Outline

1. **Problem and Motivation**

2. **Baseline Solution**

3. **Framework**

4. **Participation**

5. **First Steps**

VISUM
10 YEARS

Problem and Motivation

Meet our Project Partner: Loggi

Loggi is a next-generation logistics network in Brazil that uses technology (e.g., mobile, AI, automation, IoT)

- They are present in all Brazilian municipalities and want to reach the milestone of 5 million deliveries per day in the next 5 years

- With SoftBank, Microsoft, GGV Capital and other investment rounds, they're valued at over $1 billion and they've become a Unicorn!

Get to know the problem!

Loggi deals with a specific type of **packages** that are automatically analysed by a sorter-machine to assure they are delivered to their respective recipients

- However, sometimes, some **sorting errors may occur** and the matching between the package and the database is difficult to achieve

- This issue currently requires the manual analysis of the packages and the manual matching of the package's **barcode** (i.e., **the unique identifier** of each package) and their recipient in the database

The Challenge: Automatically Extract Data

In such cases, it would be interesting if we could achieve a pipeline fueled by **computer vision and machine learning** capable of automatically detecting the **correct barcode of the package** and crossing information with a database to automatically identify the correspondent recipients

Divide and Conquer: Package Barcode Detection

During the **VISUM 2022 Project**, you will be challenged to develop a computer vision & machine learning pipeline to **automatically detect the barcodes** from **Loggi package images**
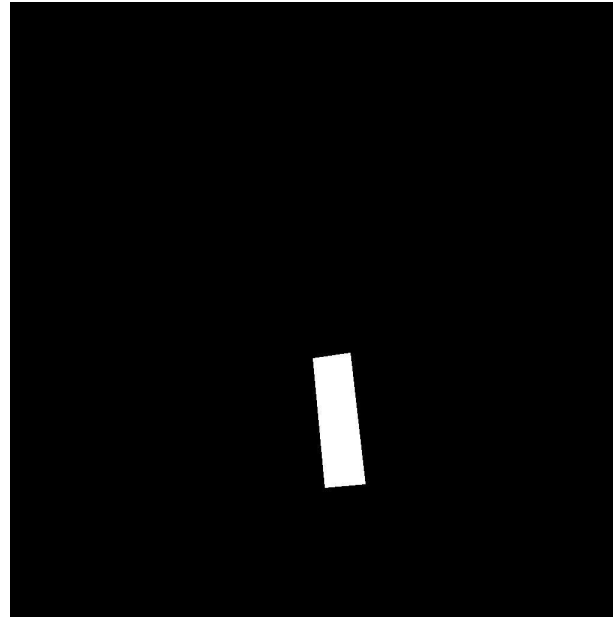

Computer Vision & Machine Learning
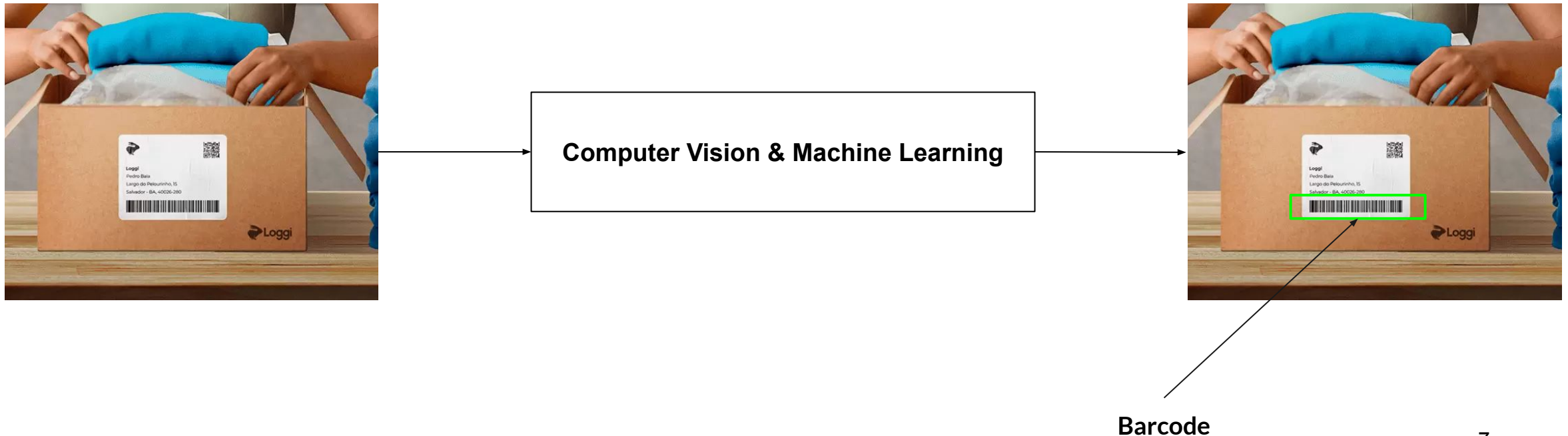
Barcode

