

## PATENT ASSIGNMENT COVER SHEET

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 Stylesheet Version v1.2

EPAS ID: PAT5376804

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
NIKHIL DEVANUR RANGARAJAN	02/13/2019
JORGEN THELIN	02/11/2019
AMAR PHANISHAYEE	02/12/2019
GUANHUA WANG	02/08/2019
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	MICROSOFT TECHNOLOGY LICENSING, LLC
<b>Street Address:</b>	ONE MICROSOFT WAY
<b>City:</b>	REDMOND
<b>State/Country:</b>	WASHINGTON
<b>Postal Code:</b>	98052
<b>PROPERTY NUMBERS Total: 1</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	16276250
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	
<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>Email:</b>	usdocket@microsoft.com
<b>Correspondent Name:</b>	NEWPORT IP, LLC
<b>Address Line 1:</b>	1400 112TH AVE SE, SUITE 100
<b>Address Line 4:</b>	BELLEVUE, WASHINGTON 98004
<b>ATTORNEY DOCKET NUMBER:</b>	MS1-9291US
<b>NAME OF SUBMITTER:</b>	PAOLA SEVERICH
<b>SIGNATURE:</b>	/Paola Severich/
<b>DATE SIGNED:</b>	02/14/2019
<b>Total Attachments: 10</b>	
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I **Nikhil Devanur RANGARAJAN** (“ASSIGNOR”) am the original inventor or an original joint inventor of subject matter (“INVENTION”) disclosed and/or claimed in a patent application entitled “**MITIGATING COMMUNICATION BOTTLENECKS DURING PARAMETER EXCHANGE IN DATA-PARALLEL DNN TRAINING**” (“APPLICATION”), which:

☒ will be filed. ASSIGNOR hereby authorizes, and requests, ASSIGNEE’S legal representative, Microsoft Technology Licensing, LLC., One Microsoft Way, Redmond, Washington 98052 (ASSIGNEE’S LEGAL REPRESENTATIVES), to insert here in parentheses (filed on \_\_\_\_\_ and given Application No. \_\_\_\_\_ by the following Office US – United States Patent and Trademark Office) this APPLICATION’s Application No., filing date, and Office, when known;

☐ was filed on \_\_\_\_ and was given Application No \_\_\_\_ by the following Office “US – United States Patent and Trademark Office”;

Microsoft Technology Licensing, LLC, a Washington limited liability company, on behalf of itself and its successors and assigns (“ASSIGNEE”), is entitled to, and is desirous of acquiring, the entire and exclusive rights, title and interest, including the right of priority, in the INVENTION and the APPLICATION (and all other applications and patents derived therefrom, such as continuing applications, in whole or in part, in and for the United States, its territories, and all foreign countries (“APPLICATION DERIVATIVES”));



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Application No.	Filing Date	Office

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For good and valuable consideration, the receipt of which is hereby acknowledged by the ASSIGNOR, the ASSIGNOR hereby sells, assigns and transfers to the ASSIGNEE, ASSIGNOR's entire and exclusive rights, title and interest, including the right of priority, in the INVENTION and the APPLICATION (and all other applications and patents derived therefrom, such as continuing applications, in whole or in part, in and for the United States, its territories, and all foreign countries ("APPLICATION DERIVATIVES"));

ASSIGNOR agrees to execute all instruments and documents required for the making and prosecution of the APPLICATION (and APPLICATION DERIVATIVES), for litigation regarding letters patent derived therefrom, and for the purpose of protecting and perfecting title to the APPLICATION (and APPLICATION DERIVATIVES).

	
_____ Inventor's Signature	_____ Date
<b>Nikhil Devanur RANGARAJAN</b>	_____
_____ Printed Name in English	_____ Printed Name in Native Language (if other than English)

I **Jorgen THELIN** ("ASSIGNOR") am the original inventor or an original joint inventor of subject matter ("INVENTION") disclosed and/or claimed in a patent application entitled **"MITIGATING COMMUNICATION BOTTLENECKS DURING PARAMETER EXCHANGE IN DATA-PARALLEL DNN TRAINING"** ("APPLICATION"), which:

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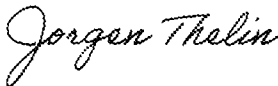
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	2019-02-11
_____ Inventor's Signature	_____ Date
Jorgen THELIN	
_____ Printed Name in English	_____ Printed Name in Native Language (if other than English)

I **Amar PHANISHAYEE** ("ASSIGNOR") am the original inventor or an original joint inventor of subject matter ("INVENTION") disclosed and/or claimed in a patent application entitled "**MITIGATING COMMUNICATION BOTTLENECKS DURING PARAMETER EXCHANGE IN DATA-PARALLEL DNN TRAINING**" ("APPLICATION"), which:

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	2/12/2019
_____ Inventor's Signature	_____ Date
Amar PHANISHAYEE	
_____ Printed Name in English	_____ Printed Name in Native Language (if other than English)



I Guanhua WANG ("ASSIGNOR") am the original inventor or an original joint inventor of subject matter ("INVENTION") disclosed and/or claimed in a patent application entitled "**MITIGATING COMMUNICATION BOTTLENECKS DURING PARAMETER EXCHANGE IN DATA-PARALLEL DNN TRAINING**" ("APPLICATION"), which:

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## PATENT ASSIGNMENT

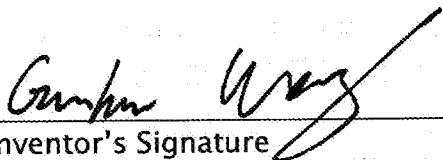
Client Docket No.: 405531-US-NP

Attorney Docket No.: MSI-9291US

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 Inventor's Signature	<u>02/08/2019</u> Date
<u>Guanhua WANG</u> Printed Name in English	<u>王冠华</u> Printed Name in Native Language (if other than English)

I **Shivaram VENKATARAMAN** ("ASSIGNOR") am the original inventor or an original joint inventor of subject matter ("INVENTION") disclosed and/or claimed in a patent application entitled "**MITIGATING COMMUNICATION BOTTLENECKS DURING PARAMETER EXCHANGE IN DATA-PARALLEL DNN TRAINING**" ("APPLICATION"), which:

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	<u>2/9/2019</u>
Inventor's Signature	Date
<u>Shivaram VENKATARAMAN</u>	
Printed Name in English	Printed Name in Native Language (if other than English)