Academic Paper Writing
10 Topics

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General Rules

- Every student is requested to select one topic by his/her research interest or direction, based on which student is required to do the homework, write the paper and design the poster.
- Each topic lists 6 papers. Students are encourage to read more related papers beyond the listed.
- The final paper should be a review regarding the selected topic, by strictly following the IEEE Transactions Journal Template. Paper length is strictly limited by 6 pages, including reference.
- Plagiarism is intolerable. Once found by any evidence, one would be sentenced to fail this course immediately.

Clean Energy System

- Wang, B., Liu, Y., Lu, D., Yue, K., & Fan, R. (2020). Transmission line fault location in MMC-HVDC grids based on dynamic state estimation and gradient descent. *IEEE Transactions on Power Delivery*.
- Farhadi, M., & Mohammed, O. (2015). Energy storage technologies for high-power applications. *IEEE Transactions on Industry Applications*, *52*(3), 1953-1961.
- Chen, M., & Poor, H. V. (2020). High-Frequency Power Electronics at the Grid Edge: A Bottom-Up Approach Toward the Smart Grid. *IEEE Electrification Magazine*, *8*(3), 6-17.
- Kinetic Energy Harvesting Toward Battery-Free IoT: Fundamentals, Co-Design Necessity and Prospects, ZTE communications, March 2021
- Ma, D., Lan, G., Hassan, M., Hu, W., & Das, S. K. (2019). Sensing, computing, and communications for energy harvesting IoTs: A survey. *IEEE Communications Surveys & Tutorials*, *22*(2), 1222-1250.
- N. Shinohara, "Trends in Wireless Power Transfer: WPT Technology for Energy Harvesting, Mllimeter-Wave/THz Rectennas, MIMO-WPT, and Advances in Near-Field WPT Applications," in *IEEE Microwave Magazine*, vol. 22, no. 1, pp. 46-59, Jan. 2021, doi: 10.1109/MMM.2020.3027935.

Bio-medical Imaging

- Control of a two-dimensional movement signal by a noninvasive brain–computer interface in humans, PNAS
- A Low-Power Integrated Circuit for a Wireless 100-Electrode Neural Recording System, IEEE Journal of Solid State Circuit
- Dynamic magnetic resonance imaging of human brain activity during primary sensory stimulation, Proc. Natl. Acad. Sci. USA
- Spatiotemporal Clutter Filtering of Ultrafast Ultrasound Data Highly Increases Doppler and fUltrasound Sensitivity. IEEE Transactions on Medical Imaging
- Moving magnetoencephalography towards real-world applications with a wearable system, Nature Research Letter
- Discerning calvarian microvascular networks by combined optoacoustic ultrasound microscopy, Photoacoustics

AI Chips

- An Energy-Efficient Precision-Scalable ConvNet Processor in 40-nm CMOS, IEEE Journal of Solid-state Circuits
- DaDianNao: A Machine-Learning Supercomputer, IEEE/ACM International Symposium on Microachitecture
- DSIP: A Scalable Inference Accelerator for Convolutional Neural Networks, IEEE Journal of Solid-state Circuits
- EIE: Efficient Inference Engine on Compressed Deep Neural Network, , IEEE/ACM International Symposium on Microachitecture
- Eyeriss: An Energy-Efficient Reconfigurable Accelerator for Deep Convolutional Neural Networks, IEEE Journal of Solid-State circuits
- Efficient Processing of Deep Neural Networks: A Tutorial and Survey, IEEE Contributed paper

光智能计算

- All-optical machine learning using diffractive deep neural networks, Science
- Deep learning with coherent nanophotonic circuits, nature photonics
- Electronic-photonic arithmetic logic unit for high-speed computing, nature communication
- All-optical spiking neurosynaptic networks with self-learning capabilities, nature research article
- 11 TOPS photonic convolutional accelerator for optical neural networks, Nature Article
- Parallel convolutional processing using an integrated photonic tensor core, nature article

CS-金融方向

- 1. Textual analysis of stock market prediction using breaking financial news: The AZFin text system
- 2. Combining satellite imagery and machine learning to predict poverty
- 3. Twitter mood predicts the stock market
- 4. Listening to Chaotic Whispers: A Deep Learning Framework for News-oriented Stock Trend Prediction
- 5. Stock Movement Prediction from Tweets and Historical Prices
- 6. Knowledge-Driven Event Embedding for Stock Prediction

Systems and Security

1. Exposing Cache Timing Side-Channel Leaks through Out-of-Order Symbolic Execution
2. SpecuSym: Speculative Symbolic Execution for Cache Timing Leak Detection
3. JIT Leaks: Inducing Timing Side Channels through Just-In-Time Compilation
4. Flush+Reload: A High Resolution, Low Noise,L3 Cache Side-Channel Attack
5. An Abstract Domain for Certifying Neural Networks
6. Differentiable Abstract Interpretation for Provably Robust Neural Networks

