折れ線グラフ

中程度の精度で自動的に生成された説明

Class Canvas site: <https://canvas.ucsc.edu/courses/65827>

Lab:

Where: BE 111

When: Mon 10:00-11:30; Tuesdays(TA office hours) 12-1:30pm and Fridays 2:30-4:00 pm

* you can go to as many as you want; that meet your schedule
* BELS will grant access to all enrolled students 24/7
* Material should be checked out from BELS(BE 40) Baskin Engineering Building(in the basement)
* Each student will be responsible for their kit and will need to return it in perfect condition at the end of the quarter

Lab Projects

* Lab projects will be posted on the Canvas site
* design the IoT system so it will meet the needs of the application
* Teams of 2-3
* for each lab project, students will need to submit a lab report and well-documented code by the assigned submission deadline
* Lab project 1 has been posted due Oct 13th

TA:

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Office hours: Tuesday 12-1:30 pm

Location: BE 111

Course:

* Lab is where you build the IoT system
* we will use Raspberry PI
* Lab 2: set up the PI
* connect the PI including the analog sensor
* how to interconnect PI (mash network)
* IoT system with application driving the system + the cloud
* The kit has a PI and sensors (everything you will need is in the kit)

(check out the kit; we will order the bels)

* CSC 130 concepts are important in this class
* Lab reports are due on Friday 23:59
* but you will have to submit your code by the end of Lab on Friday (check-offs)
* Lab 1 and 2 are individually done but 3 and 4 are in groups
* the check-offs; when the code and report are submitted

course Outline:

* IoT enabling technologies
* architecture
* devices
* wireless sensor networks
* wireless networking principles and protocols
* IoT communication protocols: LoRa, Wi-Fi, Bluetooth, Zigbee, Z-Wave, etc.
* Cloud services for IoT
* IoT security

IoT; sensor network connected to the cloud ⇔ sensor networks

(知っていないといけない内容自体は佐藤先生の授業に似てる気がする。情報システムデザインが重要だからこれはやっておいた方がいい)

CSC 130, CSC 150 How these devices communicate

だからネットワークの本読んでおいた方が良いね。茶色の方は置いてきたし、なんとなくわかってるから多分大丈夫だけど一応確認しておこう

10/3/2023

* IoT

“things” that compute, sense, or communicate and connect to the network

* “Things”

IoT devices/ could collect, process, and/or send data

cyber-physical system

collect data and actuate on the devices

ex.) autonomous cars with sensors (cruise)→connects to the cloud

problems) if the car loses connection with the cloud, it stops

Smart home: specialized usage

industry 4.0: IoT enabling non-human industry; only monitoring

health, agricultural, and environmental monitoring

The IoT devices(cluster nodes) are usually cheap so there are no problems with being broken. The info will be sent to the gateway which has a stronger connection and will be sent to the info collecting tower or the cloud

How can IoT systems be deployed in the real world?

|  |  |  |
| --- | --- | --- |
|  | sensing and/or activation | data storage and analysis and application |
| single node | locally | locally |
| single node + cloud | locally (+computation) | cloud |
| multi-node | locally | locally |
| multi-node + cloud | locally (+computation) | cloud |
| “ + edge gateway | locally | edge gateway and cloud |

Edge Gateway is added as a powerful node that connects the other IoT nodes with less power storage. Clusters of nodes including edge gateway are used widely

IoT enabling technologies

Wireless Communication/networking

IoT network architecture: Application, transport, network, link, physical layers

What kind of application you will provide to ~~ and why

Infrastructure-based network: you need to have access points or base stations for the network to operate. Only the “last-mile” is wireless. ex) Wi-Fi, cellular, mesh

Infrastructure-less network: does not need an infrastructure: peer-to-peer (not client-server) has its own networking systems.

Hybrid networks: the way to extend the existing communication infrastructure.

Embedded systems: How we create the low-power circuits; computer system

Cloud Services: storage