Ju (Julia) Huyan

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SKILLS SUMMARY

- Extensive experience in **digital image processing**, **machine learning, deep learning-based object detection, semantic segmentation,** pavement crack detection, application of science and technology and the *computer* related research.
- Strong **problem-solving skills** with an emphasis on efficient solution development.
- Experience using programming languages (MATLAB, Python, etc.) to **manipulate data.**
- Utilize analytical, statistical, and programming skills to **collect, analyze, and interpret large data sets**. then use this information to develop data-driven solutions to difficult real-life challenges.
- A wide range of technical competencies including: **statistics and machine learning**, coding languages, databases, machine learning, and reporting technologies.
- Knowledge of a variety of machine learning techniques (**clustering, decision tree learning, artificial neural networks**, etc.) and their real-world advantages/drawbacks.
- Effectively communicate and interact with scientists and engineers to **define the requirements** of the simulations and models. Obtain necessary input data for simulations and provide meaningful **interpretation of modeling results** to guide experiments, operations, and engineering designs.
- Disseminate knowledge **through publications in peer-reviewed journals** and presentations at conferences, symposia, and review meetings. Provide **reports on technical work** and input to technical publications and presentations.
- Work with management and senior staff to plan and design projects, determine technical objectives, and interact with and provide regular **project reports to government and/or industrial clients**.

WORK EXPERIENCE

- **Postdoctoral fellow**, Centre for Pavement and Transportation Technology (CPATT), University of Waterloo September 2019-present
- **Teaching Assistant**, Civil & Environmental Engineering, University of Waterloo January 2017 - December 2018
- **Research Assistant**. School of Information Engineering, Chang' An University September 2013- July 2016

EDUCATION

Ph.D. Civil Engineering, Automatic Pavement Condition Detection and Evaluation, University of Waterloo, Waterloo, ON, Canada September 2016 - August 2019

MASc. Traffic Information Engineering and Control, School of Information Engineering, Chang' An University. Xi'an, Shaanxi, China. September 2013 - July 2016

B.Sc. Communication Engineering, School of Information Engineering, Chang' An University. Xi'an, Shaanxi, China. September 2009 - July 2013

PROJECT EXPERIENCE

- Leading a project team and successfully completed the *National College Students Innovation and Entrepreneurship Training Project*.

- Developed 3D laser data collection system. Several research projects are successfully finished using this data collection system. Digital image processing algorithms, such as *clustering algorithm*, *image denoising, image enhancement, image edge detection, image segmentation,* are used in the system for data analysis

Summary of Projects

Title	Category	Responsibility	Period
Research on Key Methods of Intelligent Detection of "Multi Source Distortion" Pavement Crack Image under Multi-source Acquisition Conditions (NO: 51978071)	Natural Science Foundation of China (NSFC)	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2019-present
Big data integration analysis method for road infrastructure service performance based on multi-source information (NO: 2018YFB1600200)	National Key R&D Program "Integrated Transportation and Intelligent Transportation" Special Project "The Theory and Method of Road Infrastructure Intelligent Perception"	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2019-present
Assessment and Improvement of MTO's Imaging Processing Systems for Usage in Pavement Management	Highway Infrastructure Innovations Funding Program (HIIFP), Ministry of Transportation of Ontario, ON, Canada	Leading project, Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2016-2018
Research on Pavement Structure and Performance Evaluation of Different Recycled Materials (300102249306)	Fundamental Research Funds for the Central Universities	Data collection, data analysis, visualization, reporting	2017-present
Key Technology Research of Clustering Detection of False Depth Cracks in Pavement 3D Crack Detection.	Natural Science Foundation of China (NSFC)	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2014-2018
Research on Aggregate Classification Mechanism Based on Machine Learning and Particle Morphology (NO: 51908059)	Natural Science Foundation of China (NSFC)	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2019-present
Research on Automatic Detection and Evaluation of Pavement Condition	National Transportation Construction Technology Project in West Region	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2013-2015
Defect Detection and Evaluation of Cement Pavement	Fundamental Research Funds for the Central Universities	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2013-Present