Natural Language Processing

- Dan Klein and Christopher D. Manning. 2004. Corpus-based induction of syntactic structure: Models of dependency and constituency. In ACL.
- Kewei Tu and Vasant Honavar. 2012. Unambiguity regularization for unsupervised learning of probabilistic grammars. In EMNLP-CoNLL.
- Valentin I Spitkovsky, Hiyan Alshawi, and Daniel Jurafsky. 2013. Breaking out of local optima with count transforms and model recombination: A study in grammar induction. In EMNLP.
- Yong Jiang, Wenjuan Han, and Kewei Tu. 2016. Unsupervised neural dependency parsing. In EMNLP.
- Jiong Cai, Yong Jiang, and Kewei Tu. 2017. CRF autoencoder for unsupervised dependency parsing. In EMNLP.
- Wenjuan Han, Yong Jiang, and Kewei Tu. 2019a. Enhancing unsupervised generative dependency parserwith contextual information. In ACL.

Computer Vision

- 1. DynamicFusion: Reconstruction and Tracking of Non-rigid Scenes in Real-time
- 2. Deep Residual Learning for Image Recognition
- 3. A Theory of Fermat Paths for Non-Line-of-Sight Shape Reconstruction
- 4. Densely Connected Convolutional Networks
- 5. PIFu: Pixel-Aligned Implicit Function for High-Resolution Clothed Human Digitization
- 6. NeRF: Representing Scenes as Neural Radiance Fields for View Synthesis

网络资源调度

- Energy optimal control for time-varying wireless networks. Neely, M. J. *IEEE transactions on Information Theory*, *52*(7), 2915-2934, 2006.
- Layering as optimization decomposition: A mathematical theory of network architectures. Chiang, M., Low, S. H., Calderbank, A. R., & Doyle, J. C. *Proceedings of the IEEE*, *95*(1), 255-312, 2007.
- Neural Adaptive Video Streaming with Pensieve H. Mao, R. Netravali, M. Alizadeh *ACM SIGCOMM 2017*
- Learning Scheduling Algorithms for Data Processing Clusters H. Mao, M. Schwarzkopf, S. Venkatakrishnan, Z. Meng, M. Alizadeh *SIGCOMM 2019*
- Applications of deep reinforcement learning in communications and networking: A survey Luong, N. C., Hoang, D. T., Gong, S., Niyato, D., Wang, P., Liang, Y. C., & Kim, D. I. *IEEE Communications Surveys & Tutorials*, *21*(4), 3133-3174, 2019
- Coded Computing for Low-Latency Federated Learning Over Wireless Edge Networks. Prakash, S., Dhakal, S., Akdeniz, M. R., Yona, Y., Talwar, S., Avestimehr, S., & Himayat, N. *IEEE Journal on Selected Areas in Communications*, *39*(1), 233-250, 2021.

Adaptive Control

- W. Wan, H. Kim, N. Hovakimyan, L. Sha and P. G. Voulgaris, "A Safety Constrained Control Framework for UAVs in GPS Denied Environment," 2020 59th IEEE Conference on Decision and Control (CDC), Jeju, Korea (South), 2020, pp. 214-219, doi: 10.1109/CDC42340.2020.9304304.
- J. Wang, Y. Zheng, C. Chen, Q. Xu and K. Li, "Leading Cruise Control in Mixed Traffic Flow," 2020 59th IEEE Conference on Decision and Control (CDC), Jeju, Korea (South), 2020, pp. 226-232, doi: 10.1109/CDC42340.2020.9304443.
- D. Muthirayan, M. Parvania and P. P. Khargonekar, "Online Algorithms for Dynamic Matching Markets in Power Distribution Systems," in IEEE Control Systems Letters, vol. 5, no. 3, pp. 995-1000, July 2021, doi: 10.1109/LCSYS.2020.3008084.
- J. G. Lee and Y. Chol Kim, "PID/First-Order Control Design for a Bank of F-16 Longitudinal Dynamic Systems," 2020 59th IEEE Conference on Decision and Control (CDC), Jeju, Korea (South), 2020, pp. 5879-5884, doi: 10.1109/CDC42340.2020.9304358.
- D. Fiore, D. Salzano, E. Cristòbal-Cóppulo, J. M. Olm and M. di Bernardo, "Multicellular Feedback Control of a Genetic Toggle-Switch in Microbial Consortia," in IEEE Control Systems Letters, vol. 5, no. 1, pp. 151-156, Jan. 2021, doi: 10.1109/LCSYS.2020.3000954.
- Y. Xing, X. He, H. Fang and K. H. Johansson, "Community Detection for Gossip Dynamics with Stubborn Agents," 2020 59th IEEE Conference on Decision and Control (CDC), Jeju, Korea (South), 2020, pp. 4915-4920, doi: 10.1109/CDC42340.2020.9304467.