

# Brij Mohan Lal Srivastava

ENTREPRENEUR · RESEARCHER · SPEECH, LANGUAGE & PRIVACY

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## Education

### INRIA (Université de Lille), France

Lille & Nancy, France

PHD IN COMPUTER SCIENCE

Oct 2018 - Sep 2021

- Thesis: Speaker Anonymization – Representation, Evaluation and Formal Guarantees
- Supervisors: Prof. Marc Tommasi, Dr. Aurélien Bellet, Dr. Emmanuel Vincent

### International Institute of Information Technology, Hyderabad

Hyderabad, India

M.S. IN COMPUTER SCIENCE AND ENGINEERING

Dec 2013 - May 2017

- Thesis: Multilingual Spoken Dialog Systems for Handheld Devices
- Advisors: Dr. Manish Shrivastava, LTRC
- CGPA: 8.17/10

### SASTRA University

Thanjavur, India

B.TECH. IN INFORMATION TECHNOLOGY

July 2007 - Aug 2011

- CGPA: 8.6/10

## Experience

### Inria Startup Studio

Lille, France

PROJECT HOLDER – NIJTA

Oct 2021 - Present

- Leading the design and development of a speech anonymization startup
- Commercial deployment of the research-based prototype, developed during my PhD

### Microsoft Research India

Bengaluru, India

RESEARCH ENGINEER

Feb 2018 - Present

- Working on End-to-End models for automatic code-mixed speech recognition

### Microsoft Research India

Bengaluru, India

RESEARCH INTERN

July 2017 - Feb 2018

- Worked in Project Mélange with Dr. Kalika Bali, Dr. Sunayana Sitaram and Dr. Monojit Choudhury.
- Developed automatic speech recognition systems for code-mixed speech.

### CMUSphinx

India

SUMMER INTERN (GOOGLE SUMMER OF CODE)

May 2017 - Aug 2017

- Worked with James Salsman to implement the authentic pronunciation evaluation metric
- Project: Pronunciation Intelligibility Remediation with Pocketsphinx.js
- Blog: <http://pronounce.blogspot.in>

### Teletext Holidays

Hyderabad, India

SOFTWARE ENGINEER (SPEECH & NLP)

Sept 2016 - Mar 2017

- Develop analytic tools to mine opinion phrases, topics and agent compliance rules from recorded telephone conversational speech and erroneous speech recognition text
- Sentiment analysis over conversational spoken text, user reviews and social media data
- Agent speech training through mispronunciation detection

### Virtual Assistant for Indian healthcare (ITRA, IIIT-H)

Hyderabad, India

RESEARCH ASSISTANT

May 2014 - Aug 2016

- Mentors: Dr. Manish Shrivastava, Dr. Radhika Mamidi, Dr. Anoop Namboodiri
- Developed working prototypes for diagnosis of 1000 diseases by using human disease ontology.
- Developed acoustic and language models using CMU Sphinx toolkit
- Worked on developing robust features for keyword spotting and scaling to multiple Indian languages

## Intel Challenge 2014 - MIT Media Labs

India

SOFTWARE DEVELOPER INTERN

Summer 2014

- Developed machine learning algorithm and user interface for detecting Obstructive Sleep Apnea and Hypoapneic events in EEG signals collected through a wearable device.

## Wavemaker - Pramati Technologies

Hyderabad, India

DEVELOPMENT ENGINEER

July 2013 - Feb 2014

- Developed live variables module in wavemaker for easy integration of database and web-services to any web application using AngularJS.

## Avnet Inc.

Chennai, India

CONSULTANT

July 2011 - Aug 2013

- Developed applications using IBM Server technologies like, WebSphere Portal, Commerce and BigInsights.

## Common Probe Infrastructure - IBM Remote Mentorship Program

India

LINUX HACKER

Nov 2010 - Apr 2011

- Worked towards merging Linux kernel and user probes to provide better kernel analysis and debugging.

## Publications

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### Differentially private speaker anonymization

Under submission at USENIX

ALI SHAHIN SHAMSABADI, Brij Mohan Lal Srivastava, AURÉLIEN BELLET, NATHALIE VAUQUIER, EMMANUEL VINCENT, MOHAMED MAOUCHE, MARC TOMMASI, NICOLAS PAPERNOT

2022

### The VoicePrivacy 2020 Challenge: Results and findings

Under submission at CSL

NATALIA TOMASHENKO, XIN WANG, EMMANUEL VINCENT, JOSE PATINO, Brij Mohan Lal Srivastava, PAUL-GAUTHIER NOÉ, ANDREAS NAUTSCH, NICHOLAS EVANS, JUNICHI YAMAGISHI, BENJAMIN O'BRIEN, ANAÏS CHANCLU, JEAN-FRANÇOIS BONASTRE, MASSIMILIANO TODISCO, MOHAMED MAOUCHE

