Zhang, Zijian

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Dear Prof. Avishek Anand,

as a master student in Informatik of Leibniz Universität Hannover, I read your posting of opening doctor position on the web site of Lower Saxony Learning Lab with interest. My experience and interests align well with the qualifications you are seeking. Especially the research experiences on machine learning and data science makes me suitable for the requirement of position. Also the experience of being a Hiwi Student, finishing my master thesis as well as the following research in the same territory of my master thesis solidified my ability. This experience also allows me communicating in English, working independently as well as being a good team player. Therefore it is certain that I would be a valuable addition to the L3S Research Center.

With extensive experience of attending to competitions since my junior high school, I am adept in computer programming, algorithm design and analysis. Taking part in the contest named National Olympics of Information in Provinces (NOIP) in my senior high school, I was trained to be able to analyze real world problems and solve them with help of computer algorithms. During my Bachelor years, participation to the contest named National Undergraduate Students Electronic Design Contest Information Security Invitational enriched me my the knowledge on system as well as kernel programming of GNU/Linux. Moreover, according to the education background in bachelor period, I have also qualified knowledge on linear algebra, stochastic process, signal analysis and processing, which enhances the mathematical ability of mine. As for the time being a master student in LUH, I decided to follow the trend and payed more attention on the data science as well as machine learning . The acceptable scores of data mining, data stream analysis and so on certificate my perspiration. During the same time, the Hiwi job in Institut Mess- und Reglung and L3S solidifies my ability of programming and doing research. Recently the finishing of my master thesis in L3S Research Center makes me learn more on machine learning, data science and fundamental knowledge on deep learning and ignited my interest on scientific research and on the topic of machine learning.

It is a trend that the machine learning and deep learning algorithms are broadly leveraged in many territories, such as, recommendation and decision making support in commercial systems, network analysis in the social network and physical networks, video and audio processing so on and so forth. No need to mention the high-speed

development of AI system such as autonomous vehicle and robotics. In one hand the bright future of machine learning technique makes me eager to learn more in this territory and study the algorithms as well as their application scenarios. In the other hand the unpleasant fact of inefficient training of many, some of which are even well known, machine learning models calls for further optimization and up-scaling. That is why I chose the finding of scalable approach of learning word representation as my master thesis, as both a summarization of my four years of leaning and my initial trial of making impact for the modern machine learning community. Furthermore, many deep learning approaches are right now still a black box to the model user, whether and how the modification of network structure, adjustment of hyper-parameters affect the training result of approach is even unknown and requires inspection and exploration. Therefore if I may have the honor to work as a doctoral student in L3S Research Center, one or all of them could be my central points of research. In the first year I would like to open my eyes to the mathematical foundation needed in analysis and optimization of machine- and deep learning approaches, in the meanwhile to pursue the cutting-edge evolution of them. From the second year on I would like to focus on document and all the approaches presented in order to build my inherent organization. These are preparations for my main work on analysis and optimization of machine- and deep learning approaches. Lastly I would try my best to build my version of interpretation of modern machine learning algorithms based on the grateful works of predecessors.

In addition to my experience and personal qualities, I am extremely enthusiastic about learning new knowledges and digging into research problems. Furthermore the willing of communication as well as cooperation ability of mine can also be characterized, which was learned during my time of Hiwi job and the chairman of Association of Chinese Scholars and Students in Hannover.

Please review my attached résumé for additional details regarding my expertises and contest achievements. Your prompt reply will be highly appreciated.

Thank you for your time and consideration.

Best Regards,
Zhang, Zijian

Zijian Zhang

Curriculum Vitae

Essentially, all models are wrong, but some are useful.
–George E. P. Box

Education

2015–Now	**Masters of Science**, *Leibniz Universität Hannover*, Hannover, Lower Saxony, Germany, *weighted average examination notes: 1.79. The score including master thesis will be 1.56~1.76 presumably*. Informatik (Computer Science)
2014–2015	**Language Courses (German)**, *in various of language schools*, Hannover, Lower Saxony, Germany, *DSH-3 (Deutsche Sprachprüfung für den Hochschuluzugang - Stufe 3)*. German language
2010–2014	**Bachelor of Science**, *Xidian University*, Xi'an, Shaanxi, China. Information Security

Master Thesis

Title	**Scalable Approaches for Learning Word Representations**
Supervisors	Prof. Dr. Avishek Anand & Prof. Dr. techn. Dipl.-Ing. Wolfgang Nejdl
Description	Propose an approach of training distributed word representation model in a scalable way, which significantly accelerates the training process of a word2vec model on huge amount of corpora by parallelization, meanwhile its performance is mostly preserved.