Let's go straight to the (data) points!

You will receive an **anonymised** database composed of **images** (i.e., the packages), **segmentation masks** (of the barcodes) and the **coordinates of the bounding-boxes** (of the barcodes)

Image

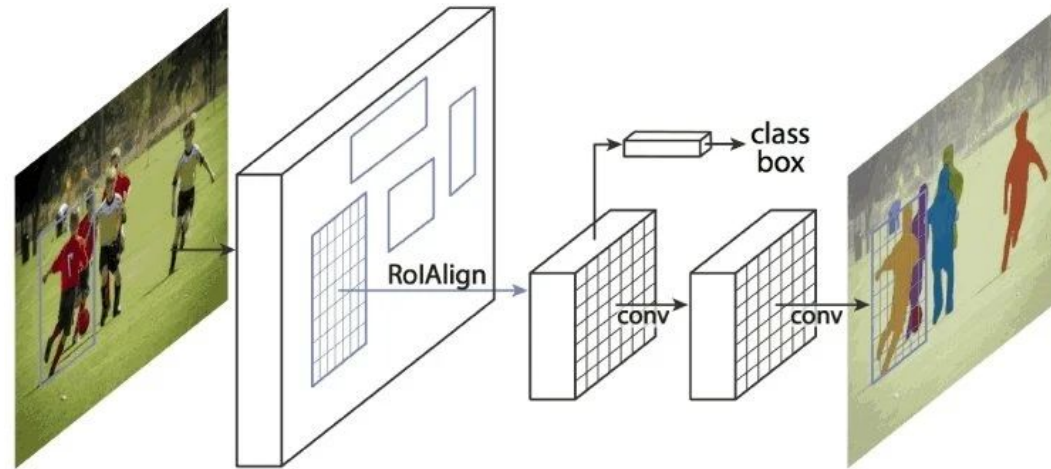**Segmentation Mask**

Bounding-Box

Baseline Solution

Baseline Solution: The baseline model

Our baseline solution is based on the **Mask R-CNN**, a state-of-the-art deep learning algorithm in terms of semantic image segmentation and instance segmentation

Mask R-CNN was developed on top of Faster R-CNN, a Region-Based Convolutional Neural Network

