Final Master's Project (TFM)

Introduction

Final master's Projects (TFMs) will have a focus on research. The work to be done will involve the development of an innovative research project within a research group specialized in Computer Security and/or Artificial Intelligence of the Department of Computer Engineering and Mathematics (DEIM). TFMs will be advised by professors in the Department of Computer Engineering and Mathematics holding a Ph.D. degree. Any possible co-advisor must hold also a PhD degree.

Assignment of TFMs

In order to be assigned to a TFM, students have two options:

1. Students enrolled in the TFM have access to the corresponding Moodle space. In that space, students will find the list of TFM proposals that are currently proposed by the professors of the DEIM. If a student is interested in one of the TFMs of the list, he/she must talk to the professor who has proposed it.
2. Students can directly talk to any PhD professor of the DEIM who works in a research topic related to Security and/or Artificial Intelligence and they can discuss about a valid TFM that interests to both. In that case, the professor will write a TFM proposal and the Proposals Assessment Committee will evaluate it in order to accept or reject it.

In any case, if the professor decides to assign a student to his/her TFM, he/she will become the TFM advisor of the student and will send a message to the coordinator of the Master indicating the title of the TFM and the name of the student who is assigned to it. The coordinator of the Master will reflect this change of status in the Moodle space.

Some points to be considered:

- A student can only be assigned to one TFM.
- If a student wants to give up his/her assigned TFM, he/she must notify the professor in charge. The professor will then inform the coordinator of the Master about this situation. Finally, the coordinator will reflect this change of status in the Moodle space.
- If a TFM advisor is not able to continue with his/her work for some justified cause, the coordinator of the Master will try to find another suitable professor in order to continue with that ongoing TFM.
- When the academic year is finished, all TFMs listed as assigned will be removed and they will appear again as new TFMs ready to be proposed. If a professor wants that his/her advised student keeps a certain TFM from one academic year to the next one, he/she must ask the coordinator of the Master to maintain the assignment.

Responsibilities of the TFM Advisor

The TFM advisor will be responsible for monitoring the work of the student. He/she will initially define the objectives to be achieved and will guide the student regarding methods to be used, bibliography to be considered, etc. The TFM advisor will continually monitor the work done through regular meetings, providing the necessary guidelines, helping students overcome potential problems and ensuring that the student will fulfill the expected schedule. The TFM advisor will also check the writing of the final documentation and the preparation of the oral

presentation. He/she may also write a confidential report to be submitted to the evaluation committee, in which he/she would briefly explain the work done by the student, the skills shown, the difficulties found and any other information that may be relevant to evaluate the work done by the student.

Documentation of the TFM

The written report that will explain the TFM and the results achieved **must be written in English, using non-sexist language**. **This report will tackle the following basic points**:

1. Introduction that presents the problem being considered and the research objectives to be achieved.
2. State of the art of the research topic, explaining the different solutions that have been already proposed in the literature to tackle the considered problem being and their limitations.
3. Innovative solution to the problem being tackled, explaining the methods that have been used, the systems that have been built, etc.
4. Detailed evaluation of the new solution.
5. Conclusions of the work done and future lines of research.
6. Reflections on the ethical and deontological aspects involved in the solution provided and, if applicable, include arguments to take into account the gender perspective and the possible environment consequences derived from the implementation of the project (See the Appendix for some examples)
7. Bibliography.

The written report of the TFM will be delivered electronically via a task in the Moodle space of the TFM before the fixed deadline. Additionally, **students** must give **physical copies of the written report** to any evaluation members if it is required by them.

Instructions about how to submit the documentation of the TFM via the task in the Moodle space will be provided in the corresponding space.

Oral defense of the TFM

The work that has been done during the TFM will be **presented orally in English by the student in front of an evaluation panel** formed by three PhD professors of the DEIM. These professors will have the roles of President, Secretary and Member. The coordinator of the Master will assemble an evaluation panel for each TFM ensuring the maximum possible impartiality regarding the evaluation of the work done. The president of the evaluation panel will be responsible for fixing date, time and place of the TFM defense with the other members of the panel. The president will inform the student, his/her TFM advisor and the coordinator of the Master about the final day, time and place for the defense.

The oral presentation by the student will take 15-20 minutes, followed by one round of questions and comments to the student by the evaluation panel.

Finally, the evaluation panel will deliberate in closed session to decide the final qualification of the student, which will be a number between 0-10. In their evaluation, they will consider the scientific and technical quality of the work, the level of achievement of the proposed objectives, quality of the documentation, clarity of the oral presentation, the adequacy of the responses to all the questions delivered by the evaluation panel and, finally, the information provided by the TFM advisor in his/her confidential report.

General information for students – Final Master's Project.

Deadlines of the TFM

The deadline for submitting the written documentation of the TFM will be indicated in the Moodle space of the TFM. **Any documentation submitted outside the deadline set by the coordinator of the Master will be rejected.**

Similarly, the period for performing the oral defenses will also be indicated in that Moodle space.

Annex

Some reflections on ethical and deontological aspects involved in carrying out a computer project where artificial intelligence or computer security techniques are applied:

- Transparency: It is essential that AI algorithms are understandable and that users know how decisions are made. Lack of transparency can lead to mistrust and the perception that unfair decisions are being made.
- Privacy: The collection and handling of personal data must be done with the utmost respect for users' privacy. It is important to implement measures that protect sensitive information and ensure that data is used ethically.
- Responsibility: Developers and organizations must take responsibility for the consequences of their systems. This includes the possibility of errors in algorithms that may affect individuals or society in general.
- Fairness: It is crucial to avoid bias in AI models. Systems must be designed to be fair and equitable, avoiding discrimination towards specific groups. This involves constant review of the data and algorithms used.
- Security: In the field of computer security, it is vital to protect systems against attacks and vulnerabilities. This not only protects the organization, but also the users who trust that their information is safe.
- Social impact: Considering how a project can affect society as a whole is key. Technology should be used for the common good and not to perpetuate inequalities or cause harm.
- Informed consent: Users must be informed about how their data will be used and give their consent in a clear and understandable way. This fosters a relationship of trust between developers and users.
- Sustainability: Reflecting on the environmental impact of the technologies used is increasingly relevant. Sustainability must be an aspect considered in the development of computer projects.