# EE30005 Introduction to Electronics Design Lab (Quiz for Module 3)

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Quiz Questions

Answer the questions below.

What does data augmentation do in the context of wake word training? * 5점

- ◯ Speeds up training by pre-processing data into a more appropriate format
- ◯ Reduces model complexity by pre-processing data to emphasize between class variations
- ◯ Improves audio quality by removing artifacts such as noise or distortion
- ◯ Increases dataset size by applying transformations such as noise or volume changes

What is TinyML? * 5점

- ◯ Converting large ML models into executables for resource-constrained embedded systems
- ◯ A type of neural network architecture specifically designed for resource-constrained embedded systems
- ◯ A programming language for microcontrollers
- ◯ Training machine learning models on embedded systems

What is the fundamental real-time requirement for streaming audio processing? * 5점

- Achieving the highest possible accuracy to enable a good user experience
- Processing time that is less than the data arrival rate
- Maintaining low memory usage to ensure stable execution over prolonged periods (e.g., days)
- Achieving a high data throughput to enable high bandwidth processing

What is the fundamental difference between batch and streaming processing of audio data? * 5점

- Batch processing is slower than streaming due to the time cost of loading data
- Batch requires more buffer memory than streaming
- Streaming operates under strict time constraints, while batch does not
- Streaming processing is more accurate than batch

What is the fundamental difference between traditional programming and machine learning? * 5점

- Traditional programming requires more data than machine learning
- Traditional programming is faster than machine learning, as it avoids training phases
- Traditional programming manually determines rules, ML automatically learns rules from data
- Traditional programming uses compiled code, ML uses interpreted code

In our labs, why was the target duration for wake word samples 1.25 seconds? * 5점

- It matches the default microphone buffer size, simplifying implementation
- It's the minimum TensorFlow Lite supports - a shorter buffer would require additional pre-processing
- It's the standard in the industry - most wake words use this buffer size
- It's calculated to be larger than the wake word duration to capture full context and prevent truncation

What are the four states in a typical wake word detection state machine? * 5점

- Listen, Analyze, Decide, Act
- Start, Process, End, Reset
- Idle, Detecting, Triggered, Cooldown
- Input, Hidden, Output, Feedback

In the first lecture, we stepped through the processes of training a model to predict sine wave values. The first model we built (with one hidden layer) was underfitted to the sine function. Why? * 5점

- Learning rate was too high
- Too much training data
- Model complexity was too low
- Training time was too short

Why is it essential to collect "other words" (counter-examples) in addition to the wake word for training a wake word model? * 5점

- ○ To test the model's ability to handle multiple languages
- ○ To balance the dataset so all classes have equal representation
- ○ To increase the total dataset size for better model convergence
- ○ To reduce false positives on phonetically similar phrases

Why is a single inference unreliable for wake word detection? * 5점

- ○ Single inferences are too slow - multiple inferences can improve speed
- ○ Models are always inaccurate - multiple samples are required to improve accuracy
- ○ Transient noise spikes, partial matches, and jitter can cause false positives/negatives
- ○ The audio quality of a single inference is poor

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