Research on the Process Control Technology of Pavement Construction Quality Based on 3D Data	Fundamental Research Funds for the Central Universities	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2014-Present
Research on the Key Technology of 3D Detection of Cement Concrete Pavement Distress	New-star Plan of Science and Technology in Shaanxi Province	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2013-2015
Asphalt Mixture Analysis for Doctoral Programs	Special Research Found for the Doctoral	Project management, data collection, data analysis, QA&QC, visualization, reporting, presenting	2013-2015

PAPERS AND PATENTS

Paper Publication

Title	Journal	Authors	Publish Time	SCI (Q, IF) /EI
CrackU-net: a novel deep convolutional neural network for pixelwise pavement crack detection	Structural Control and Health Monitoring	**Ju Huyan,** Wei Li, Susan Tighe, Zhengchao Xu, Junzhi Zhai	May,2020	Q1, IF=3.740
Detection of Sealed and Unsealed Cracks with Complex Backgrounds Using Deep Convolutional Neural Network	Automation in Construction	**Ju Huyan**, Wei Li*, Susan Tighe, Junzhi Zhai, Zhengchao Xu, Yao Chen	August, 2019	Q1, IF=4.313
Image-based coarse aggregate angularity analysis and evaluation	Journal of Materials in Civil Engineering	**Ju Huyan**, Wei Li, Susan Tighe, Yingjie Zhang, Baofeng Yue	July, 2019	Q2, IF=1.984
Three-Dimensional pavement crack detection based on primary surface profile innovation optimized dual-phase computing	Engineering Applications of Artificial Intelligence	**Ju Huyan,** Wei Li*, Susan Tighe, Liyang Xiao, Zhaoyun Sun, Nana Shao	November, 2019	Q1, IF=3.526
Three-dimensional asphalt pavement crack detection based on fruit fly optimization density peak clustering	Mathematical Problems in Engineering	Wei Li, Ranran Deng, Yingjie Zhang, Zhaoyun Sun, Xueli Hao, **Ju Huyan***	October, 2019	Q3, IF=1.179

Illumination compensation model with K-means algorithm for the detection of pavement surface cracks with shadow	Journal of Computing in Civil Engineering	**Ju Huyan**, Wei Li*, Susan Tighe, Ranran Deng, Shuai Yan	May, 2019	Q2, IF=2.554
International roughness index prediction based on multigranularity fuzzy time series and particle swarm optimization	Expert Systems with Applications: X 2	Wei Li, **Ju Huyan*,** Liyang Xiao, Susan Tighe, Lili Pei	July, 2019	Q1, IF=4.292
Pavement Cracking Detection Based on Three-dimensional Data Using Improved Active Counter Model (ACM)	Journal of Transportation Engineering, Part B: Pavements	Wei Li, **Ju Huyan*,** Susan Tighe	January, 2018	Q4, IF=0.722
An innovative Primary Surface Profile-based three-dimensional pavement distress data filtering approach for optical instruments and tilted pavement model-related noise reduction	Road Materials and Pavement Design	Wei Li, **Ju Huyan***, Susan Tighe, Nana Shao, Zhaoyun Sun	September, 2017	Q2, IF=1.98
Three-Dimensional Pavement Crack Detection Algorithm Based on Two-Dimensional Empirical Mode Decomposition	Journal of Transportation Engineering, Part B: Pavements	Wei Li, **Ju Huyan*,** Susan Tighe, Qingqing Ren, Zhaoyun Sun	May, 2017	Q4, IF=0.722
Asphalt Pavement Surface 3D Data Acquisition System Based on Line- Structure Light	Journal of Chang'an University (Natural Science Edition)	Zhaoyun Sun, **Ju Huyan***, Wei Li, Jing Bao, Zhu Liu	September, 2016	EI
Pavement Crack Detection Based on Two - Scale Clustering Algorithm and 3D Data	Journal of South China University of Technology (Natural Science Edition)	Wei Li, **Ju Huyan***, Aimin Sha, Zhaoyun Sun, Xueli Hao	November, 2015	EI
Pavement Crack Types Judgment Based on Three-dimensional Pavement Data	China Journal of Highway and Transport	Wei Li, Zhaoyun Sun, **Ju Huyan***, Aimin Sha, Juan Zhang	November, 2015	EI
Measuring Method for Asphalt Pavement Texture Depth Based on 3D Laser Scanning Data	Journal of China & Foreign Highway	Wei Li, Zhaoyun Sun**, Ju Huyan**, Xueli Hao	September, 2015	EI

