

CS 537 - Fall 2021 – Advanced Topics in Internet of Things

Reading List

1. Week - August 24 – August 26 (Introduction to IoT)

August 24: Introduction to Course and IoT Space (*presented by Klara Nahrstedt*)

August 26: IoT Devices and IoT Data Formats (*presented by Klara Nahrstedt*)

2. Week – August 31 – September 2 (Images-Video Formats)

August 31: Human Vision System and Image Formats (*presented by Klara Nahrstedt*)

September 2: Video Formats and Basic Coding (*presented by Klara Nahrstedt*)

3. Week – September 7 – September 9 (Image and Video Coding)

September 7: Basic Image Coding (JPEG, JPEG-2000) (*presented by Klara Nahrstedt*)

September 9: Video Coding (MPEG, MPEG-4, H.264) (*presented by Klara Nahrstedt*)

(Good Overview: Gong, Mao, “An overview of Emerging Video Coding Standards”, ACM SIGMOBILE Mobile Computing and Communications Reviews (GetMobile), December 2018, Vol.22, Issue 4)

4. Week – September 14 – September 16 (Video and Audio Coding)

September 14: Video Coding (HEVC and Beyond) (*presented by Klara Nahrstedt*)

September 16: Auditory System and Audio Coding (*presented by Klara Nahrstedt*)

5. Week – September 21 – September 23 (IoT Analytics)

September 21: Overview of IoT Analytics Algorithms (*presented by Klara Nahrstedt*)

September 23: IoT Analytics (*presented by Students*)

- Sudershan Boovaraghavan, Anurag Maravi, Prahaladha Mallela, Yuvraj Agarwal “[MLIoT: An End-to-End Machine Learning System for the Internet-of-Things](#)”, ACM/IEEE IOTDI (International Conference on Internet of Things Design and Implementation) 2021.
- Renju Liu; Luis Garcia; Zaoxing Liu; Botong Ou, Mani Srivastava, “[SecDeep: Secure and Performant On-device Deep Learning Inference Framework for Mobile and IoT Devices](#)”, ACM/IEEE IOTDI 2021

6. Week – September 28 – September 30 (IoT Analytics)

September 28: IoT Analytics (*presented by Students*)

- Carlos Ruiz, Shijia Pan, Adeola Bannis, Ming-Po Chang, Hae Young Noh, and Pei Zhang, “[IDIoT: Towards Ubiquitous Identification of IoT Devices through Visual and Inertial Orientation Matching During Human Activity](#)”, ACM/IEEE IOTDI 2020
- Samyi Jain, Xun Zhang, Yuhao Zhou, Ganesh Ananthanarayanan, Junchen Jiang, Yuanchao Shu, Victor Bahl, Joseph Gonzalez, “[Spatula: Efficient cross-camera video analytics on large camera networks](#)”, ACM SEC (Symposium on Edge Computing) 2020

September 30: IoT Analytics (*presented by Students*)

- Li et al, “[Reducto: On-Camera Filtering for Resource-Efficient Real-Time Video Analytics](#)”, ACM SIGCOMM 2020
- Yilin Liu, Shijia Zhang, Mahanth Gowda, “[When Video meets Inertial Sensors: Zero-shot Domain Adaptation for Finger Motion Analytics with Inertial Sensors.](#)”, ACM/IEEE IOTDI 2021

7. Week - October 5 – October 7 (IoT Systems)

October 5: IoT Systems – Reliability (*presented by students*)

- Mbarka Soualhia; Chunyan Fu); Foutse Khomh, “[Infrastructure Fault Detection and Prediction in Edge Cloud Environments](#)”, ACM SEC 2019
- Sumukh Marathe, Akshay Nambi, Manohar Swaminathan; Ronak Sutaria, “[CurrentSense: A novel approach for fault and drift detection in environmental IoT sensors](#)”, ACM/IEEE IOTDI 2021

October 7: IoT Systems – Video on the Edge Computing (*presented by students*)

- Wang et al., “[Bandwidth-efficient Live Video Analytics for Drones via Edge Computing](#)”, ACM SEC 2018, Seattle, WA, October 2018.
- Xian Shuai; Yulin Shen; Yi Tang, Shuyao Shi; Luping Ji; Guoliang Xing, “[milliEye: A Lightweight mmWave Radar and Camera Fusion System for Robust Object Detection](#)”, ACM/IEEE IOTDI 2021

8. Week – October 12 – October 14 (IoT Systems)

October 12: IoT Systems (presented by Students)

- Adam Hall, Umakishore Ramachandran, “[An Execution Model for Serverless Functions at the Edge](#)”, ACM/IEEE IOTDI 2019
- Daniel Happ, “[On Combining Publish/Subscribe with Append-only Logs for IOT Data](#)”, ACM SEC 2020.

