Ecolog: providing resources to train engineers in responsible computing

Starting next fall, Ecolog, an initiative that brings together experts from all over France, aims to provide, via open source, a set of educational resources (syllabus, modules, MooC, tools, etc.) dedicated to “responsible” digital technology, for engineers of all profiles.

While environmental concerns and energy issues are increasingly important, the impact of digital technology is rarely mentioned. Yet digital technology accounts for 4% of greenhouse gas emissions worldwide and this figure is likely to double by 2025. Computers, smartphones, connected objects and data centers consume a considerable amount of electricity and the phenomenon will only get stronger with the constant rise of digital technology in all areas.

In recent years, various initiatives have emerged to try to limit the energy footprint of digital technology, such as the Shift Project and the Institut du Numérique Responsable (INR). It is in this context that INR and the Nantes region IT training sector, which includes the University of Nantes, IMT Atlantique and Centrale Nantes, have joined forces to meet the challenge of digital sobriety, in its broadest sense.

To do this, they have chosen to tackle the problem at its root: from the initial training of engineers. The initiative, called Ecolog, is to date unique in France. It aims to create a body of “complementary” training courses, available in open source, and dedicated to responsible computing.

"It is indeed very important that engineering programs participate in the advent of a more sober and ethical digital world, by providing students with the tools and in-depth skills that will enable them to reduce the carbon footprint in all their actions - from purchasing to software design, data hosting and the use of artificial intelligence," explains Thomas Ledoux, professor at IMT Atlantique and a leader of the project.
A complete set of training courses for the start of the 2022 school year

In concrete terms, Ecolog will propose circa ten syllabuses of pedagogical modules, each representing about twenty hours of courses - the equivalent of three days of continuing education. Among these, a common core of "general" modules, intended for engineers of all profiles, and dealing with the issues of responsible digital technologies, responsible purchasing and digital strategy. Other, more targeted, modules will be dedicated to specific jobs of the computer engineer: developers, project managers, data scientists, A.I. specialists, fullstack engineers, UX/UI designers, IoT engineers, etc. Schools, but also companies will have free access to these resources.

Begun last September, Ecolog is organized around four sub-working groups (1-state of the art, 2-common core, 3-trades, 4-referential) which are regularly coordinated under the responsibility of a steering committee of 3 co-leaders from higher education and/or from the responsible digital ecosystem. The goal is to have a complete corpus, including a website, by the beginning of the next school year, in September 2022. Subsequently, this body of work could give rise to RNCP (1) records and certifications, one or more MOOCs, or even a real "responsible digital technology" curriculum. To carry out this work, some forty experts from the four corners of France have been working since September, on a voluntary basis. All have solid experience and are particularly motivated. One of their priorities is to create a repository of skills and best practices.

More and more businesses are concerned

"Of course, it is difficult to evaluate with precision what the gain of "frugal" computing can be. It all depends on the trade-off. By using "degraded" services (e.g. a more sober website, less sophisticated route calculations, less careful construction of 3D images), it is possible to reduce the carbon footprint by about 20% - and even by 50% when using renewable energy. Very significant savings are therefore achievable," explains Thomas Ledoux, who states: "In the case of the Ethereum blockchain, for example, 70% of the deployed scripts are never called: it would be enough to change this mode of operation to reduce the minimum storage space for each participant by 60%. And by domino effect, this would lead to a very significant decrease in the energy consumption of the blockchain, as it is replicated by all its participants!"

Ecolog is already generating a real buzz. Many partners support the initiative: academic institutions (Télécom Paris, the universities of Grenoble, Lille, Lyon, Nantes, Pau and Rennes), service companies (CapGemini, Sopra-Steria, CGI), start-ups, banks (Crédit Agricole) and insurance companies (MAIF), institutions such as Dinum (2)... Ademe (3) and the Brittany region contribute to its financing. And other players continue to commit themselves alongside Ecolog. On their side, businesses are more and more mobilized on the issue of digital responsibility. They are eager to recruit better trained engineers, capable of dealing with this issue and they want it to be integrated into the training of future engineers.

For its part, in early November the Senate adopted a bill on digital sobriety and the training of computer engineers. The CTI (Commission des titres d'ingénieur) has also taken up the subject, and plans to set up courses from next September. Ecolog's approach is therefore fully in line with current concerns.

(1) Répertoire national des certifications professionnelles.
(2) Direction interministérielle du numérique
(3) Agence de l'environnement et de la maîtrise de l'énergie.
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