

## PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1  
Stylesheet Version v1.2

EPAS ID: PAT4728435

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| <b>SUBMISSION TYPE:</b>   | NEW ASSIGNMENT                             |
| <b>NATURE OF CONVEYANCE:</b>  | ASSIGNMENT                                 |
| <b>CONVEYING PARTY DATA</b>   |  |
| <b>Name</b>   | <b>Execution Date</b>                      |
| TIANCHU GUO   | 10/25/2017                                 |
| YOUNGSUNG KIM   | 11/24/2017                                 |
| HUI ZHANG   | 10/25/2017                                 |
| BYUNGIN YOO   | 11/24/2017                                 |
| CHANG KYU CHOI  | 11/29/2017                                 |
| JAE-JOON HAN  | 11/24/2017                                 |
| JINGTAO XU  | 10/25/2017                                 |
| DEHENG QIAN   | 10/25/2017                                 |
| <b>RECEIVING PARTY DATA</b>   |  |
| <b>Name:</b>  | SAMSUNG ELECTRONICS CO., LTD.              |
| <b>Street Address:</b>  | 129, SAMSUNG-RO, YEONGTONG-GU, GYEONGGI-DO |
| <b>City:</b>  | SUWON-SI                                   |
| <b>State/Country:</b>   | KOREA, REPUBLIC OF                         |
| <b>Postal Code:</b>   | 16677                                      |
| <b>PROPERTY NUMBERS Total: 1</b>  |  |
| <b>Property Type</b>  | <b>Number</b>                              |
| Application Number:   | 15837877                                   |
| <b>CORRESPONDENCE DATA</b>  |  |
| <b>Fax Number:</b>  | (202)315-3758                              |
| <i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i> |  |
| <b>Phone:</b>   | 202-429-0020                               |
| <b>Email:</b>   | pto@nsiplaw.com                            |
| <b>Correspondent Name:</b>  | NSIP LAW                                   |
| <b>Address Line 1:</b>  | P.O. BOX 65745                             |
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| <b>ATTORNEY DOCKET NUMBER:</b>  | 012052.1523                                |
| <b>NAME OF SUBMITTER:</b>   | S. MAHMOOD AHMAD                           |
| <b>SIGNATURE:</b>   | /S. Mahmood Ahmad/                         |

|                     |            |
|---------------------|------------|
| <b>DATE SIGNED:</b> | 12/11/2017 |
|---------------------|------------|

**Total Attachments: 9**

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## COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)

### DECLARATION

As a below-named inventor, I hereby declare that this declaration is directed to the application attached hereto, or to United States Application Number or PCT International Application Number \_\_\_\_\_ filed on \_\_\_\_\_ (if applicable), entitled:

### FACIAL EXPRESSION IMAGE PROCESSING METHOD AND APPARATUS

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the above-identified application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 USC 1001 by fine or imprisonment of not more than five (5) years, or both.

I have reviewed and understand the contents of the above-identified application, including the claims.

I am aware of the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information that became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

### ASSIGNMENT

For valuable consideration, I, as a below-named assignor, hereby assign to:

SAMSUNG ELECTRONICS CO., LTD.  
129, Samsung-ro, Yeongtong-gu  
Suwon-si, Gyeonggi-do, 16677  
Republic of Korea

and its successors and assigns (collectively hereinafter called "the Assignee"), the entire right, title, and interest throughout the world in the inventions and improvements that are the subject of the application identified in the above declaration, which is United States Application Number or PCT International Application Number 15/837,877 filed on December 11, 2017.

I authorize and request the attorneys appointed in the above-identified application to hereafter complete this Assignment by inserting above the application number and the filing date of the above-identified application when known, and to correct any typographical errors that may be discovered in this Assignment.

This Assignment includes the above-identified application, any and all United States and foreign patents, utility models, and design registrations granted for any of the inventions and improvements that are the subject of the above-identified application, and the right to claim priority based on the filing date of the above-identified application under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes; and I authorize the Assignee to apply in all countries in my name or in its own name for patents, utility models, design registrations, like rights of exclusion, and inventors' certificates for any of the inventions and improvements that are the subject of the above-identified application; and I agree for myself and my heirs, legal representatives, and assigns without further

**COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)**

compensation to perform such lawful acts and to sign such further applications, Assignments, preliminary statements, and other lawful documents as the Assignee may reasonably request to effectuate fully this Assignment.

In witness whereof, I, as a below-named inventor and assignor, intending to be legally bound, have hereunto affixed my signature on the date indicated below next to my signature.

|                           |   |      |            |
|---------------------------|---|------|------------|
| Inventor's Legal Name     | <b>Tianchu GUO</b>  |      |            |
| Inventor's Signature      | <i>Guo Tianchu</i>  | Date | 2017.10.25 |
| Residence (City, Country) | Beijing, P.R. China   |      |            |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |            |

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>Youngsung Kim</b>  |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Suwon-si, Republic of Korea   |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

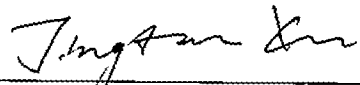
|                           |   |      |            |
|---------------------------|---|------|------------|
| Inventor's Legal Name     | <b>Hui ZHANG</b>  |      |            |
| Inventor's Signature      | <i>Zhang Hui</i>  | Date | 2017-10-25 |
| Residence (City, Country) | Beijing, P.R. China   |      |            |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |            |

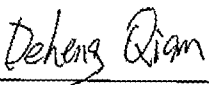
|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>BYUNGIN YOO</b>  |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Seoul, Republic of Korea  |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

**COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)**

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>CHANG KYU CHOI</b>   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Seongnam-si, Republic of Korea  |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>Jae-Joon Han</b>   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Seoul, Republic of Korea  |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

|                           |   |      |            |
|---------------------------|---|------|------------|
| Inventor's Legal Name     | <b>Jingtao XU</b>   |      |            |
| Inventor's Signature      |                                       | Date | 2017/10/25 |
| Residence (City, Country) | Beijing, P.R. China   |      |            |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |            |

|                           |   |      |            |
|---------------------------|---|------|------------|
| Inventor's Legal Name     | <b>Deheng QIAN</b>  |      |            |
| Inventor's Signature      |                                      | Date | 2017-10-25 |
| Residence (City, Country) | Beijing, P.R. China   |      |            |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |            |

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### ASSIGNMENT

For valuable consideration, I, as a below-named assignor, hereby assign to:

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Suwon-si, Gyeonggi-do, 16677  
Republic of Korea

and its successors and assigns (collectively hereinafter called "the Assignee"), the entire right, title, and interest throughout the world in the inventions and improvements that are the subject of the application identified in the above declaration, which is United States Application Number or PCT International Application Number 15/837,877 filed on December 11, 2017.

I authorize and request the attorneys appointed in the above-identified application to hereafter complete this Assignment by inserting above the application number and the filing date of the above-identified application when known, and to correct any typographical errors that may be discovered in this Assignment.

This Assignment includes the above-identified application, any and all United States and foreign patents, utility models, and design registrations granted for any of the inventions and improvements that are the subject of the above-identified application, and the right to claim priority based on the filing date of the above-identified application under the International Convention for the Protection of Industrial Property, the Patent Cooperation Treaty, the European Patent Convention, and all other treaties of like purposes; and I authorize the Assignee to apply in all countries in my name or in its own name for patents, utility models, design registrations, like rights of exclusion, and inventors' certificates for any of the inventions and improvements that are the subject of the above-identified application; and I agree for myself and my heirs, legal representatives, and assigns without further compensation to perform such lawful acts and to sign such further applications, Assignments, preliminary statements, and other lawful documents as the Assignee may reasonably request to effectuate fully this Assignment.

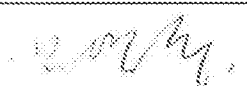
**PATENT**

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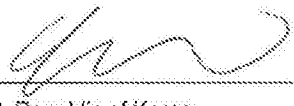
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In witness whereof, I, as a below-named inventor and assignor, intending to be legally bound, have hereunto affixed my signature on the date indicated below next to my signature.

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | Tianchu GUO   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Beijing, P.R. China   |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

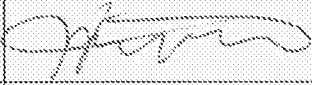
|                           |   |      |                   |
|---------------------------|---|------|-------------------|
| Inventor's Legal Name     | Youngsung Kim   |      |                   |
| Inventor's Signature      |                                        | Date | November 24, 2017 |
| Residence (City, Country) | Suwon-si, Republic of Korea   |      |                   |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |                   |


|                           |   |      |  |
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| Inventor's Legal Name     | Hui ZHANG   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Beijing, P.R. China   |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |


|                           |   |      |                   |
|---------------------------|---|------|-------------------|
| Inventor's Legal Name     | BYUNGIN YOO   |      |                   |
| Inventor's Signature      |                                      | Date | November 24, 2017 |
| Residence (City, Country) | Seoul, Republic of Korea  |      |                   |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |                   |

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | CHANG KYU CHOI  |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Seongnam-si, Republic of Korea  |      |  |
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COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)

|                           |   |      |                   |
|---------------------------|---|------|-------------------|
| Inventor's Legal Name     | Jae-Joon Han  |      |                   |
| Inventor's Signature      |                                        | Date | November 24, 2017 |
| Residence (City, Country) | Seoul, Republic of Korea  |      |                   |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |                   |

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | Jingtao XU  |      |  |
| Inventor's Signature      |                                        | Date |  |
| Residence (City, Country) | Beijing, P.R. China   |      |  |
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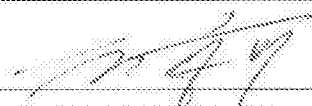
In witness whereof, I, as a below-named inventor and assignor, intending to be legally bound, have hereunto affixed my signature on the date indicated below next to my signature.

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| Inventor's Legal Name     | Tianchu GUO   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Beijing, P.R. China   |      |  |
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|---------------------------|---|------|--|
| Inventor's Legal Name     | Youngsung Kim   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Suwon-si, Republic of Korea   |      |  |
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| Inventor's Legal Name     | Hui ZHANG   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Beijing, P.R. China   |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

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|---------------------------|---|------|--|
| Inventor's Legal Name     | BYUNGIN YOO   |      |  |
| Inventor's Signature      |   | Date |  |
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|                           |   |      |                   |
|---------------------------|---|------|-------------------|
| Inventor's Legal Name     | CHANG KYU CHOI  |      |                   |
| Inventor's Signature      |                                      | Date | November 29, 2017 |
| Residence (City, Country) | Seongnam-si, Republic of Korea  |      |                   |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |                   |

**COMBINED DECLARATION AND ASSIGNMENT UNDER 37 CFR 1.63(e)**

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>Jae-Joon Han</b>   |      |  |
| Inventor's Signature      |   | Date |  |
| Residence (City, Country) | Seoul, Republic of Korea  |      |  |
| Mailing Address           | Samsung Advanced Institute of Technology, 130 Samsung-ro, Youngtong-gu, Suwon-si, Gyeonggi-do, 16678, Republic of Korea |      |  |

|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>Jingtao XU</b>   |      |  |
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|                           |   |      |  |
|---------------------------|---|------|--|
| Inventor's Legal Name     | <b>Dcheng QIAN</b>  |      |  |
| Inventor's Signature      |   | Date |  |
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