XINYU ZHAO

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EDUCATION

B.E in Mechanical Engineering September 2012 - June 2016
Jilin University, Overall Result: 84.35/100

M.S in Mechanical Engineering September 2016 - June 2018
University of Washington, GPA: 3.72/4.0

Ph.D in Industrial Engineering August 2018 - August 2022
Arizona State University, GPA: 3.71/4.0

SKILLS

Programming Languages Python, Java, MATLAB, R, SQL, C++
Software & Tools Pytorch, Tensorflow, AllenNLP, CUDA, Git

PROJECTS

Text Mining for aviation accident reports August 2019 - present
Supported by NASA *Tempe, AZ*

In this project, we try to extract important information from aviation accident reports automatically.

- We solve the sparsity and inconsistency issue from the accident reports using embedding technique. A novel Encoder Decoder framework is designed to learn the embedding vectors for representing aviation event logs. The encoder is designed with Recurrent Neural Network to study the temporal relationship among event data. The decoder is designed as a hierarchical tree structure considering the event taxonomy.
- We extracted structured information like time, event data from unstructured aviation accident reports. An attention based Seq2Seq model is designed for this automatic summarization task.

High Dimensional Process Monitoring August 2018 - present
Supported by NSF *Tempe, AZ*

In this project, we develop suitable change detection algorithms under certain scenarios.

- Monitoring the heart signal changes. We designed physics-based deep learning model for capturing the complex spatio-temporal relationship in heart signals. More specifically, we apply convolutional-LSTM and dilated-CNN for the spatio-temporal modeling.
- Identifying the defect area in Materials. Hidden Markov Model is used considering the underlying microstructure changes as the transition between hidden states. We treat acoustic emission signals collected from a nanolithography process as the observations of HMM.
- Predicting the aviation trajectory changes with weather data. We apply LSTM and HMM for a time series classification problem.
- Calculating the remaining useful life(RUL) time for machines. We designed a semi-supervised HMM for the task. The EM algorithm is revised to satisfy the monotonicity constraint according to the nature of RUL prediction. We further apply Partial Observable Markov Decision Process(POMDP) for the predictive maintenance task.
- We study the change detection problem under multiple failure mode from a theoretical point of view. We proved two theorem to guarantee the behavior of the proposed change detection algorithm.

EMPLOYMENT

AstrumU July 2015 - April 2016
Data Scientist Intern *Kirkland, WA*

We mainly focus on building efficient algorithms to automatically extract most valuable information for recruiters from unstructured resume data.

- We extracted structured information like name, education, skills from unstructured resume. A pipeline is designed for the information extraction task which able to handle resume in different formats. In general, the pipeline solved the problem 1) converting different formats of resume into raw text 2) extracting key entities like names, education automatically 3) summarizing the skills from the resume automatically
- We build up a recommendation pipeline for finding the best candidate for recruiters according to the job requirements.

PUBLICATIONS

- Yan, Hao, **Zhao, Xinyu**, Zhiyong Hu, and Dongping Du. "Physics-based deep spatio-temporal metamodeling for cardiac electrical conduction simulation." In 2019 IEEE 15th International Conference on Automation Science and Engineering (CASE), pp. 152-157. IEEE, 2019.
- **Zhao, Xinyu**, Hao Yan, Jing Li, Yutian Pang, and Yongming Liu. "Spatio-temporal anomaly detection, diagnostics, and prediction of the air-traffic trajectory deviation using the convective weather." In 11th Annual Conference of the Prognostics and Health Management Society, PHM 2019. Prognostics and Health Management Society, 2019.
- **Zhao, Xinyu**, Yunyi Kang, Hao Yan, and Feng Ju. "Semi-supervised constrained hidden markov model using multiple sensors for remaining useful life prediction and optimal predictive maintenance." In 11th Annual Conference of the Prognostics and Health Management Society, PHM 2019. Prognostics and Health Management Society, 2019.