

寇雯博

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教育背景

加州大学伯克利分校

2021年01月 - 至今

- 学期交换

西安电子科技大学

2018年06月 - 2020年12月

数学与应用数学 本科 数学与统计学院

- GPA : 3.8 / 4.0 (前5%)

学术经历

不良坐姿检测装置的研究

2021年02月 - 至今

该研究计划设计一种头环对不良坐姿进行检测。难点在于从传感器读取的大量数据中获取位置信息来判断人体坐姿和噪声对数据精度的影响。在无相关背景的情况下，我快速学习该领域内的知识，判断出问题实质为利用传感器的数据进行室内定位

- 广泛阅读了传感器数据融合算法方面的英文文献
- 阅读了大量姿态解算相关的资料，建立了头部运动的物理模型
- 提出使用拓展卡尔曼滤波法来对处理传感器数据，自学了卡尔曼滤波法的原理以及MATLAB代码的实现

DCIC 2020: 数字中国创新大赛

2020年09月 - 2020年10月

与港科大、川大的研究生队友一同参赛。所选赛题为：端午假期厦门市交通路网拥堵识别及缓堵策略研究

研究的难点在于大量数据的清洗，有效判断特征值，设计交通拥堵指数的算法以及实现点位匹配，我自学并负责了以下内容

- 真实交通路网数据的清洗和可视化
- 编程实现了团队提出的计算交通拥堵指数的算法
- 使用k-NN算法实现车辆和街道的点位匹配

复合材料等效热传导性能预测的机器学习方法研究

2019年09月 - 2020年12月

在零相关经验的背景下进行该研究，并组建了三人的研究小组，担任负责人。该研究的难点在于，复合材料模型的建立，对大量数据进行预处理以及选取合适的机器学习算法。

- 大量阅读了复合材料和机器学习交叉方向的英文文献
- 领导研究小组完成了复合材料物理模型的建立及用FreeFem++编程实现对应复合材料热传导系数的计算
- 建立各种复合材料的数据库，并用小波分解来压缩随机复合材料的特征值，以减少数据量并过滤原始数据特征的噪声
- 使用scikit-learn library中的机器学习方法和TensorFlow对各种复合材料的数据库进行训练
- 整理了所有实验结果并参与撰写了三篇SCI论文

论文

- Hao Dong, Yufeng Nie, Junzhi Cui, **Wenbo Kou**, Minqiang Zou, Junyan Han, Xiaofei Guan, Zihao Yang. A wavelet-based learning approach assisted multiscale analysis for estimating the effective thermal conductivities of particulate composites, Computer Methods in Applied Mechanics and Engineering, Volume 374, 2021, 113591, ISSN 0045-7825.
- **寇雯博**, 董灏, 邹岷强, 韩均言, 贾西西. 混杂复合材料等效热传导性能预测的小波-机器学习混合方法. 物理学报, 2021, 70(3): 030701.
- Hao Dong, **Wenbo Kou**, Junyan Han, Minqiang Zou, Jiale Linghua. A hybrid wavelet-learning method of predicting effective heat transfer conductivities of braided composite materials (修改中)

技能及其他

- **技能** : 熟悉 : Java, Python 了解 : Git, MATLAB, R, C, PyTorch, TensorFlow

- **语言：**英语（CET-4）598，英语（CET-6）562，英语（TOEFL）104



EDUCATION

University of California, Berkeley

Jan 2021 - Dec 2021

- Semester exchange

Xidian University

Jun 2018 - Dec 2020

Mathematics and Applied Mathematics Bachelor Mathematics and Statistics

Xi'an

- GPA : 3.8 / 4.0 (first 5%)

ACADEMIC EXPERIENCE

Research on bad sitting posture detection device

Feb 2021 - Present

The research plans to design a headband to detect poor sitting posture. The difficulty lies in obtaining position information from a large amount of data read by sensors to determine the impact of human sitting posture and noise on data accuracy. Without the relevant background, I quickly learned the knowledge in the field and judged that the problem is essentially the use of sensor data for indoor positioning.

- Read extensively the English literature on sensor data fusion algorithms
- Read a lot of information related to posture calculation and establish a physical model of head movement
- Proposed to use the extended Kalman filter method to process sensor data, and learned the principle of Kalman filter method and the realization of MATLAB code by myself

DCIC 2020: Digital China Innovation Competition

Sep 2020 - Oct 2020

Participate with the graduate students of Hong Kong University of Science and Technology and Sichuan University. The topic of the selected competition is Research on the Congestion Recognition and Mitigation Strategies of Xiamen City Traffic Road Network during the Dragon Boat Festival. The difficulty lies in the cleaning of large amounts of data, the effective judgment of characteristic values, the design of traffic congestion index algorithms, and the realization of point matching.

- Cleaning and visualization of real traffic road network data
- Implemented the algorithm proposed by the team to calculate the traffic congestion index
- Use the k-NN algorithm to achieve point matching between vehicles and streets

Research on Machine Learning Method for Predicting Equivalent Heat Conduction Performance of Composite Materials

Sep 2019 - Dec 2020

The research was conducted under the background of zero relevant experience, and a three-person research team was formed as the leader. The difficulty of this research lies in the establishment of composite material models, the preprocessing of large amounts of data, and the selection of appropriate machine learning algorithms.

- Read a lot of English literature on the intersection of composite materials and machine learning
- I lead the research team completed the establishment of the physical model of the composite material and the calculation of the corresponding composite material thermal conductivity with Freefem++ programming
- Establish a database of various composite materials, and use wavelet decomposition to compress the characteristic values of random composite materials to reduce the amount of data and filter the noise of the original data characteristics
- Use machine learning methods in the scikit-learn library and TensorFlow to train databases of various composite materials
- Sorted out all experimental results and participated in the writing of three SCI papers

PAPER

- Hao Dong, Yufeng Nie, Junzhi Cui, Wenbo Kou, Minqiang Zou, Junyan Han, Xiaofei Guan, Zihao Yang. A wavelet-based learning approach assisted multiscale analysis for estimating the effective thermal conductivities of particulate composites, Computer Methods in Applied Mechanics and Engineering, Volume 374, 2021, 113591, ISSN 0045-7825.
- Kou Wen-Bo**, Dong Hao, Zou Min-Qiang, Han Jun-Yan, Jia Xi-Xi. Hybrid wavelet-based learning method of predicting effective thermal conductivities of hybrid composite materials. Acta Physica Sinica, 2021, 70(3): 030701. doi: 10.7498/aps.70.20201085
- Hao Dong, **Wenbo Kou**, Junyan Han, Minqiang Zou, Jiale Linghua. A hybrid wavelet-learning method of predicting effective heat transfer conductivities of braided composite materials (Revising)

SKILLS & OTHERS

- Skills:** Java, Python, Git, MATLAB, R, C, PyTorch, TensorFlow
- Languages:** English (CET-4) 598, English (CET-6) 562, English (TOEFL) 104