Mask R-CNN

Baseline Solution: The baseline approach
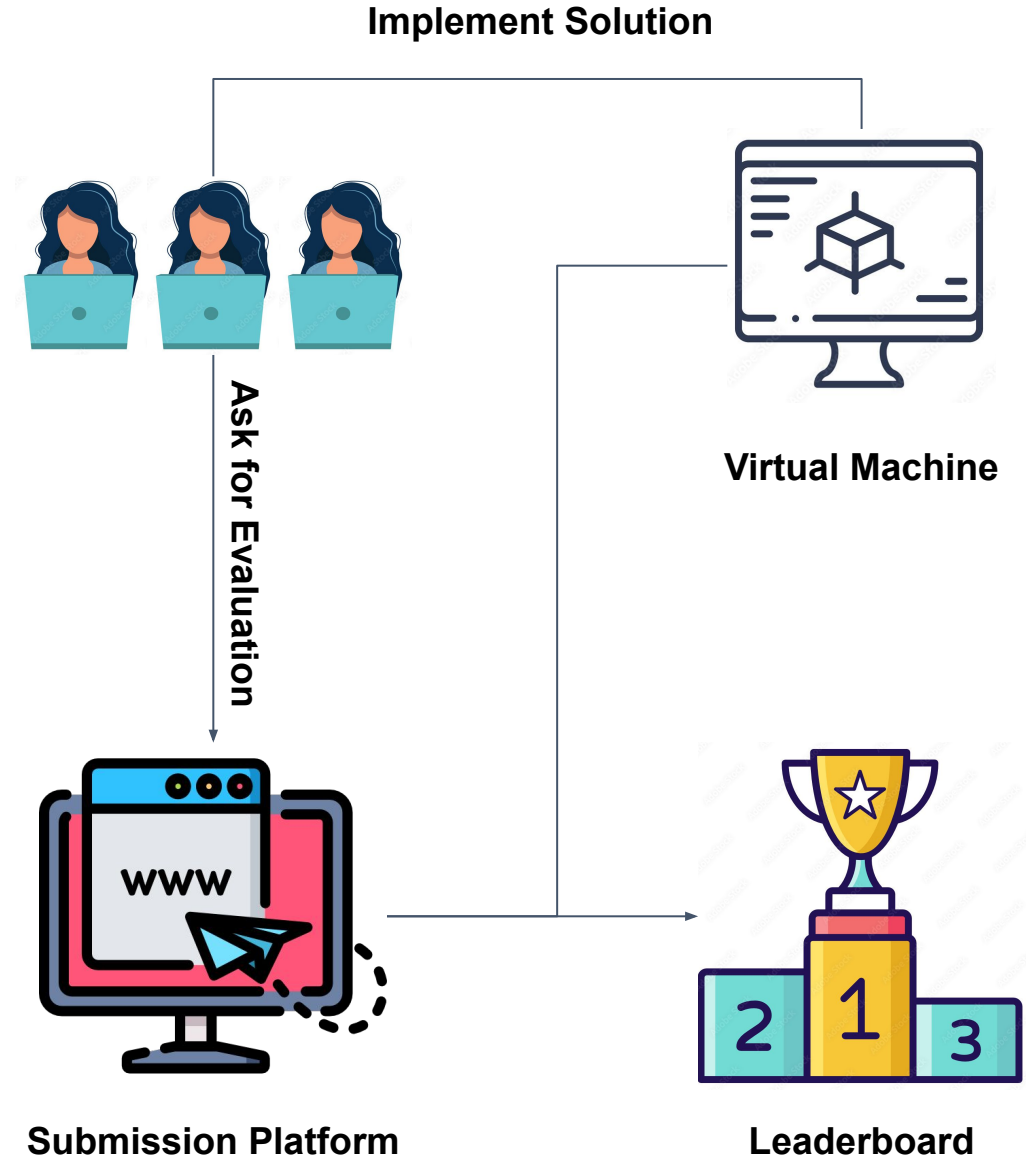

