**Guide to the MIPAL Neural Network Vision System**

**Márton Szemenyei**

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# Introduction

This document is a detailed guide to install and use

Our system has four major components: databases, the annotation tool the code for training networks and NaoDNN

# Using the RoboCup Annotator

## Installation

Works on all platforms

Requires Boost and OpenCV 3.3

Xcode project and makefile added, makefile should work with both make and bmake

Command to run

## Features

Brush tools, square and circular

Line drawing and polygon

Superpixel segmentation

Size parameter

Overwrite protection

Optical flow propagation

Reset, save or skip

## Cropping the field edge

Use line tool to draw line

Remove horizon, enter to save, any other button to save original

Line persists to the next image, Esc to clear

# Training the neural networks

## Requirements and install

Pytorch, torchvision, visdom, progressbar, numpy, pillow, argparse

Highly recommended to have CUDA-enabled GPU

## Training procedure

First, pre-train network on the classification set

Then, train on the synthetic dataset

Then finetune

Then optionally prune

Then run the tester to export

## Label Propagation

First, train on synthetic

Then finetune

Then prune

The valid

## Options

VGA resolution

Deep network

# Using NaoDNN

## Implemented Layers

Pytorch compatible

Convolution

Tr Convolution

Fully Connected

Pooling (Max and Average)

Batch normalization

Concatenation

Shortcut

Reorg

Softmax

Activations

## Exporting/importing neural networks

Use the tester/valid, or the function

Create config file – very important

## How to load and run neural network

Function to create and load neural net

Functions to run network