October 14: IoT Systems and Resource Management (*presented by students*)

- Aliaa Essameldin et al. “[More than The Sum of its Things: Resource Sharing Across IoTs at the Edge](#)”, ACM SEC 2020
- Lanyu Xu et al. “[CHA: A Caching Framework for Home-based Voice Assistant Systems](#)”, ACM SEC 2020

9. Week – October 19 – October 21 (IoT Networks)

October 19: Multimedia Networking (*presented by Klara Nahrstedt*)

October 21: IoT Networks (*presented by Students*)

- Poonam Yadav, Qi Li, Anthony Brown, Richard Mortier, “[Network Service Dependencies in Commodity Internet of Things](#)”, ACM/IEEE IOTDI 2019.,
- Mehdi Jafarizadeh, Xingzhi Liu, Rong Zheng, “[SoftBLE: An SDN Framework for BLE-based IoT Networks](#)”, ACM/IEEE IOTDI 2021

10. Week - October 26 – October 28 (IoT Networks & MIDTERM EXAM)

October 26: IoT Networks (*presented by Students*)

- Spiteri, Sitaraman, Sparacio, “[From Theory to Practice: Improving Bitrate Adaptation in the DASH Reference Player](#)”, ACM MMSys 2018.
- Guan et al., “[Pano: Optimizing 360 Video Streaming with better understanding of quality perception](#)”, ACM SIGCOMM 2019, Beijing, China, August 2019

October 28: NO CLASS (Take-Home Exam, posted October 25 (Monday, 11:59pm), due November 1 (Monday, 11:59pm))

11. Week – November 2 – November 4 (IoT Privacy/Security and Apps)

November 2: IoT Privacy/Security (*presented by students*)

- Youssef Khazbak, Junpeng Qiu, Tianxiang Tan, Guohong Cao, “[TargetFinder: Privacy-Preserving Target Search through IoT Cameras](#)”, ACM/IEEE IoTDI 2019.
- Panagiotis Chatzigiannis, Foteini Baldimtsi; Constantinos Koliass; Angelos Stavrou, “[Black-Box IoT: Authentication and Distributed Storage of IoT Data from Constrained Sensors](#)”, ACM/IEEE IOTDI 2021

November 5: IoT Applications – Industry IoT (*presented by students*)

- Vuk Lesi, Zivana Jakovljevic, Miroslav Pajic, “[Reliable Industrial IoT-Based Distributed Automation](#)”, ACM/IEEE IoTDI 2019.
- Dolvara Gunatilaka, Chenyang Lu, “[REACT: An Agile Control Plane for Industrial Wireless Sensor-Actuator Networks](#)”, ACM/IEEE IOTDI 2020

12. Week – November 9 – November 11 (IoT Apps)

November 10: IoT Applications – IoT Buildings *(presented by Students)*

- Amelie Bonde, Shijia Pan, Mostafa Mirshekari, Carlos Ruiz, Hae Young Noh, and Pei Zhang, “[OAC: Overlapping Office Activity Classification through IoT-Sensed Structural Vibration](#)”, ACM/IEEE IOTDI 2020.
- Tianlong Yu, Tian Li, Yuqiong Sun, Susanta Nanda, Virginia Smith, Vyas Sekar, and Srinivasan Seshan, “[Learning Context-aware Policies from Multiple Smart Homes via Federated Multi-Task Learning](#)”, ACM/IEEE IOTDI 2020

November 12: IoT Applications – Multi-Modal Applications *(presented by students)*

- Rana et al., “[Towards Generating Ambisonics using audio-visual cue for virtual reality](#)”, ICASSP 2019 - 2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), Brighton, UK, May 2019
- Yang, et al., “[Telling Left From Right: Learning Spatial Correspondence of Sight and Sound](#)”, IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2020

13. Week – November 16 – November 18 (Visualization and Quality of Experience)

November 16: IoT and Augmented Reality *(presented by Students)*

- Zida Liu, Guohao Lan; Jovan Stojkovic; Yunfan Zhang; Carlee Joe-Wong; Maria Gorlatova, “[CollabAR: Edge-assisted Collaborative Image Recognition for Mobile Augmented Reality](#)”, ACM IPSN (International Conference on Information Processing in Sensor Networks) 2020
- Yong Li, Wei Gao, “[DeltaVR: Achieving High-Performance Mobile VR Dynamics through Pixel Reuse](#)”, ACM IPSN 2019

November 18: QoE in Video 360 (*presented by students*)

- Covaci et al., “360° Mulsemedia: A Way to Improve Subjective QoE in 360° Videos”, ACM Multimedia 2019, Nice, France, October 2019
- Singla et al., “Subjective Evaluation of tile-based streaming for omni-directional video”, ACM MMSys 2019, Amherst, MA, June 2019.

14. Week – November 23 – November 25 (THANKSGIVING BREAK)

15. Week – November 30 – December 2 (Final Project Presentations)

November 30: Final Project Presentations (*presented by students*)

December 2: Final Project Presentations (*presented by students*)

16. Week – December 7-December 9 (Final Project Presentations)

December 7: Final Project Presentations (*presented by students*)

December 9: End of Semester (Reading Day)

17. Week – December 15 – December 17 (Final Exams)

December 16: Final Project Report Due December 15 (Wednesday), 11:59pm