Midterm

Due Apr 14 at 4:30pm **Points** 34 **Questions** 7 **Available** after Apr 14 at 2pm
Time Limit 75 Minutes

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	36 minutes	34 out of 34

ⓘ Correct answers are hidden.

Score for this quiz: **34** out of 34
Submitted Apr 14 at 3:34pm
This attempt took 36 minutes.

Question 1 — 10 / 10 pts

Consider a restaurant recommendation application (Live2Eat), which shows you nearby restaurants for a given location. Assume that Live2Eat automatically updates the location as the user moves, and that it also updates the nearby restaurants. It has **two options** for obtaining the location information.

The first option: by using GPS, which is more accurate.

The second option: by using the mobile tower-based cellular network, which is far less accurate.

Suppose that there is a Live2Eat user who is driving down a street, and the GPS signal is lost at time t = 0. Also suppose that the average speed of traffic is 15 kmph. The error in GPS localization is 50 m (0.031 miles), while the error in mobile tower-based localization is 100 m (0.062 miles). Consider that location information is requested by Live2Eat every minute.

When should you switch from GPS to cellular? (Explain your answer in worksheet)

- ○ Right at t = 0
- ○ Anytime after 2 mins
- ○ Anytime before 2 mins
- ◉ Anytime after around 30 seconds

Question 2

10 / 10 pts

Imagine a scenario where Boeing designed a pilot monitoring system that deploys in response to a failing MCAS system. If an MCAS system is engaged and the pilot is detected to be stressed, MCAS will automatically disengage.

In this system, consider a brain mobile interface application where the pilot wears a Neurosky headset that senses brain signals (EEG) at **400 Hz**. Each brain data point is a 32-bit floating point number. The brain signal is collected by a central controller in the plane and sent to a server, where complex machine learning algorithms are employed to determine the stress level of the pilot.

Additionally, the aircraft is equipped with sensors, such as the AoA, pitch monitoring, and other relevant sensors. The data rate from the AoA is **5 kbps**, and the data rate from the other relevant sensors is **300 kbps**.

Using the data from these sensors, the MCAS disable system attempts to predict MCAS failures. If the system detects that the pilot is stressed and an MCAS failure is predicted, the auto-disable facility should disable MCAS. The auto-disable feature only has 5 seconds to make a decision after collecting 5 seconds worth of data.

There are two options for performing all of the related computation: (a) use a GPU server at the control center, or (b) use a fog server that is onboard the aircraft. The GPU server upload speed is **1 Mbps**, whereas the fog server upload speed is 5 Mbps. However, the computation speed of the GPU server is **1500 kbps** (in other words, it can finish the computation on 1500 kb of data in 1 second), whereas the fog server has a computational speed of *200 kbps**.

What is the computation time for the GPU server and fog server, in milliseconds? (Explain your answer in worksheet)

- (●) GPU - 1.06 s, Fog - 7.9 s
- ( ) GPU - 7.9 s, Fog - 1.06 s

- GPU - 3.44 s, Fog -5.91 s
- GPU - 5.91 s, Fog -3.44 s

Question 3

4 / 4 pts

Which attacks are forms of causative attacks? *Select all that apply.*

- [x] Poisoning attacks
- [ ] Red herring
- [ ] Hill climbing
- [x] Label flipping

Question 4

4 / 4 pts

Which statements are *most* accurate regarding poisoning attacks? *Select all that apply.*

- [x] You need access to the training dataset to launch this attack.

- [ ] You need to know the entire machine learning architecture to launch this attack.
- [x] The attacks use false labels for the dataset.
- [x] The attacks can only be launched on machines which learn in runtime.

Question 5

2 / 2 pts

Why do we need IP-in-IP tunneling?

- (•) Used by the home agent to forward messages from correspondent host to care of address
- ( ) Used by foreign agent to send acknowledgment back to home agent
- ( ) Used by mobile host to communicate with foreign agent
- ( ) Used by correspondent host to communicate with home agent

Question 6

2 / 2 pts

Which statement is the *most* accurate regarding mobile IP?

- It can be accommodated with IPv4 without any modification.
- IPv4 modification is needed to avoid DNS overload.
- IPv4 modification is needed since more IP addresses are needed.
- IPv4 modification is needed to support new versions of mobile devices only. With old mobile devices, IPv4 will suffice.

Question 7

2 / 2 pts

What are the advantages of Registration area based location information as opposed to cell based location information?

- Lesser update cost
- Lesser handoff cost
- Lesser search cost
- Lesser registration cost

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