

NTUA - IMT WORKSHOP

NTUA Postgraduate Course
“Design & Construction of
Underground Works”

TUNNEL LINING FRACTURE DETECTION

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Instructors:

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Elliniko Metro



Introduction to Deep Learning, Convolutional Neural Networks , Transfer Learning

CASE STUDY: THE ATHENS METRO

Visit during the maintenance hours, fracture photos,
analysis with python (notebooks will be distributed), detect fractures



F1:96% / RE:99%
PR:92%



SHORT COURSE - WORKSHOP PROGRAM

DAY 1

Introduction

Construction method of the Athens Metro.

NATM, TBM

Final Lining Inspection Methodology

Site visit at 1.00 am:

Site visit to the Athens Metro for final lining inspection.

Acquire material that will be used during the short course.

DAY 2

Introduction to the project

History of Deep Learning

Perceptron, CNN (Le-Net5)

Developments

Transfer Learning

Introduction to Tensorflow and Keras

Project 1: My first CNN on MNIST

Project 2: Use CNN for segmentation

Project 3: Recognise pictures of cats & dogs based on ability to recognize pictures of elephants (transfer learning)

DAY 3

Project 4: Metro tunnel final lining cracks

-Python Notebook provided by instructors

- choice of the reference model

- definition of starting data

- data construction (train, validate, test)

- recovery of the model (resnet or unet or mobilev2)

- update the model (train - validate)

- application on other images

- recovery of segmented images (with starting size)