Research fellowship on - Deep Reinforcement Learning for Financial Trading - Università Ca’ Foscari Venezia (Italian law 30 December 2010, n.240, art. 22)

The present document in English is to be considered as a mere summary of the main provisions of the notice of competition which is available in Italian at the following link: http://www.unive.it/data/12137/ The text in Italian is the official text of the notice of competition for all legal intents and purposes and, in the event of non-conformity with the present document, it shall prevail.

Description
The Department of Economics at Università Ca’ Foscari Venezia invites applications for a fellowship in:

Title:
- A Deep Reinforcement Learning for Financial Trading SECS-S/06
- scientific coordinator and tutor: Prof. Marco Corazza
- duration: 12 months

abstract:
The objectives of the research project are the creation, implementation and application of automated financial trading systems (hereinafter: FTSs) based on the family of machine learning techniques known as Reinforcement Learning (hereinafter: RL).

- Generally, an RL-based agent is characterized by four elements: a policy; a reward function; a value function; a description of the environment. This research project focuses on some aspects of these four elements. In details:
  - With reference to the policy, in the majority of the RL models the variables which specify the environment are discrete. But, in creating and developing FTSs, the state variables are generally continuous (for instance: the price, the returns and the exchange volumes of the risky assets). This leads to the necessity to provide an approximation of the value function. Generally, a widespread considered approach consists in using linear functionals. Other authors suggest to consider nonlinear functionals, so to improve the performances of the learning. In this latter framework, we intend to focus on parameterized nonlinear functionals belonging to the family of machine learning techniques known as Supervised Learning.
  - With reference to the reward function, the most used in financial application of RL models is the known Sharpe ratio. Although this ratio is a celebrated risk-adjusted performance measure, it does not seem able to capture both some aspects characterizing the current academic researches on these measures and the practices and rules taken into account by the portfolio management industry. Because of this, we intend to focus on the specification of reward functions which are jointly methodologically founded and operatively effective.
  - With reference to the agent’s overall objective, its formulation is expressed in terms of an iterative updating rule used for the calculation of the value function. A crucial role in this rule is played by the so-called learning coefficient. In case of stationary environment, in order to ensure the convergence of the iterative process, the learning coefficient must decrease over
iteration. But, financial environments are very often nonstationary. In such cases, there are not
general or particular rules for managing the learning coefficient. Therefore, we intend to focus
on the specification, implementation and application of some adaptive procedure for the
dynamic management of the learning rate.

The resolution of the Departmental Council of 2018-05-23 contains declaration of financial backing
for the entire duration of the fellowship, which will be funded with funds available in the Project
ECO.FONDOCORAZ, Professors Giovanni FASANO and Raffaele PESENTI and UE.A.DEC -
Dipartimento di Economia –

The research may be carried out in English.
The fellowship is intended to provide the successful candidate with the opportunity to pursue
his/her own research while benefiting from the range of expertise at Università Ca’ Foscari
Venezia.

Who can apply
Prospective candidates are expected to hold a degree (study course of no less than 4 years,
established by the academic regulations prior to the DM of November 3rd 2009, no. 509),
specialist degree (art. 3, par. 1, letter b), DM of November 3rd 2009, no. 509), master’s degree
(art. 3, par. 1, letter b), DM of October 22nd 2004, no. 270) and appropriate scientific-professional
curriculum for the research

Ca’ Foscari encourages applications from researchers with positive evaluation in all the criteria in
individual proposals such as Marie Skłodowska Curie Actions - Individual Fellowships/ERC Starting
Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific Young Independence
Research) or similar.
Researchers having successfully completed Marie Skłodowska Curie Actions - Individual
Fellowships/ERC Starting Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific
Young Independence Research) or similar funded projects are warmly encouraged to
apply.Duration of contract: 12 months (approximately starting on April 2018).

Stipend: The research fellowship amounts to Euro 19,541,00 per year, gross to the recipient, net
of the expenses to be sustained by the Provider. The amount may be subject to adjustment in the
event of variations in the law.

Deadline for submission of applications: by and no later than 2018-07-09, h. 12.00 noon –
local time.
If the deadline is on Saturday or on holidays, the deadline is extended to the first working day
thereafter.

How to apply:
Candidates should submit:
1. The application form;
2. A motivation letter (max 1 page) along with their CV in European format, duly dated and
signed, both to enclosed as a one single.pdf file. (http://www.unive.it/pag/28830)

3. A copy of a valid identity document (either Identity Card or Passport);

4. (If available) Evaluation Summary Reports of Marie Skłodowska Curie Actions - Individual Fellowships/ ERC Starting Grants/FIRB (Italian Fund for basic research investments)/SIR (Scientific Young Independence Research) individual proposals having passed all the evaluation thresholds;

5. (If available) Details of Marie Skłodowska Curie Actions - Individual Fellowships, ERC Starting Grants, FIRB (Italian Fund for basic research investments)/ SIR Scientific Young Independence Research funded projects;

6. All documents, qualifications and publications relevant for the selection procedure (please, see the notice http://www.unive.it/data/28825/).

All the schemes of the quoted documentation are available on the website (http://www.unive.it/pag/28830).

How to submit your application

Applications should be submitted by the online procedure, available on the notice webpage (http://www.unive.it/data/28825/)

Or submit here:

http://static.unive.it/domandeconcorso-en/accesso/dec-617-18072018

The candidate, after the uploading, will receive a submission number and an e-mail acknowledging receipt of his/her application.

The candidate if necessary could access the procedures for updating any data and materials by the link provided by the e-mail, in any case any updates must be made no later than the deadline **2018-0208-1218, h. 12.00 noon – local time**.

Please note that the University can be contacted for any support needs by the candidate until 24 hours prior to the deadline.

Please note that in case of an high number of applications and / or weight of the materials loaded by the candidates the system might become slower, Therefore it is suggested not to start the process close to the deadline.

**NB:** the University does not take on responsibility for wrong or late communication of addresses, nor for any communication problem not depending on the University.

Evaluation

Up to 100 points, specifically:
For qualifications, publications and possible tests, from 0 to 60;
For interview, from 0 to 40.
Selection procedure
The interview will be on 2018/09/26, at 09.15 AM, at Meeting Room 3, Department of Economics, Cannaregio 873 - 30121 Venezia.
The short-list of the candidates admitted to the interview, or any postponement, will be published on the University's webpage on 2018/09/03 (http://www.unive.it/data/28899/).
Candidates living farther than 200 Kms from Venice may ask to hold a telematic interview.

Information and contacts
Candidates may find further details about the application process and the research project in the official call published on the following (http://www.unive.it/data/28825/)
For further information please contact: Segreteria Amministrativa del Dipartimento di Economia, phone number: 041-2349173; e-mail: simar@unive.it