3D Road Reconstruction Research Based on Structured Light	Computer Engineering and Design	Xueli Hao, Zhaoyun Sun, Wei Li, **Ju Huyan**	August, 2015	EI
3D Pavement Crack Identification Method Based on Dual-phase Scanning Detection	China Journal of Highway and Transport	Zhaoyun Sun, Haiwei Zhao, Wei Li, Xueli Hao, **Ju Huyan**.	February, 2015	EI
Research and Implementation of the Automatic Detection System of Aggregate Particles Characteristic Parameters Based on VC	Advanced Materials Research	Xueli Hao, Zhaoyun Sun, Wei Li, **Ju Huyan.**	November, 2014	EI
Quantitative Analysis on Macrotexture of Asphalt Concrete Pavement Surface Based on 3D Data	Presentation for TRB 2020 January, Washington, DC, US.	**Ju Huyan,** Wei Li, Susan Tighe, Zhaoyun Sun, Hongchao Sun	June, 2020	Conference
Implementing Unsupervised Machine Learning to Gain A Better Understanding of The Asphalt Pavement	Presentation for CSCE conference. 2019 June, Montreal, Canada.	Guangyuan Zhao, **Ju Huyan*,** Susan Tighe, Wei Li.	June, 2019	Conference
Life-cycle Cost Analysis and Performance Comparison of Asphalt Overlays on PCC Pavements In Wet-freeze Regions of Canada	Poster for TAC conference. 2019, September, Halifax, Canada.	**Ju Huyan,** Abimbola Grace Oyeyi, Susan Tighe.	September, 2019	Conference

Summary of Patents and Software Copyrights

Title (Patents / Software Copyrights)		Patent No.	Grant Time
Patents	A Kind of Pavement Fault Detection Algorithm and System Based on Three-dimensional Data	201410787896	2015
	A Kind of Pavement Crack Recognition Algorithm and System	201410787530.5	2015
	A Kind of Pavement Crack Recognition and Feature Algorithm and System Extraction	201410787747.6	2015
	A Kind of Three-dimensional Filtering Algorithms and Systems for Dislocation Based on Histogram Bimodal of The	201410787722	2016

Software Copyrights	License Plate Recognition System Based on LabView	2015SR126200	July 2015
	Particles Analysis and Design System Based on LabView	2015SR126203	July 2015
	Cell Image Particle Analysis and Design System Based on LabView	2015SR126208	July 2015
	Intelligent Pointer Meter Detection System Based on LabView	2015SR096569	June 2015
	Automatic Pointer Meter Detection System Based on Machine Vision and LabView	2015SR096477	June 2015
	Automatic Foam Identification System	2015SR126196	July 2015

HONORS AND AWARDS

Summary of Awards AND Scholarships

Acquired Time	Title/Name
2016-2019	Graduate Research Studentship (GRS)
2018	UW Grad Scholarship
2016-2019	Int'l Doctoral Student Award
2016-2017	Prov/Doc Entrance Award-Women
November 2012	National Graduate Student Award of China
December 2011	National Graduate Student Award of China
October 2015	Excellent Student Cadre
October 2015	The First Postgraduate Academic Scholarship
June 2015	Outstanding Communist Youth League Member
November 2014	Outstanding Postgraduate Student
November 2014	The First Postgraduate Academic Scholarship
June 2014	Outstanding Communist Youth League Member
September 2013	The First Postgraduate Academic Scholarship
May 2013	Excellent Student Cadre
October 2010	Individual Scholarship
May 2010	Outstanding Youth League Member
December 2010	The Third Award for Electronic Magazine Design
2009-2013	Arts and Sports Awards in Chang' an University (12 items)

SELF-ASSESSMENT

- A Ph.D. with strong perception and intellect, widen and swift thinking.
- Highly motivated and reliable person with excellent health and pleasant personality.
- Positive work attitude, willing and able to work diligently without supervision.
- Experience in facilitating workshops and meetings and writing research grant applications.
- Experience in supervising undergraduate or graduate students.
- Able to work under high pressure and time limitation. Able to adapt to different environment.
- Value teamwork as the top priority. Excellent interpersonal communication skills and organizational capability. Excellent written and oral communications skills
- Interest in working with interdisciplinary, collaborative research teams.