**ChatGPT prompt**

I am trying to create a dataset for training. A positive example of a data sample is shown below:

## Training Scenario: Operation Crimson Echo

\*\*Commander’s Intent:\*\*

\* Destroy the underground command center. Disable the communication infrastructure. Damage the bunkers beyond repair.

\* 100% bombs on time and on target

\* Maximum 50% BLUELAND Air Force losses

\* 100% REDLAND Air Force destruction

\*\*Force Composition:\*\*

\* REDLAND Air Force: four SA-7 surface-to-air missile launchers and three ZSU-23-4 Shilka self-propelled anti-aircraft gun systems.

\* REDLAND Ground Forces: 500 troops guarding the facility, armed with small arms and heavy machine guns. There are no known armored vehicles present.

\*\*Geography:\*\*

\* Distance to REDLAND threats: SAM Regiment: 10 nm north and 15 nm east of the target, Airbase: 20 nm south of the target

\* Environmental Conditions: Nighttime mission, with scattered clouds and visibility of 5 nm. Target located in an urban area, with surrounding buildings and narrow streets

\*\*Surrounding Conditions:\*\*

\* REDLAND's Air Force is on high alert, with increased air patrols in the area

\* REDLAND's ground forces are conducting exercises 30 nm north of the target, but are not expected to interfere with the air strike mission

\* BLUELAND's intelligence suggests that REDLAND has recently reinforced its air defenses in the area, but the extent of the reinforcements is unknown

\*\*Target(s) Details:\*\*

\* Central military complex consists of 5 underground bunkers, an underground command center, and hardened communication infrastructure.

\* Bunkers are reinforced with steel and ceramic armor.

\* Command center is protected by thick blast doors and advanced security protocols.

\*\*Rules of Engagement:\*\*

\* REDLAND forces are considered hostile and will respond defensively upon detection of incoming aircraft.

\* They are not authorized to initiate contact unless provoked.

\* Friendly fire prevention measures must be taken to minimize collateral damage to civilians and non-target structures.

\* Only authorized military targets within the defined engagement zone shall be engaged.

A negative example of a data sample is shown below:

## Training Scenario: Operation Crimson Echo

\*\* Commander’s Intent:\*\*

\* Destroy key infrastructure in REDLAND's central energy production complex.

\*\*Force Composition:\*\*

\* REDLAND Air Force: 24 combat aircraft, 12 anti-aircraft batteries, 6 surface-to-air missile batteries.

\* REDLAND Ground Forces: 10,000 soldiers, equipped with light infantry weapons.

\*\*Geography:\*\*

\* Distance to target: 200nm

\* Distance to REDLAND border: 150nm

\* Environmental Conditions: Nighttime mission

\*\*Surrounding Conditions:\*\*

\* Friendly forces have established a no-fly zone in the northern sector.

\*\*Target(s) Details:\*\*

\* Central energy production complex with 4 reactor

\*\*Rules of Engagement:\*\*

\* Minimize civilian casualties and damage to surrounding infrastructure.

The prompt used to generate these data samples is as follows in the quotation marks:

“BLUELAND is a make-believe country. REDLAND is another make-believe country, an enemy of BLUELAND.

Write me a training scenario for an air strike mission by BLUELAND to destroy a specified target. This scenario will be given to BLUELAND, who will devise a strategy to execute the plan. The scenario should be non-descriptive, concise and factual. The information should be sufficient to help BLUELAND to decide their loadout and strategy. The scenario should include the following information about the target and REDLAND:

1. Commander’s Intent: Captures the broad mission objectives (eg: 100% TOT, 50% BLUELAND losses, 100% REDLAND destruction, destroy bunkers, etc)
2. Force Composition: REDLAND’s units and objects participating in the scenario, Order of Battle, i.e the identification, strength, command structure, disposition for the personnel, units, equipment of any military force, command & control hierarchies, communication networks and communication channels. This should be specific, i.e exact model of aircraft or missiles (eg: F-15 fighter jets, SA-7 surface-to-air missile launchers, ZSU-23-4 Shilka self-propelled anti-aircraft gun systems, etc).
3. Geography: Distance to target and distance to REDLAND threats. Specification of environmental conditions which are of interest (eg: day/night/dawn, buildings, vegetation, ditches in surroundings, etc)
4. Surrounding Conditions: Overview of all scenario-related information of interest, i.e surrounding military situation, REDLAND readiness state, etc.
5. Target(s) Details: Any relevant information about target(s), i.e type and number of targets.
6. Rules of Engagement: Directives that outline when and how BLUELAND can engage hostile forces.”

As seen above, the negative example lacks detail like stating the exact type and number of aircraft, exact type and number of missiles and sites, distance to all REDLAND threats, specific environmental conditions, specific REDLAND readiness state and target details. Without these details, BLUELAND forces cannot properly plan their loadout, type of missiles and mission strategy.

With that, could you generate another possible positive and negative pair of data sample? Please adhere to the prompt when generating possible data samples.