Bachelor Thesis

Title	**GPU Accelerated Detection of Communities in Graph**
Supervisors	Prof. Qi, Yutao & Prof. Zhang, Weidong
Description	This thesis propose a CUDA based approach of accelerating communities detection and division in graph data. This approach greatly makes use of the ability of high performance parallel computation of a GPU and diminish the duration of community detection in tens of times

Experience

Miscellaneous

2016–2017 **Student assistant job (HiWi) with Master Thesis**, FORSCHUNGSZENTRUM L3S, Hannover, Lower Saxony, Germany.

Propose an approach of scaling training process over gigantic corpus. The original SGNS Word2Vec model is thoroughly inspected and a strategy of divide-and-combine method of training is figured out for dealing with large corpus. In the beginning the original corpus is divided into several word/bigram-distribution-preserving sub-corpora and then a Word2Vec model are trained based on each individual sub-corpus independently. At last several combination method for sub-models have been conducted and evaluated. For those model combination method which produces a high-dimensional model, a following PCA for dimension reduction is attached at the end of framework. This project became later on the master thesis of mine. Furthermore, in order to tackle some interesting problems in the future work, for instance unbalanced vocabulary problem, and make notable impact for the territory, I decided to continue contributing to this project even after the master thesis is handled over.

Detailed achievements and gains:
○ Master programming with Python in a pythonic way;
○ Learned several machine learning algorithms, including but not limited to:
  – Classification algorithms, from basic Naïve Bayes classifier, C45 classifier and SVM etc. to more advanced kernel based models,
  – Regression strategies like MSE and logistic,
  – Clustering algorithm such as K-means, hierarchical agglomerative/divisive clustering, density based clustering etc.,
  – Generative models, especially in the aspect of word embedding such as GloVe, word2vec etc.,
  – Foundation of optimization theory,
  – Foundation of school of Bayes, including but not restricted to MCMC, Metropolis-Hastings, ME algorithms, together with their mathematical foundation including Lebesgue-Stieltjes integral in real analysis, fundamental thought of variational in functional analysis, Markov model and LDE in stochastic process.
  – Classical algorithms in linear algebra (mainly dimension reduction algorithms) such as PCA, MDS, Laplacian matrix and spectrum analysis of graph etc.,
  – Algorithms such as (General) Canonical Component Analysis/Canonical Variance Analysis, (General) Procrustes Problem, Tensor Canonical Component Analysis, which contribute to integrate different view of same dataset.
  – Knowledge on scientific English writing;
○ Foundation of deep neural network, including but not limited to:
  – Classical models like Restricted Boltzmann Machine, Quantum Boltzmann Machine, auto encoder, deep belief network etc.;
○ Basic scalable programming on Hadoop cluster and MapReduce Streaming, operating Hadoop HDFS etc.;
○ Foundation of information retrieval;
○ Foundation of NLP, especially in realm of Word-Embedding.

| 2015–2016 | **Studentische Hilftskraft**, Institut Mess- und Regelung (Institute of measuring and controlling), Leibniz Universität Hannover, Hannover, Lower Saxony, Germany. |

Contributed to a doctor project about automatic detecting defection on surface of manufactures using laser diode. Help to build a prototype of project using C/C++, Visual C++ and Matlab.
Detailed achievements:
○ Learned OS relevant C/C++ programming e.g. inter-processes communication etc.;
○ Learned basic Matlab science numerical calculation programming;
○ Learned GUI designing within Matlab using including GUIDE and Matlab GUI framework.

| 2016 | **Project on Agile developing**, Institut Softwareentwicklung (Institute of Software Development), Leibniz Universität Hannover, Hannover, Lower Saxony, Germany. |

A half-year-long software projection in the institute of software development, during which ability of cooperation with a German-speaking-scrum-team as well as terminologies and practical implementation of agile software development is trained
Detailed achievements:
○ Knowledges on agile development and methods within, such as scrum, Kanban method, paired programming etc.
○ Knowledges on Java programming language.
○ Ability of independent working and acting as team player.

| 2013–2014 | **Student Part-time job**, School of Electronic Engineering, Xi'an, Shaanxi, China. |

Analyzing functionality of ether/wireless net communication protocols, designed the in order to enhance transmission security during communication as well as camouflage high-valuable-targets.