2021

### Privacy and utility of x-vector based speaker anonymization

Under submission at TASLP

Brij Mohan Lal Srivastava, MOHAMED MAOUCHE, MD SAHIDULLAH, EMMANUEL VINCENT, AURÉLIEN BELLET, MARC TOMMASI, NATALIA TOMASHENKO, XIN WANG AND JUNICHI YAMAGISHI

2021

### A comparative study of speech anonymization metrics

Accepted at Interspeech

MOHAMED MAOUCHE, Brij Mohan Lal Srivastava, NATHALIE VAUQUIER, AURÉLIEN BELLET, MARC TOMMASI AND EMMANUEL VINCENT

2020

### Introducing the VoicePrivacy initiative

Accepted at Interspeech

NATALIA TOMASHENKO, Brij Mohan Lal Srivastava, XIN WANG, EMMANUEL VINCENT, ANDREAS NAUTSCH, JUNICHI YAMAGISHI, NICHOLAS EVANS, JOSE PATINO, J.-F. BONASTRE, PAUL-GAUTHIER NOÉ AND MASSIMILIANO TODISCO

2020

### Design Choices for X-vector Based Speaker Anonymization

Accepted at Interspeech

Brij Mohan Lal Srivastava, NATALIA TOMASHENKO, XIN WANG, EMMANUEL VINCENT, JUNICHI YAMAGISHI, MOHAMED MAOUCHE, AURÉLIEN BELLET, MARC TOMMASI

2020

### Evaluating voice conversion-based privacy protection against informed attackers

Accepted at ICASSP

Brij Mohan Lal Srivastava, NATHALIE VAUQUIER, MD SAHIDULLAH, AURÉLIEN BELLET, MARC TOMMASI, EMMANUEL VINCENT

2020

### Privacy-preserving adversarial representation learning in ASR: Reality or illusion?

Accepted at Interspeech

Brij Mohan Lal Srivastava, AURÉLIEN BELLET, MARC TOMMASI AND EMMANUEL VINCENT

2019

<b>Homophone identification and merging for code-switched speech recognition</b>	<i>Accepted at Interspeech</i>
Brij Mohan Lal Srivastava AND SUNAYANA SITARAM	2018
<b>Phone Merging for Code-switched Speech Recognition</b>	<i>Accepted at ACL Code-Switching Workshop</i>
SUNIT SIVASANKARAN, Brij Mohan Lal Srivastava, SUNAYANA SITARAM, KALIKA BALI AND MONOJIT CHOUDHURY	2018
<b>Spoken English Intelligibility Remediation with PocketSphinx Alignment and Feature Extraction Improves Substantially over the State of the Art [PDF]</b>	<i>IEEE IMCEC</i>
YUAN GAO, Brij Mohan Lal Srivastava AND JAMES SALSAMAN	2018
<b>Phonetically Balanced Code-Mixed Speech Corpus for Hindi-English Automatic Speech Recognition</b>	<i>Accepted at LREC</i>
AYUSHI PANDEY, Brij Mohan Lal Srivastava AND SURYAKANTH V GANGASHETTY	2018
<b>Adapting monolingual resources for code-mixed Hindi-English speech recognition</b>	<i>Accepted at IALP</i>
AYUSHI PANDEY, Brij Mohan Lal Srivastava AND SURYAKANTH V GANGASHETTY	2017
<b>Significance of neural phonotactic models for large-scale spoken language identification [PDF]</b>	<i>IJCNN, Anchorage, Alaska</i>
Brij Mohan Lal Srivastava, HARI KRISHNA VYDANA, ANIL KUMAR VUPPALA AND MANISH SHRIVASTAVA	2017
<b>Articulatory gesture rich representation learning of phonological units in low resource settings [PDF]</b>	<i>4th SLSP, Pilsen, Czech Republic</i>
Brij Mohan Lal Srivastava AND MANISH SHRIVASTAVA	2016
<b>Vaidya: A Spoken Dialog System for Health Domain [PDF]</b>	<i>ICON, IIT-BHU, Varanasi, India</i>
Brij Mohan Lal Srivastava, PRATHYUSHA DANDA AND MANISH SHRIVASTAVA	2016
<b>Starting Small Learning Strategies for Speech Recognition [PDF]</b>	<i>INDICON, Bengaluru, India</i>
HARI KRISHNA, Brij Mohan Lal Srivastava, MANISH SHRIVASTAVA AND ANIL KUMAR VUPPALA	2016
<b>Predicting inflectional patterns in Code Mixed Automatic Speech Recognition</b>	<i>Himalayan Language Symposium, IIT-Guwahati</i>
AYUSHI PANDEY, Brij Mohan Lal Srivastava, SAIKRISHNA RALLABANDI AND SURYAKANTH V GANGASHETTY	2016
<b>A Framework for Humor Recognition from Social Media using Word Embeddings</b>	<i>ICOLSI-37, JNU, New Delhi</i>
SAI KRISHNA, Brij Mohan Lal Srivastava AND AYUSHI PANDEY	2015