**Instance Type: p3.16xlarge**

**Copying edited file over:**

1. cd "/mnt/c/Users/Development (UC)/Desktop/kailin/Review2"
2. scp kto.py ~
3. cd ~
4. scp -i MyKeyPair.pem kto.py ec2-user@13.228.77.232:~/

**To create the AWS instance:**

1. Run on the terminal: aws ec2 run-instances --image-id resolve:ssm:/aws/service/ami-amazon-linux-latest/amzn2-ami-hvm-x86\_64-gp2 --instance-type g4dn.xlarge --key-name MyKeyPair
2. Go to the EC2 dashboard
   * Go to the Security tab and ensure SSH is enabled
   * Go to Storage and change volume to 100GiB
   * Check public IPv4 address
3. Copy files into EC2 instance
   * scp -i MyKeyPair.pem kto.py ec2-user@13.228.77.232:~/
   * scp -i MyKeyPair.pem missionData\_llm.csv [ec2-user@13.228.77.232:~/](mailto:ec2-user@13.228.77.232:~/)

**In the AWS instance:**

1. SSH into the AWS instance from the terminal with command: ssh -i MyKeyPair.pem [ec2-user@54.169.170.179](mailto:ec2-user@54.169.170.179)
2. To increase volume, follow instructions in <https://docs.aws.amazon.com/ebs/latest/userguide/recognize-expanded-volume-linux.html>
   1. df -h
   2. sudo lsblk
   3. sudo growpart /dev/nvme0n1 1
   4. sudo lsblk
   5. df -hT
   6. sudo xfs\_growfs -d /
   7. df -hT
3. Download Anaconda
   1. wget <https://repo.anaconda.com/archive/Anaconda3-2023.03-Linux-x86_64.sh>
   2. bash Anaconda3-2023.03-Linux-x86\_64.sh
   3. source ~/.bashrc
   4. conda create --name myenv python=3.11
   5. conda activate myenv
      1. pip install datasets transformers trl peft wandb
      2. pip install -U “huggingface\_hub[cli]”
      3. huggingface-cli login, hf\_kaJrEUqyvoAzWUNfgblGKEVuztSSIwLWnl
      4. python kto.py --per\_device\_train\_batch\_size 1 --num\_train\_epochs 10 --learning\_rate 1e-4 --lr\_scheduler\_type=cosine --gradient\_accumulation\_steps 1 --logging\_steps 10 --eval\_steps 500 --output\_dir=./kto-aligned-model-lora --warmup\_ratio 0.1 --report\_to wandb --bf16 --logging\_first\_step --use\_peft --load\_in\_4bit --lora\_target\_modules=all-linear --lora\_r=16 --lora\_alpha=16 --gradient\_checkpointing --max\_length 1000 --max\_prompt\_length 1000 (Trial 1)
      5. python kto.py --per\_device\_train\_batch\_size 1 --num\_train\_epochs 5 --learning\_rate 1e-5 --lr\_scheduler\_type=cosine --gradient\_accumulation\_steps 8 --logging\_steps 10 --eval\_steps 200 --output\_dir=./kto-aligned-model-lora-2 --warmup\_ratio 0.1 --report\_to wandb --logging\_first\_step --use\_peft --lora\_target\_modules=all-linear --lora\_r=16 --lora\_alpha=16 --gradient\_checkpointing --max\_length 1000 --max\_prompt\_length 500 (Trial 2)
      6. python kto.py --per\_device\_train\_batch\_size 1 --num\_train\_epochs 2 --learning\_rate 1e-5 --lr\_scheduler\_type=cosine --gradient\_accumulation\_steps 8 --logging\_steps 10 --eval\_steps 200 --output\_dir=kto-aligned-model --warmup\_ratio 0.2 --report\_to wandb --bf16 --logging\_first\_step --gradient\_checkpointing --max\_length 1000 --max\_prompt\_length 500 (Trial 3 )
      7. <https://wandb.ai/authorize>

**Stop instance** with aws ec2 stop-instances --instance-ids <ids-here>

**Terminate instance** with aws ec2 terminate-instances --instance-ids <ids-here>

A screen shot of a computer code

Description automatically generated

Solution 1:

A screen shot of a computer

Description automatically generated

Result:

A screenshot of a computer program

Description automatically generated

Solution 2: use .to(“cuda”) on model

Result:

A screen shot of a computer code

Description automatically generated

Solution 2a: Install NVIDIA driver

1. sudo wget [https://developer.download.nvidia.com/compute/cuda/repos/amzn2023/x86\_64/cuda-amzn2023.repo -O /etc/yum.repos.d/cuda-amzn2023.repo](https://developer.download.nvidia.com/compute/cuda/repos/amzn2023/x86_64/cuda-amzn2023.repo%20-O%20/etc/yum.repos.d/cuda-amzn2023.repo)
2. sudo rpm --import <https://developer.download.nvidia.com/compute/cuda/repos/amzn2023/x86_64/7fa2af80.pub>
3. sudo yum clean all
4. sudo yum -y install cuda-toolkit-12-5
5. sudo yum update
6. sudo yum install gcc kernel-devel epel-release kernel-devel dkms nvidia-driver-latest-dkms pkg-config xorg-x11-server-devel
7. sudo yum groupinstall "X Window System" "Development Tools"

<https://www.nvidia.com/content/DriverDownloads/confirmation.php?url=/tesla/440.95.01/NVIDIA-Linux-x86_64-440.95.01.run&lang=us&type=Data%20Center%20/%20Tesla> (remember to choose the latest version of CUDA toolkit)

A screen shot of a computer program

Description automatically generated

1. Chmod +x NVIDIA-Linux-x86\_64-550.90.07.run
2. Sudo ./ NVIDIA-Linux-x86\_64-550.90.07.run

A screenshot of a computer

Description automatically generated

Even the quantized one cannot run. Need 64GB memory.

A computer screen with text on it

Description automatically generated

A screenshot of a computer

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Batch size of 2 is not possible no matter how I change the parameters, so I used gradient accumulation steps to simulate batch size > 1.

Tried to use bitsandbytes but that means that the model must be BOTH stored in the GPU, with both models stored in GPU instead of using both GPU and CPU, there isn’t sufficient GPU memory for training 🡪 the only way to store the models is using device\_map=’auto’ so that it can be split between GPU and CPU.

A screen shot of a computer code

Description automatically generated

<https://huggingface.co/docs/trl/main/en/lora_tuning_peft>

model seems to be loaded in 4 bit.