made or auth | norized to be made by me. |
| I believe that I am the original inventor or an origin | nal joint inventor of a claimed Invention in the |
| application. | |
| I have reviewed and understand the contents of th | ne above-identified application, and |
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| me to be material to the patentability as defined in | 1 37 CFR 1.56. |
| I hereby acknowledge that any willful false stateme | ent made in this declaration is punishable |
| under 18 USC 1001 by fine or imprisonment of not | more than five (5) years, or both. |
| السمر DocuSigned by: | |
| /Slung Chen/ | |
| Sneng Chen | |
| | |
| January 9, 2019 | |
| Date | |

| U.S. Patent Appln. No | Attorney Docket No. <u>28946.42 (L0042)</u> |
|---|--|
| Filing Date | Client Docket No. <u>P63006-US01</u> |
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| Inventors: Hakan Boyraz, Marshall Tappe Brown | en, Baoyuan Liu, Xiaohan Nie, Sheng Chen, Christopher |
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| I hereby acknowledge that any willful fals | e statement made in this declaration is punishable |
| under 18 USC 1001 by fine or imprisonme | ent of not more than five (5) years, or both. |
| Occusigned by: // Christophur Brown/ | |
| January 10, 2019 | |
| Date | |

Page 9 of 9