Image

Mask R-CNN

Segmentation Mask

Bounding-Box
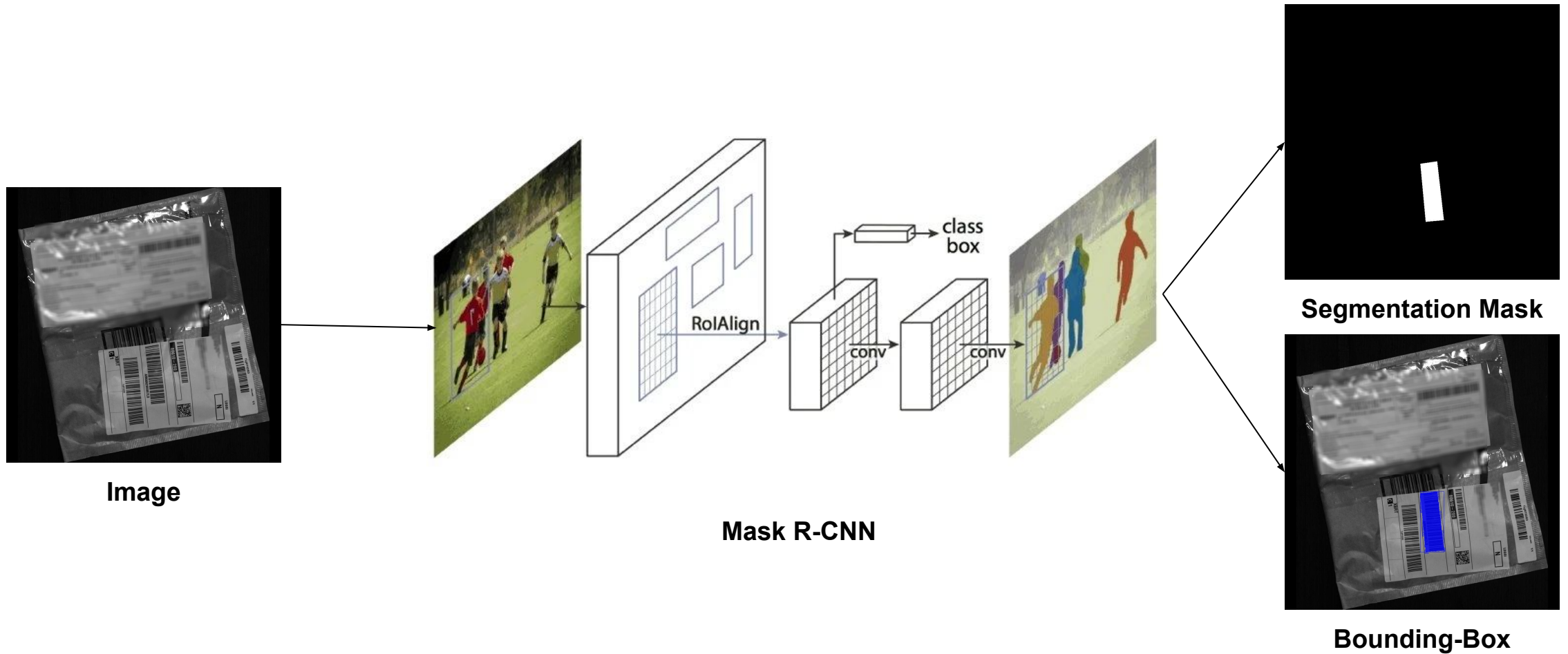
Overview

- From 11th to 14th of July you will work in-person and will be able to submit your solutions and get ranked in VISUM 2022's Leaderboard

- The best teams will create a slide deck and make a presentation to the Jury

- The best team will win **an awesome prize!**

Implement Solution

Ask for Evaluation

Virtual Machine

www

Submission Platform

2 1 3

Leaderboard

Virtual Machine - Setup

1. Each Team will receive a Google Cloud voucher-code and will have to create its own Virtual Machine (VM)
   a. We will give you a set of instructions on how to do it
   b. The main goal here is to assure that you also learn some basics of cloud computing during this Summer School!

2. Your VM will have the following specifications:
   a. GPU - 1 X NVIDIA Tesla T4
   b. CPU - 4 vcpu's (Intel Broadwell)
   c. RAM - 15GB
   d. Storage - 60GB
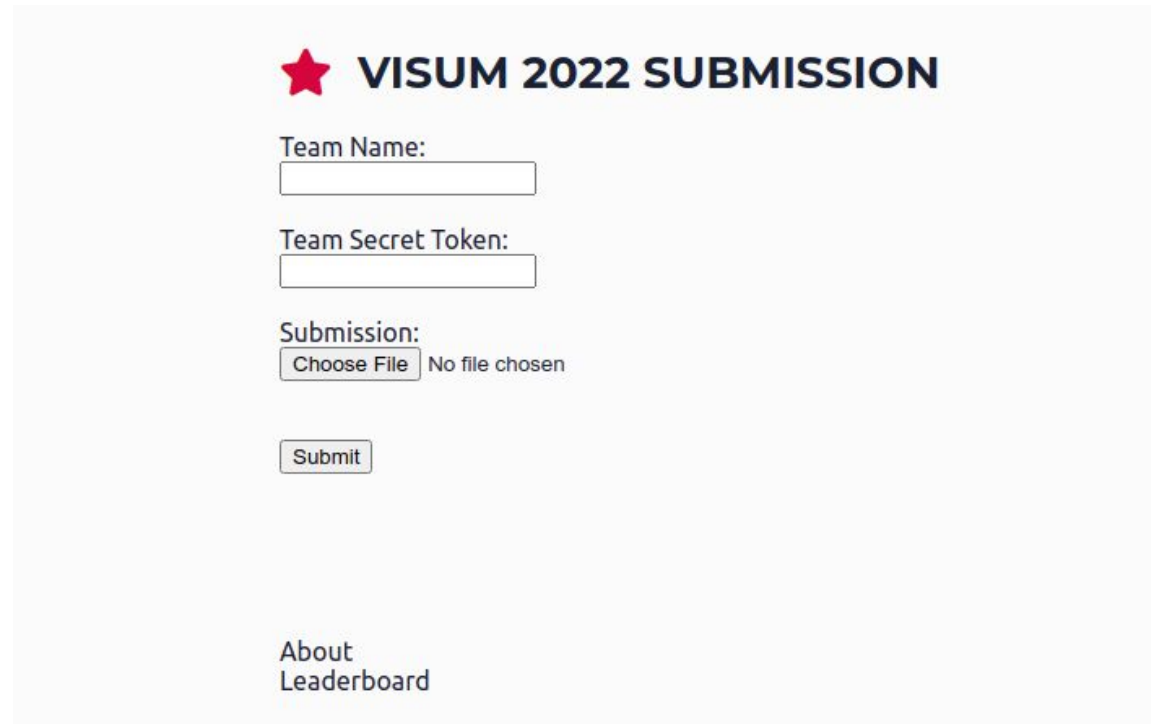
Virtual Machine - Software

