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MAGAZINE

WEBVALLEY (reimagined) 2020: A training program for young data scientists in the field of computational biology created by students for schools

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A new format: a remote collaborative and generative teaching innovation experience created by an international team of selected students, supported by researchers and teachers

Now in its 20th edition, this year WebValley has further innovated its format: the 2020 edition has developed entirely in a remote “widespread” laboratory, coordinated by the tutors at a Head Office hosted by Trento-based Istituto Artigianelli, for a duration of 2 weeks (16-29 August).

Furthermore, the challenge launched to participants was twofold: to work on the “traditional” proposed scientific research project and, at the same time, to transform this scientific input into an educational output, starting from the consolidated professional experience of the FBK-MPBA Unit in the development of data science based predictive models and applications to computational biology. On the one hand, girls and boys worked on a state-of-the-art unsupervised machine learning case study applied to computational biology for future applications in precision medicine, and on the other hand, they leveraged this real project-based research experience to develop a training package and a high-level toolkit, intended for their peers and, therefore, for the school system. The purpose of this training course will be to provide the basic skills, both field-specific field and across-discipline, necessary to undertake high-level courses in data science and become an attractive resource for biotech laboratories of excellence all over the world.

“The lockdown, closure of schools and online learning experiences that started between February and March 2020 have shown us that space and time can and must be interpreted in a different manner, and also that the protagonists of the school ecosystem travel at very different paces with respect to each other. Kids are fast: they adapt, accept and welcome change quickly. For its part, the School system has responded to the lockdown imposed by the health emergency by offering more or less differentiated digital and remote teaching models. While proving receptive on several fronts, however, the Italian school system has suffered from the inertia that has characterized it for decades, both during the March 2020 closure, and on the occasion of these weeks’ reopening. In

particular, what emerged was the lack of a systematic intervention on the processes of innovation, design and re-design, and of a real direction to guide it and keep its ranks.

In any case, the school system, like any other institution, had to and could experiment with a new model of work and, in the light of the experience lived, it becomes essential to bring together reflections and experiences and create a joint effort between the many players involved."

With these words Claudia Dolci and Giuseppe Jurman, directors of the school, explain the grounds on which they started for the re-planning of the WebValley experience.

"We started by asking ourselves some very specific questions: 'What do kids need? What is missing in today's school system that would get them as ready as possible for an increasingly complex and constantly evolving world?"

We therefore realized that, in order to try to give answers and propose wide-ranging solutions, it was essential to intercept the needs of the school world and understand how an institution like FBK can contribute to this change, responding to the need for innovation and renewal that the time we are living in has made more apparent and more urgent.

One of the paths the Foundation decided to undertake was to invest, learn, implement and offer models already tested and validated over the years, in order to adapt them to the new needs of the school system and share them with it."

"Among these models, the FBK WebValley International Data Science summer camp, already in its original setting, also proposes itself as an innovative educational and teaching model, where kids are not offered a traditional school experience, but actually a full immersion in research, which is carried out together with the researchers themselves.

Since the first edition in 2001, during the camp, participants have been offered basic tools and knowledge, including very technical, specialized, and high-level knowledge, which, however, are immediately contextualized and put into practice in the realization of an authentic rather than simulated research project ad hoc for the occasion. All this takes place in spaces other than classrooms, in an immersive experience where the formal and informal times of learning and exchanging with researchers and technologists alternate in a very free and creative way."

The camp management has therefore reformulated the questions of this year's challenge:

What are the essential tools, the must-haves of the new generation data scientists' profile? What is the mix of skills that makes up an essential portfolio in the industry – specifically, in this year's project – in the field of computational biology?

By choosing not to give up on WebValley 2020, FBK has sought to provide concrete answers to these questions, with the aim of providing young participants with both basic sectoral knowledge and effective operational, communicative, organizational and cross-discipline tools.

Therefore, the final product of the project was twofold:

the case study of the application of ML technologies to Single Cell Sequencing data

the EDUCATIONAL PACKAGE, consisting of theoretical lessons, practical hands-on, applications of data science tools to high-throughput omics data, and online material (tutorial, webinar, dataset).

But how did this new edition of WebValley actually take place?

“The camp – Jurman explained – included a first week of online courses and laboratories to build the wealth of scientific and technological knowledge that the young participants then immediately contextualized and put into practice in the second week of hands-on work on cases of study and datasets provided by our scientific partners. During the second week, with the support of FBK (MPBA and RIS) researchers and experts from international laboratories, the team devoted itself to a real scientific research project, combining topics of excellence with cutting-edge technology resources, such as cloud computing and shared management tools.At the same time, they extracted from this experience the constitutive elements of the training package for their peers.”

In addition, informal chat, communication, discussion and socialization events, which normally took place spontaneously and naturally in in-person editions, were included in this virtual program”, Dolci added.

Another nice new element of Webvalley was the involvement – thanks to the coordination by the Research and Innovation for Schools Unit – of a team of teachers and education experts, both to monitor the drafting of the educational output at the end of the two-week camp, and to experiment, finalize, integrate, together with the researchers, the educational product created by the WebValley team. This school-research dialogue work will go on in the months to come, with the aim of having the first experiments in the 2020/21 school year.

“In this way – Dolci and Jurman concluded – it will be possible to further fine-tune and complete the WebValley2020 educational package and thus make it attractive and operationally useful for the scientific and educational community as a tool aimed at building a modern computational biology data scientist profile.”

Starting from the 2018 edition, the team has also included students from the Pavonian Artigianelli Institute for Graphic Arts with the specific role of Communication Officers, who again this year took care of communication and reporting on the event on social networks and supported the team in preparing the final presentation of the results that was streamed on August 28, 2020.

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21 PARTICIPANTS: 18 high school students between 17 and 19 years old and 3 higher education students (ITS Volta and TAG Artigianelli). Two thirds were males, 4 foreign students and 17 Italians, of which 10 from Trentino Alto Adige (one from the autonomous province of Bolzano and the others from the Autonomous Province of Trento).

Among the project Partners of this edition, Microsoft provided participating schools with MS Teams tools for videoconferencing, as well as Teamwork and Sharepoint for documents and cloud computing tools on the Microsoft Azure platform for scientific analysis and project development.

PERMALINK

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