

# Thesis Proposal for IAS - Lab



Proud member of:



# Company Profile

M3E is a young company, focused on the development and application of **mathematical models** and **advanced scientific software** for the optimal solution of engineering problems.

*“We combine **Engineering, Math** and **Computer Science** to solve the most challenging problems around.”*

Field of expertise:

- Numerical Simulation
- Scientific Software development
- Model & Algorithm development
- Numerics & HPC
- Data Analysis & Machine Learning



# Computer Vision for Civil Protection

## Introduction

M3E has been selected for the POR FESR project “*Computer Vision for Civil Protection*”, a R&D project supported by *EU & Regione del Veneto* to develop Computer Vision based algorithms to detect the inception of Landslides, and help to reduce the Hydrogeological risk.

During the project, real time images will be acquired by two cameras located in the so called ‘Frana Fantoni’ (VI - Italy), in order to monitor the evolution of the landslides thanks to the acquired images.

## Objectives:

The aim of the Thesis is to develop an algorithm able to reconstruct the 3D scene, using mainly stereophotogrammetrical techniques, and subsequently compute the displacements between sequences of images, defining thresholds in order to assess the risk of failure.

## Project partners

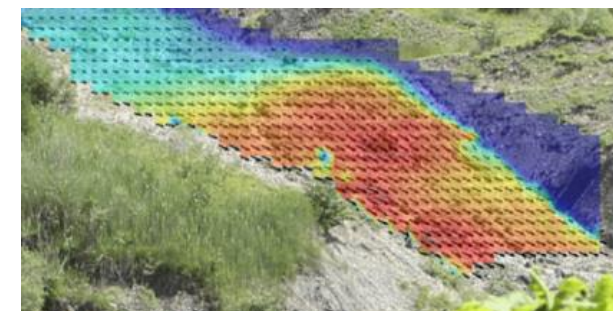
M3E, Dalla Gassa, EPC Consulting, University of Padua.

## You will learn to

- Develop algorithms for stereo images process
- Use Python & C++ for image processing
- Collaborate with a team of technicians
- Prepare Project Reports and Slide Deck in English

## Requirements

- Basic knowledge of Python and C++



# Deep Learning for Predictive Manufacturing

## Introduction

M3E has been selected as member of ImproveNet, an Innovation Network involving top firms from industry, such as Electrolux, Santex Rimar, Galdi, etc. and has been involved in PreMani project, a collaborative research initiative to develop predictive models based on Machine Learning for increase product quality and reduce failures, in the spirit of Industry 4.0.

During the project, several real time data will be collected from machineries, and the data will be used to create data driven models, able to identify anomalous conditions in the production plant.

## Objectives

The aim of the Thesis is to develop algorithms able to forecast time series, using Deep Neural Networks endowed for example with LSTM and GRU layers, and use the algorithms to identify anomalous pattern in the time series.

## Project partners

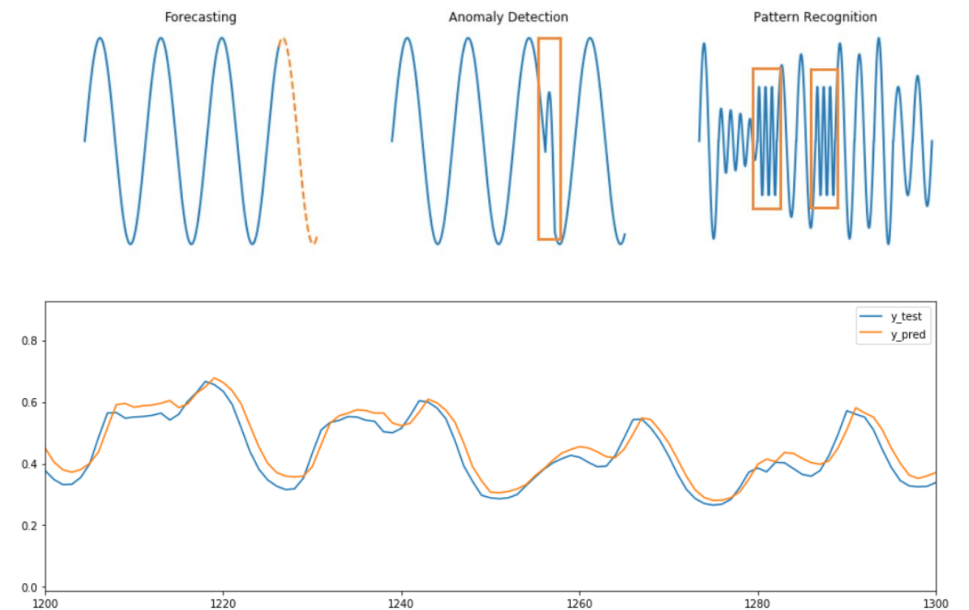
ImproveNet – Innovation Network

## You will learn to

- Develop Machine Learning & Deep Learning algorithms for time series predictions.
- Collaborate with a team of technicians.
- Prepare Project Reports and Slide Deck in English.

## Requirements

Basic knowledge of Data Science and Python



# Data Analysis & Machine Learning for Industrial IOT

## Introduction

The latest technologies and modern trends, such as Digital Transformation and Industry 4.0, are boosting the collection of real-time data from Industrial Process and Machine, which are connected from the edge to the cloud. Hence, the management and advanced post-processing of data collected from industrial plant is fundamental to extract values from the dataset.

## Objectives

The aim of the Thesis is to develop robust and efficient algorithms for the extraction of valuable information from dataset. This approach is applied in several sub-topic, such as (i) to assess the performance of the machine; (ii) to predict machine downtime before they happen to take proactive maintenance actions, (iii) to identify product anomaly and reduce defects by analyzing sensor data in the production process, (iv) to reduce waste and cost by an accurate forecast and optimizing the consume of energy.

## Project partners

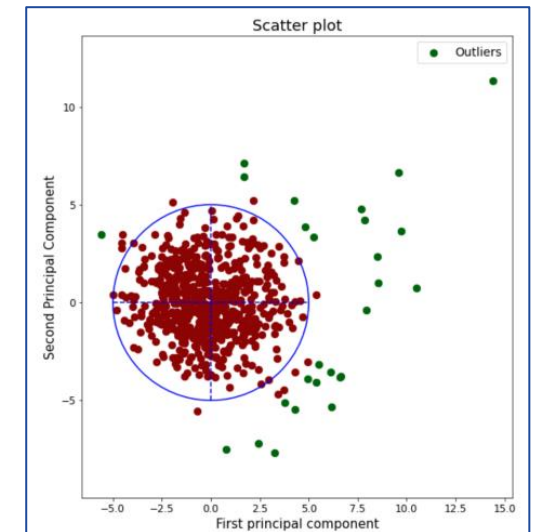
ImproveNet – Innovation Network

## You will learn to

- Develop Data Science and Machine Learning for IIOT data post-processing.
- Collaborate with a team of technicians.
- Prepare Project Reports and Slide Deck in English.

## Requirements

Basic knowledge of Data Science and Python



## More info?

Please shot us an e-mail,  
we will be honored to invite you for a coffee!

>>> [n.spiezia@m3eweb.it](mailto:n.spiezia@m3eweb.it)

Or ask to one of our last students,  
and get feedback and info about their experience.

>>> [alberto.forti93@gmail.com](mailto:alberto.forti93@gmail.com) [graduated in 2020]

>>> [michellemazzucco96@gmail.com](mailto:michellemazzucco96@gmail.com) [graduated in 2021]