○ Work-flow of 802.x series of protocol and communication encryption within
○ Working principle of Intranet sniffer, including the host discovery process and protocol fingerprint technique etc. and strategies of camouflage the high-valuable-hosts in front of sniffers.
○ Knowledge of GNU/Linux kernel programming, including kernel modules, KDB, netfilter/IP tables etc.

Awards

2012	National 2nd Prize in The National Undergraduate Electronic Design Contest Information Security Invitational 2012
2011	National 2nd scholarship in Xidian University
2007–2009	2nd Prize in NOIP (National Olympiad in informatics in Provinces) for three times

Computer skills

Programming	C/C++, Python, Java, Pascal, Matlab, GNU Bash
OS	GNU/Linux, including daily management and kernel programming
Theories	Algorithms in graph, Dynamic Programming, Fundamental machine learning and neural networks, Basic knowledge on quantum mechanic
Front-end	Matlab GUI Toolkit, QT

Web	HTML5, CSS3, ECMAScript
Security	Reverse Engineering on x86, Cryptography basis, Penetration Testing basis
Others	CUDA, Functional Programming, Repair of Imported Printer

Languages

Chinese	**Mother-tongue**	
English	**Fluent**	
German	**Intermediate**	
Japanese	**Basic**	*Basic words and phrases only*

Interests

- Reading
- Martial art
- Fitness
- History

- Chinese Flute
- Jogging
- Philosophy
- Forensic Science and Criminology

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25. Februar 2018

Herrn
Zijian Zhang

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30173 Hannover

Matrikelnummer:	3184680
geboren am:	23.05.1992
in:	Hebei
aktuelles Fachsemester:	6

Bescheinigung über erbrachte Studien- und Prüfungsleistungen

Fach:	Informatik
(angestrebter) Abschluss:	Master of Science
PO-Version:	2009

PrfNr.	Prüfungsbezeichnung	Prf.Art	Semester	Datum	Note	Status	LP	Vermerk	Versuch
199	**Informationssysteme**								
10	**Vorlesungsmodul Data Mining**		SoSe 15	28.08.2015	1,3	BE	4		1
11	Data Mining	PL	SoSe 15	28.08.2015	1,3	BE	4		1
50	**Vorlesungsmodul Personalisierung und Benutzermodellierung**		SoSe 15	16.09.2015	2,0	BE	4		1
51	Personalisierung und Benutzermodellierung	PL	SoSe 15	16.09.2015	2,0	BE	4		1
760	**Laborübungsmodul Agile Software-Entwicklung**		WiSe 15/16	10.03.2016		BE	6		1
761	Labor: Agile Software-Entwicklung	SL	WiSe 15/16	10.03.2016		BE	6		1
1160	**Vorlesungsmodul Temporal Information Retrieval**		WiSe 15/16	21.03.2016	1,0	BE	4		1
1161	Temporal Information Retrieval	PL	WiSe 15/16	21.03.2016	1,0	BE	4		1
1180	**Seminarmodul Fortgeschrittene Themen in Data Mining**		SoSe 16	22.07.2016		BE	3		1
1181	Semesterthema: Data Stream Mining	PL	SoSe 16	22.07.2016	1,0	BE	3		1
399	**Netze und Verteilte Systeme**								
250	**Vorlesungsmodul Organic Computing**		WiSe 15/16	23.03.2016	2,3	BE	4		1
251	Organic Computing	PL	WiSe 15/16	23.03.2016	2,3	BE	4		1
440	**Seminarmodul Aspekte Verteilter Systeme**		SoSe 16	13.07.2016	2,3	BE	3		1
441	(Semesterthema: Implementierung zur Energieeffizienz im HPC)	PL	SoSe 16	13.07.2016	2,3	BE	3		1
700	**Großes Laborübungsmodul Web-Technologien**		WiSe 15/16	30.04.2016		BE	6		1
701	Labor: Web-Technologien	SL	WiSe 15/16	30.04.2016		BE	6		1
980	**Vorlesungsmodul Network Management**		WiSe 15/16	16.02.2016	1,3	BE	4		1
981	Network Management	PL	WiSe 15/16	16.02.2016	1,3	BE	4		1
4920	**Vorlesungsmodul Formale Begriffsanalyse**		WiSe 15/16	25.02.2016	1,3	BE	4		1

