

7. Machine learning workshop

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Table of Contents

[1. Introduction 2](#_Toc132116206)

[2. My application (prototype) 2](#_Toc132116207)

[2.1 Used technology and tooling 2](#_Toc132116208)

[2.2 Troubleshooting & Testing 2](#_Toc132116209)

[3. File overview 3](#_Toc132116210)

# Introduction

In this workshop we got an introduction to using machine learning and where it already is common to be used. In this document, I will explain all files that were provided by the zip on Canvas and what tools I have used to create my application.

# My application (prototype)

The Machine learning algorithm that I wanted to implement inside my application, is created to detect possible hazards for the users of my application (Mario Kart – Outdoor Adventure). The machine learning part/feature would recognize traffic or traffic signs to warn the user that is playing the app.

For the first version of the prototype, I have trained the algorithm to detect red traffic lights.

## Used technology and tooling

* The images I have used are searched on Google Images by the keywords: “Red Traffic Lights”.
* I have used Roboflow to analyse and generate datasets based on my images.
  + I marked on all 30 images what the app should recognize and added some augmentations:
    - Graphical user interface, text, application, email

      Description automatically generated
* I added the 3 datasets (validate, test, train) and generated a model for to recognize the red traffic lights.
* I added the model that was created (after 2.5 hour of rendering) inside a SwiftUI project and installed the app on the iPhone from the ISSD.

## Troubleshooting & Testing

After testing the application, I noticed the following things:

* Distance from the camera to the object is important.
* Mistakes & errors:
  + In one of the trainings images, I set the border to recognize the red light too big and therefor the app also detects orange as a red traffic light.
    - A new dataset is created with improved borders, but because of lack of time, a new prototype could not be generated before the end of the workshop (this takes about 2.5 hours for the MacBook to finish).

# File overview

* **Documentation about the workshop**   
  (Name: Documentation – Machine Learning Workshop.docx)
* **Model created in Create ML** (Name: MyObjectDetector.mlproj)
* **A folder with traningdata** (named TrainingData). Inside this folder there are 2 more folders:
  + Folder: Traffic Lights, is where all raw 30 images of the red traffic lights are added.
  + Folder: -trafic control-.v2i.createml, is where the datasets are located that were created on Roboflow with the raw red traffic lights images.
* **A project folder with the prototype version of the app, created in SwiftIUI.** This folder is called: “objectdetectorapp-main”.