INSTRUCTIONS AND USEFUL INFORMATIONS - <u>FAQ</u>

1. <u>Q: Should/can I use my own computer to train my algorithms for the competition?</u>

   A: No. In order to ensure that every team has access to the same computing resources, each team will be assigned its own remote machine (from Google Cloud) with the following specifications:

   - 8 vCPUs
   - 30 Gb RAM
   - 60 Gb disc
   - GPU NVIDIA Tesla K80
   - OS Ubuntu 18.04 LTS

2. <u>Q: How do I access my machine?</u>

   A: See sections "II. Initial setup" and "III. Opening and editing files" below.

3. <u>Q: Do I need to use any specific programming language and/or software to develop my solution?</u>

   A: Yes. You must use Python 3 to develop your solution. Basic knowledge of Unix shell commands will also be very useful. Although not strictly required, you may find the initial setup easier if your personal computer is running a Linux distribution or Mac OS.

4. <u>Q: Is the required software already installed in my remote machine?</u>

   A: Yes, CUDA, cuDNN and Python 3.6 are already installed, as well as many useful Python libraries (e.g.: Numpy, OpenCV, Scikit-Learn, TensorFlow, PyTorch, etc.).

5. <u>Q: Can I install further Python packages?</u>

   A: Yes, you may install whichever packages you want. The recommended way is using pip (see section "III. Connecting via SSH" below). Please, do not use virtual environments (e.g. conda).

6. <u>Q: Can I work via Jupyter notebooks?</u>

   A: We do not recommend and strongly discourage the usage of Jupyter notebooks. These often lead to memory problems when there are multiple notebooks running on the same machine.

7. Q: How do I submit my predictions?

A: You do not have to submit anything explicitly. Your code will be run by the competition organizers on the test data in a separate machine, in order to generate your predictions. Please note that you will not have access to the test data at any time during the competition. It is very important that you read section "IV. Submissions", where all instructions regarding this subject are provided.

8. Q: When and how is the leaderboard updated?

A: The public leaderboard will be updated daily. Each day, at around 12:00 PM, your test.py will be copied (together with all additional files that you may have created and packages you may have installed) to a separate machine and will be run there. Therefore, it does not interfere with any jobs that you might be running in your machine. Note that the public leaderboard will show results for a fraction of the test data only. The final leaderboard, computed using the whole test set, will be published on Friday, 12th July, in the morning. The leaderboards will be published in our GitHub.

9. Q: Is there any maximum execution time that my inference script should respect?

A: Your test.py should run in reasonable time: anything around one hour or less for generating the predictions for the whole training set should be fine.

10. Q: What is the competition deadline?

A: The precise time is yet to be defined, but it will not be before 12:00 PM on Thursday, 11th July.

11. Q: I have read every section in this document and I still have questions. / I am having technical issues connecting to the machine, etc. Can anybody help me?

A: Sure, VISUM staff will be around to help you. You can also contact the competition staff at any time via email (Diogo – dpc@inesctec.pt / Eduardo – eduardo.m.castro@inesctec.pt / João – joao.t.pinto@inesctec.pt / Ricardo – ricardo.j.araujo@inesctec.pt / Wilson – wilson.j.silva@inesctec.pt).

INSTRUCTIONS AND USEFUL INFORMATIONS – <u>INITIAL SETUP</u>

Upon registration in the competition, your team will receive an email with the IP address and the password of your machine. You will need these, every time you need to establish a connection to your machine, so please keep them accessible throughout the competition period.

You may change the password, if you want to. However, please be aware that you and your team members share the same user account, so please share the new password with them.

Your user account has no root privileges. Therefore, you shall not be able to install new software (at least via apt) in your machine. You may install new Python packages using pip.

There is no graphical interface server running on the remote machines. Therefore, you will not be able to run any program that requires a GUI directly on your remote machine (e.g. image viewers, fancy text editors, etc.). You may use any program running on your local machine to visualize and edit files on the remote machine, though. This is explained in section "III. Opening and editing files".

Below, you will find detailed steps on how to establish a connection to the remote machine and start working in the project.

<u>Windows users:</u>

1. Unfortunately, in Windows, establishing an SSH connection is not as straightforward as in other OS. However, this can be done using third party applications like PuTTy (https://www.putty.org/). This tutorial will guide you through all the required steps.
2. On step 5. of the tutorial, use the provided IP address (e.g. 35.237.233.98) as the hostname, and leave the Port and Connection Type fields with their default values (22 and SSH, respectively).
3. On step 8., type visum as the username.
4. On step 9., type the password you have received.
5. After you have established the connection, please proceed to subsection "All users" below.

