

CE5045

Embedded System Design

Final Project Guidelines

<https://github.com/tychen-NCU/EMBS-NCU>

Instructor: Dr. Chen, Tseng-Yi

Computer Science & Information Engineering

Final Project Presentation

- We will have **presentations** about your final project during the lecture sessions in the weeks of June 17.
 - ✓ All the presentations are will be held in the class
- It is an individual presentation
 - ✓ Each group will be given a **20-minute time slot** for the presentation (not including the Q & A)
 - We will conduct a fair, random process to determine the order.
 - The presentation order and time slots for each person will be announced on the LMS.
 - Every group **MUST** give the presentation based on the released time slot, and control your presentation time well.
 - There would be NO chance to have a make-up presentation.

Direction I: Paper Presentation

- You are suggested to organize your presentation to cover (but not limited to) the following points:
 - ✓ **Summary.** What are the major issues addressed in the papers? Do you consider them important? How the state-of-the-art designs resolved the issues? What are the new solutions and findings of the paper?
 - ✓ **Strengths.** What are the strengths of the papers? Are there any reasons why the papers should be accepted?
 - ✓ **Weaknesses.** What are the weaknesses of the papers? Are there impractical assumptions made in the papers? Are there any reasons why the papers should NOT be accepted?
 - ✓ **Improvements.** What are the potential research issues that can further improve or extend the paper?

Direction I: Paper Presentation

➤ Selected papers:

1. Achieving Lossless Accuracy with Lossy Programming for Efficient Neural-Network Training on NVM-Based Systems, the ACM/IEEE International Conference on Hardware/Software Codesign and System Synthesis (CODES+ISSS 2019)
2. LongShoT: Long-Range Synchronization of Time, the ACM/IEEE International Conference on Information Processing in Sensor Networks (IPSN 2019)
3. A Sound Activity Detector Embedded Low-Power MEMS Microphone Readout Interface for Speech Recognition, the ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED 2019)
4. CNN-based Camera-less User Attention Detection for Smartphone Power Management, the ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED 2019)
5. Deterministic Memory Hierarchy and Virtualization for Modern Multi-Core Embedded Systems, 25th IEEE Real-Time and Embedded Technology and Applications Symposium
6. Graphics-aware Power Governing for Mobile Devices, the 17th ACM International Conference on Mobile Systems, Applications, and Services
7. Capttery: Scalable Battery-like Room-level Wireless Power, the 17th ACM International Conference on Mobile Systems, Applications, and Services
8. NAPEL: Near-Memory Computing Application Performance Prediction via Ensemble Learning, in the 56th ACM/IEEE Design Automation Conference (DAC 2019)
9. Losing the Car Keys: Wireless PHY-Layer Insecurity in EV Charging, USENIX Security '19
10. Real-Time Object Detection On Low Power Embedded Platforms, The IEEE International Conference on Computer Vision (ICCV), 2019

Direction II: Porting FreeRTOS

- In this direction, you should port FreeRTOS to an embedded platform (e.g., Arduino, raspberry Pi, TI MSP 430, etc.) and finish the following requirements:
 - ✓ Develop an embedded application based on FreeRTOS
 - ✓ The application should be multitasking
 - ✓ Implement a real-time scheduling algorithm to FreeRTOS scheduler
 - ✓ The multi-tasks in the application should include inter-task communication
- Evaluation criteria
 - ✓ Correctness (50%)
 - ✓ Completeness (20%)
 - ✓ Difficulty (20%)
 - ✓ Creativity (10%)

Direction III: Develop Embedded Apps.

- In this direction, you can develop what you want but you need to adhere the following rules:
 - ✓ The developed tool or application should obey the definition of embedded system.
 - ✓ The developed tool or application can be executed on an embedded platform.
 - ✓ If you utilize some third-party resources, you need to identify which part of the project is developed by yourself.
 - ✓ You need to demonstrate the project at your presentation.
- Evaluation criteria
 - ✓ Creativity (40%)
 - ✓ Correctness (30%)
 - ✓ Difficulty (20%)
 - ✓ Completeness (10%)