PrfNr.	Prüfungsbezeichnung	Prf.Art	Semester	Datum	Note	Status	LP	Vermerk	Versuch
4921	Formale Begriffsanalyse	PL	WiSe 15/16	25.02.2016	1,3	BE	4		1
499	**Software Engineering**								
200	**Vorlesungsmodul Compiler-Konstruktion**		WiSe 15/16	29.03.2016	1,7	BE	4		1
201	Compiler-Konstruktion	PL	WiSe 15/16	29.03.2016	1,7	BE	4		1
770	**Großes Laborübungsmodul Modelle für virtuelle Realitäten**		SoSe 15	24.07.2015		BE	6		1
771	Labor: Modelle für virtuelle Realitäten	SL	SoSe 15	24.07.2015		BE	6		1
1110	**Vorlesungsmodul Mensch-Computer-Interaktion 2**		SoSe 17	27.07.2017	2,7	BE	4		1
1111	Mensch-Computer-Interaktion 2	PL	SoSe 17	27.07.2017	2,7	BE	4		1
1240	**Vorlesungsmodul Modellbasiertes Software Engineering**		SoSe 16	30.08.2016					
1320	**Vorlesungsmodul Microservices**		SoSe 17	03.08.2017	1,0	BE	4		1
1321	Microservices	PL	SoSe 17	03.08.2017	1,0	BE	4		1
699	**Theoretische Informatik**								
590	**Vorlesungsmodul Advanced Topics in Computational Complexity Theory**		WiSe 15/16	05.02.2016	2,0	BE	4		1
591	Advanced Topics in Computational Complexity Theory	PL	WiSe 15/16	05.02.2016	2,0	BE	4		1
1170	**Vorlesungmodul Large Scale Data Mining**		SoSe 16	29.07.2016	1,3	BE	4		1
1171	Large Scale Data Mining	PL	SoSe 16	29.07.2016	1,3	BE	4		1
4099	**Informatik-Grundlagen**								
4200	**Fachmodul Echtzeitsysteme**		SoSe 15	24.09.2015	3,7	BE	4		1
4210	Industrielle Steuerungstechnik und Echtzeitsysteme	PL	SoSe 15	24.09.2015	3,7	BE	4		1
4500	**Fachmodul Graphische Datenverarbeitung**		SoSe 15	23.09.2015	2,3	BE	4		1
4510	Graphische Datenverarbeitung I	PL	SoSe 15	23.09.2015	2,3	BE	4		1
4800	**Fachmodul Künstliche Intelligenz**		SoSe 15	22.09.2015	2,0	BE	4		1
4810	Künstliche Intelligenz	PL	SoSe 15	22.09.2015	2,0	BE	4		1
6099	**Nebenfach**								
6300	**Master-Nebenfachmodul Informationstechnik**		SoSe 16	22.08.2016	1,5	BE	12		1
6310	Kanalcodierung	PL	SoSe 16	03.08.2016	1,3	BE	4		1
6312	Mobilkommunikation	PL	SoSe 16	22.08.2016	1,7	BE	4		1
6320	Evolution der öffentlichen Mobilfunknetze (3G / 4G)	PL	WiSe 15/16	02.03.2016	1,7	BE	4		1
9998	Masterarbeit	MA	SoSe 17	25.01.2018		AN	0		1

Diese Bescheinigung ist maschinell erstellt worden und trägt daher keine Unterschrift.

Prf.Art: BA=Bachelorarbeit BK=Bonuspunktekonto DA=Diplomarbeit F=Fach FG=Fachgebiet FP=Fachprüfung KP=Kursprüfung LN=Leistungsnachweis MA=Masterarbeit MK=Maluspunktekonto MO=Modul PA=Projektarbeit PL=Prüfungsleistung PR=Praktikum PS=Präsentattion SA=Studienarbeit SL=Studienleistung SP=Sportart TL=Teilleistung VP=Vorprüfung

Status: AN=angemeldet BE=bestanden EN=endgültig nicht bestanden NB=nicht bestanden PV=Prüfungskonto

Vermerk: AAA=Amtsärztliches Attest ANA=Attest nicht anerkannt LAA=Leistung anerkannt Ausland LAB=Leistung anerkannt berufsqualifiziert LAI=Leistung anerkannt Inland LAH=Leistung anerkannt Leibniz Universität Hannover LAN=Leistung anerkannt NIZ=nicht zugelassen RT=Anmeldung zurückgezogen RTE=entschuldigt gefehlt RTU=unentschuldigt gefehlt TA=Täuschung