1. You may/should install useful software (e.g., CUDA, PyTorch, Tensorflow)

2. You may install Python packages using "pip"

Virtual Machine - Files

After the creation of the Virtual Machines (VMs), you will have to download the official GitHub repository and follow the instructions to get access to the training data

Submission - Platform

1. We will give you access to the submission platform where you will be able to perform submissions and earn your way up to the podium!

Submission - Number of Daily Submissions

1. Each Team will have **Three Daily Individual Submissions** - each Daily Submission consists of an individual request of the Team in the submission platform

2. These are run on a **subset** of the private test data

Submission - Process

1. To perform a submission request you need to fill the form with the name of your Team and your Team's Secret Token, and upload a Dockerfile with instructions to run the prediction phase

2. After submission, the system will:
   a. Evaluate if you have reached the limit of daily submissions

   b. Run your submission on a subset of the test set

   c. Publish your results in a **leaderboard**

Submission - Leaderboard

1. All the results will be updated at our Daily Leaderboard:
   a. **Last mAP** - the mAP obtained for the last submission

   b. **Best mAP** - the best mAP obtained so far

   c. **Status** - the submission status for the Team:
      i. "Waiting for submission"
      ii. "Running submission"
      iii. "Daily submissions done"

VISUM

10 YEARS

Participation

Create and register your Team!

1. Each Team should be **composed of 3 people** and their members will have to create a Team's Name
   a. This information will be submitted to https://forms.gle/9oyimYjsgmsugvQE9

2. You will have:
   a. A Google Cloud Voucher (150$)
   b. A secret token for the submission platform
   c. Private text and voice channels in our **Discord**

Project Sessions: Discord

1. From 2nd to 11th of July, you will work remotely, and Discord will be the preferable means of communication
    a. In case of doubts, just pass by the **#request-help** channel

2. During this preliminary week, participants are not allowed to submit solutions
    a. Hence it will be the perfect time for you to make mistakes and to test the baseline solutions, implemented by Project Committee of VISUM 2022

3. We hope that everything **runs smoothly!**

Project Sessions: Porto, Portugal

1. From 11th to 14th of July, you will work in-person, hence, our team will be there to help and to discuss ideas with your Team

2. During this week, participants **are expected to submit** solutions!

3. We may use some of the Project time-slots to organise **general brainstorming** sessions

Project Presentation & Prizes

1. The best Teams in the Final Leaderboard are invited to present their approach on Saturday (16th of July)

2. These Teams will be eligible to win the competition along with the following prizes:
   a. **Amazon** vouchers (750€ each), **kindly sponsored by Protocol Labs Research**

Access and clone the GitHub repository

The official GitHub repository can be found at:
https://github.com/visum-summerschool/visum-competition2022

Download the database

Run the "download_data_participants.sh" bash script to download the database to your Team's VM

Train the baseline model

Run the "code/model_train.py" Python script to train the baseline model from the Project Committee (i.e., a simple Mask R-CNN)