<u>Linux and Mac users:</u>

1. Open a terminal window
2. Run the command: `ssh visum@<ip_address>` where `<ip_address>` should be replaced with the IP address of your remote machine.
3. If you are asked if you want to proceed with the connection, type yes. Type the password you have received when you are asked for it.
4. After you have established the connection, please proceed to subsection "All users" below.

All users:

1. Now that you are connected to your remote machine, you are ready to start working in the project! You will find the whole training set in the directory `/home/master/dataset/train`. There is also a test folder at `/home/master/dataset/test` that is a link to all the RGB images on the training dataset. This link is simply there to allow you to test your test.py script.

2. Download the evaluation and other auxiliary scripts (including the baseline code), by pulling our GitHub project:
   `git pull https://github.com/visum-summerschool/visum-competition2019`

3. Go to the baseline directory:
   `cd /home/visum/visum-summerschool/visum-competition2019/baseline`

4. Download the baseline model weights: bash download_model.sh (a new file named baseline.pth shall be created)

5. Run inference on the training data using the baseline model, by doing: python test.py. This script will output a new file, named predictions.csv, in the expected format. If you need to change the script test.py, please make sure that your changes do not affect the format of the produced predictions.csv.

6. Compute the evaluation metrics, using the model predictions and the ground truth annotations (of the training data), by doing: python eval.py. The performance metrics of the baseline model on the training set will be displayed.

INSTRUCTIONS AND USEFUL INFORMATIONS – OPENING AND EDITING FILES

As stated before, you may use any software installed in your personal computer to access, edit and visualize any file in the remote machine. For this purpose, we suggest using SSHFS, which makes it easy to mount a remote directory into a local directory.

Windows users:

1. Download and install WinFSP. You can download the installer of the latest stable version directly from here.
2. Download and install SSHFS-Win. You can download the installer of the latest stable version directly from here.
3. Open 'File Explorer', right-click on 'This PC' and choose 'Map network drive'.
4. Choose a drive to mount at.
5. In the Folder field, enter: `\\sshfs\visum@<ip_address>` replacing `<ip_address>` with the IP address of your remote machine.
6. Select the option 'Connect' with different credentials and enter the password of your remote machine when asked for it.
7. Now, the home directory of your remote machine will be mounted at the Windows drive you have chosen. Confirm you have read and write access to the files.

Linux and Mac users:

1. Open a terminal window.
2. Install SSHFS, using the appropriate command according to your OS:
   Ubuntu/Debian: `sudo apt install sshfs`
   Mac OS: `brew cask install osxfuse; brew install sshfs`
3. Create an empty directory in your computer, for instance:
   `mkdir ~/Desktop/visum`
4. Mount the home directory of your remote machine at the directory you have just created:
   `sshfs visum@<ip_address>:/home/visum ~/Desktop/visum`
   replacing `<ip_address>` with the IP address of your remote machine.
5. Enter the password of your remote machine when asked for it.

6. Now, the home directory of your remote machine will be mounted at the directory you have chosen. Confirm that you have read and write access to the files.

INSTRUCTIONS AND USEFUL INFORMATIONS - SUBMISSIONS

It is very important that you follow all the guidelines in this section. <u>Otherwise, your model will not be evaluated and your submission will fail.</u>

As mentioned before, you shall not submit your test set predictions directly. Your code and model will be copied and run in a separate machine, together with all remaining files in your home directory (including Python packages installed via pip), in order to generate those predictions. For this process to run successfully, you must proceed as follows:

1. Implement your model's inference step in a file exactly at this location: `/home/visum/test.py`
2. Your test.py should perform inference on the test data, which is located exactly at this location: `/home/master/dataset/test`. (In your machine, this data is just the same as the training data.)
3. Make sure that your test.py outputs a CSV file containing the model predictions exactly at this location: `/home/visum/predictions.csv`
4. Make sure that your predictions.csv has exactly the same format as the one generated by the baseline solution. Specifically, it should have one line for each detected object and each line should have exactly the following format:
`image_file_name,x0,y0,x1,y1,predicted_label,confidence_level`

You may verify the correctness of your file by running the eval.py script. For this reason, you should not modify the provided eval.py, otherwise you will not be able to confirm if your predictions are being generated correctly.

Note that leaderboards will be generated and provided on a daily basis. Daily leaderboards are merely informative and are calculated using only a small fraction of the test data. The final leaderboard will be obtained using the whole test set and will be the only one that the evaluation panel will take into account to decide the winner.