

Research fellowship on: Search engine for touristic destinations: fairness and explainability of ranking techniques based on machine learning, PNRR iNEST Project, Interconnected North-East Innovation Ecosystem - Implementing Entity: University of Padua, - CUP: H43C22000540006 (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](#)) 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 “Centro temporaneo Progetto Ecosistema dell’Innovazione” at Università Ca' Foscari Venezia invites applications for a fellowship in:

Title: Search engine for touristic destinations: fairness and explainability of ranking techniques based on machine learning

SSD or Research sector: INF/01

Scientific coordinator or supervisor: Prof. Salvatore Orlando

Duration: 24 months

Abstract: This research project is concerned with the development of vertical search engines for tourist destinations, hospitality facilities, and general territory information for tourists. Current search engine technologies use Machine Learning (ML) algorithms, particularly models called Learning-to-Rank (LtR), to re-rank the results to be proposed to users. These search engines use complex features, related to the user's query and context, as well as features that describe the resources to be searched (such as documents, POIs, etc.) to identify the most relevant results that can satisfy the users' information need. In addition, Deep Learning (Neural Information Retrieval) techniques are beginning to be used to fill possible semantic gaps related to the use of natural languages in formulating queries and descriptions of objects to be searched.

Among the most challenging research problems in this area, we have fairness and explainability of decisions made by ranking systems. Fairness is related to the datasets used for training ML algorithms, which may contain sampling-related biases, thus generating models that produce discriminatory ranking with respect to groups of users (e.g., male/female) or groups of tourism resources to be reordered by relevance (e.g., hotels/apartments). Moreover, the explainability of ML decisions, which corresponds to linking the instance features to the relevance predictions of an LtR model in a way that users may easily understand, can highlight which features of queries, user profiles, or relevant objects returned to the user, triggered the ranker's decisions. While fairness, appropriately certified, can increase the trust of users (e.g., hospitality facility managers who are interested in a fair exposure of their products in the rankings returned by the search engine), explainability can improve the loyalty of tourists, i.e., end users of the search engine.

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 master's degree in computer science or equivalent title obtained abroad and a professional scientific curriculum suitable for carrying out research activities.

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: 24 months (approximately starting in July 2023)

Stipend: The research fellowship amounts to 21.401,93 Euros per year gross percipient, net of charges to be borne by the institution.

Deadline for submission of applications: May 22, 2023 noon CET

How to apply:

Candidates shall 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 ([link](#)); a declaration must be appended in the footnote of the curriculum, pursuant to the Italian DPR 445/2000 and subsequent amendments and additions, that the information provided corresponds to the truth. Moreover, the candidates have to consent to the use of their personal data for the purposes of this selection procedure pursuant to the Italian Legislative Decree 196/2003 and to the EU Regulations 2016/679;
3. The attachments called "obligations and understanding" and "participation and compatibility";
4. All documents, qualifications and publications relevant for the selection procedure (please, see the notice - [link](#));
5. A copy of a valid identity document (either Identity Card or Passport);
6. (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;
7. (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;
8. Declaration on availability to held the interview in remote ([Link](#)) to be send via email at the following address: inest_pnrr@unive.it

All the schemes of the quoted documentation are available on the website ([link](#)).

Incomplete applications will be rejected.

How to submit your application

Applications should be submitted by the online procedure, available at the following link:

<https://apps.unive.it/domandeconcorso-en/accesso/inest22052023motori>

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 of **May 22, 2023 noon CET**.

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 a 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 **June 06, 2023, at 12.30 p.m. (Italian time)**. The interview will be held in remote.

The short-list of the candidates admitted to the interview, or any postponement, will be published on the

University's webpage on **May 25, 2023** ([link](#)).

It is the candidate's responsibility to check the admission results and, if admitted, to show up at the required date and time.

The interview may ascertain knowledge of the following topic:

- Tourism applications;
- Destination Search Engine and Recommender Systems;
- Machine learning techniques.

Information and contacts

Candidates may find further details about the application process and the research project in the official call published on the following ([link](#))

For further information please contact CESA, email: inest_pnrr@unive.it.