**Predictive and Descriptive Learning**

**and Machine Learning Lab**

Half-term Activities Report

**Developing Deep Learning models**

Author:  **(Only ONE author!)**

*October 31st 2018* (tentative…)

*The main objective of this Report/Presentation is to demonstrate your abilities to design and develop a project using Deep Learning*

# Participation in Deep Learning activities

## 1.1.- Attendance to Deep Learning, TensorFlow and Keras classes

## *Please describe your participation in class activities*

* + I attended to all the sessions.
  + I worked around with different Convolutional architectures during the Font Recognition session with Convolutional Neural Networks. In another session, I used several stacked LSTMs to perform Human Activity Recognition with the HAR dataset that was provided.
  + I also wanted to have a taste on NLP. In order to do so, I downloaded the Twitter US Airlines Dataset. First, I researched and learnt about how to perform basic text preprocessing for NLP. Once the tweet text data was clean (remove stopwords, HTML tags, symbols…) I used Keras WordEmbedding wrapper and a Dense structure in order to perform classification. I also played using LSTMs instead of Dense layers, keeping the sequential meaning of the data intact.
  + All of these scripts are being attached.

## 1.2.- Deep Reinforcement Learning introduction

* + I attended the Deep Reinforcement Learning sessions. I’ve also been studying Keras DQN implementations for several OpenAI environments such as Cartpole, Inverted Pendulum.

# Other personal activities

# *Please, if possible give certificates or some info (documents, code, notebooks, etc.) of your personal activities.*

## 2.1.- Machine Learning activities

* + I’ve been studying the book “An Introduction to Statistical Learning” along with another really good book called “Hands-On Machine Learning with Scikit Learn and TensorFlow” which covers not only the regular ML concepts but also explores Deep Learning with TensorFlow and DRL with OpenAI.
  + This particular activity has helped me consolidate the knowledge and concepts that have been covered all along the Master.

## 2.2.- Deep Reinforcement Learning activities

* + I have been following David Silver’s course on Reinforcement Learning available at Deep Mind’s Youtube Channel. The slides and material can be found here:<http://www0.cs.ucl.ac.uk/staff/d.silver/web/Teaching_files/intro_RL.pdf>

## 2.3.- Conferences

* + I attended the TensorFlow Dev Summit that took place in Campus Madrid and where we had the chance to learn about TensorFlow’s new releases and projects in different regions around the world. During the second part of the meeting several local speakers gave us a presentation about their work regarding Image Recognition and NLP among others.

# Developing Deep Learning models

# *In this section you must describe a problem you have addressed using Deep Learning Models*

## 3.1.- Problem description

* + You can work on a personal application area or to extend any application area we have introduced in class as, for example, Human Activity Recognition from sensor signals.
  + In any case give a detail description of your application area.

## 3.2.- Deep Learning approach

* + **This is the main section of this report**: Please give as much details as possible on the methodology you have used to apply Deep Learning to address your problem. Consider:
    - Data description. Training, validation and testing datasets.
    - Deep Learning architectures (why you have selected them)
    - Evaluation. Hyperparameters selection, cross-validation, etc.

## 3.3.- Some results and conclusions

* + This is a half-term report, so you may consider to continue working on this application area for your final project.
  + You must also consider that for your final project you can work in a Team with other Master’s students.
  + So you can give some ideas for future activities.