## Academic Projects

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<b>Statistical Machine Translation from English to German</b>	<i>IIT-Hyderabad</i>
AS PART OF NATURAL LANGUAGE APPLICATION COURSE	Feb 2014
<ul style="list-style-type: none"> <li>• Learnt probabilistic phrase alignment model from English to German.</li> <li>• Learnt language model from German text.</li> <li>• Combined the translation and language model to predict the translation.</li> </ul>	
<b>Comparison of TF-IDF and PageRank algorithm for information retrieval</b>	<i>IIT-Hyderabad</i>
AS PART OF INFORMATION RETRIEVAL & EXTRACTION COURSE	Mar 2014
<ul style="list-style-type: none"> <li>• Indexed English Wikipedia corpus using algorithms TF-IDF &amp; PageRank algorithms</li> <li>• Implemented a JAX-WS based web-service and user interface to fetch results simultaneously from both algorithms.</li> </ul>	

## Search Engine for Wikipedia

AS PART OF INFORMATION RETRIEVAL & EXTRACTION COURSE

- Built inverted index for preprocessed Wikipedia corpus.
- Search engine based on tf-idf model was developed.

IIIT-Hyderabad

Feb 2014

## 3 Link Manipulator(Robot) path planning using Rapidly Exploring Random Tree

AS PART OF INTRO TO ROBOTICS COURSE

- Developed kinematic model of the robot.
- Exploring configuration space with obstacles using Rapidly Exploring Random Trees(RRT).
- Find the path from initial to final position avoiding obstacles.

IIIT-Hyderabad

Apr 2014

## Speech synthesis using magnitude and phase spectrum

AS PART OF SPEECH TECHNOLOGY COURSE

- Computed MFCC features from speech signal
- Extracted phase and magnitude spectrum using Fast Fourier Transform (FFT).
- Synthesized speech signal from spectral information.

IIIT-Hyderabad

Aug 2014

## Speaker recognition using Gaussian Mixture Models

AS PART OF SPEECH TECHNOLOGY COURSE

- Trained speaker-specific GMMs with varying number of mixture components.
- Computed distance measure to associate test utterances to GMMs.

IIIT-Hyderabad

Sep 2014

## Isolated word recognition using Dynamic Time Warping

AS PART OF SPEECH TECHNOLOGY COURSE

- Created posteriorgram model for individual words.
- Aligned test queries against models using DTW.
- Calculated cost to recognize keywords.

IIIT-Hyderabad

Oct 2014

## Indian sign language recognition using Convolutional Neural Networks (CNN)

AS PART OF STATISTICAL METHODS IN AI COURSE

- Classification of English characters represented as hand signs in images using CNN
- Experiments with various configurations like data augmentation, dropout and non-linear functions.

IIIT-Hyderabad

Dec 2014

## Extracurricular Activity

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2013	<b>Lead</b> , Center of Excellence	Avnet Inc.
2011	<b>Webmaster</b> , DAKSH Techfest	SASTRA University
2010 - 11	<b>IBM Campus Ambassador</b> , SASTRA	SASTRA University
2009 - 10	<b>Joint Secretary</b> , IT Association	SASTRA University
2008 - 09	<b>Executive Member</b> , IT Association	SASTRA University

## Honors & Awards

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2021	<b>Challenge Scientifique</b> , Inria Startup Studio	HackAtech
2014-16	<b>Full research fellowship</b> , ITRA	IIIT-Hyderabad
2012	<b>Best Performer Award</b> , Avnet Inc.	Chennai, India
2011	<b>Ace of the Ace award for outstanding performance</b> , Avnet Inc.	Chennai, India
2008	<b>Dean's list award to appear in top 10% of the batch</b> , SASTRA University	Thanjavur, India

## Program Committees

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2021	<b>Reviewer</b> ,	EMNLP
2020	<b>Organizer</b> , The VoicePrivacy Challenge [website]	Interspeech 2020 Special Session
2018	<b>Organizer</b> , Low Resource Speech Recognition Challenge for Indian Languages	Interspeech 2018 Special Session
2017	<b>Reviewer</b> , Applied Soft Computing	Elsevier
2018	<b>Member</b> , Speech Prosody	Poland

## Skills

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### Programming languages

C/C++, PYTHON, MATLAB, JAVA, JAVASCRIPT, BASH

### Machine Learning & Speech Processing Toolkits

KALDI, CMU SPHINX, TENSORFLOW, TORCH, KERAS, CNTK, PYTORCH.

## Native

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### Languages

*Hindi* - MOTHER TONGUE, *English* - FLUENT

### Hometown

LUCKNOW, UTTAR PRADESH, INDIA