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In response to the world-wide breakthrough of Virtual Reality (VR) and Augmented Reality (AR), the University of Oxford has launched the Immersive Technologies Summer School in June 2018. The goal of this new programme was to introduce immersive technologies to researchers and enable them to exploit VR and AR for: public engagement, the design of new research tools and knowledge transfer.

The programme selected 15 participants, from 5 different UK universities, and provided them with a new skill set for the development of VR and AR software applications. For the selection process, each applicant submitted an idea that leveraged immersive technologies. The four best ideas have been selected and developed throughout the course. Finally, these were presented at the Mathematical Institute for the IT Innovation Challenge Showcase 2018.

The Immersive Technologies Summer School was, within the University of Oxford, an interdisciplinary and interdepartmental initiative. It was organised by the VR and AR Oxford Hub, MPLS Enterprise and the Radcliffe Science Library, and it received support from EPSRC, HTC Vive, Dell, AMD and Department of Engineering Science. Thanks to this broad collaboration, the training programme was made available free of charge to all attendees.
The Immersive Technologies Summer School involved a team of people working in various departments of the University of Oxford.

Dr Mattia Montanari and Maria Lißner have directed the programme and delivered the teaching activities with Marco Del Tutto and Domagoj Fijan. Richard Smith provided technical support in class and at the showcase event, whilst Dr Gustavo Quino Quispe helped fundraising and forging the entire course. Dr Anne Miller and Professor Clive Siviour provided guidance and support from the Mathematical Physical and Life Sciences (MPLS) Division and the Department of Engineering Science, respectively.

Special thanks go to the sponsors: EPSRC, HTC Vive, DELL and AMD. These provided financial support, feedbacks to the students, hardware facilities and software, which determined the successful development of the programme.
The summer school attracted over 80 applications from various international institutions. The 15 applicants selected came from the following UK universities:

- University of Oxford,
- University of Bath,
- University of Edge Hill,
- Brunel University,
- University of Warwick.

Most of the attendees were postgraduate students whose research is funded by EPSRC, and only a few had previous knowledge of VR and AR.

The cohort was very diverse in terms of gender, subject of studies and interests. Out of 15 participants, 7 were female. The majority had a background in Computer Science, but there was a large group of people interested in psychology and cancer research. A group of students who are developing an idea funded by IT Services, called Oxford Looking Glasses, also took part to the programme.

“A diverse audience of engineers, scientists, artists and business students, coming from 5 UK universities, and good gender diversity”
Before the course began, all students were asked to take a set of e-learning modules. These were a selection of online videos specifically tailored for each student. This allowed them to cover their personal interests in detail and, at the same time, guaranteed a coherent background to the whole cohort.

In class there was a balance of delivery between front-of-class teaching and hands-on practice. The topics covered included: user experience design (UX), game development and app deployment. Students were then divided into four groups and each group was assigned a different app to develop. This is certainly where the students spent most of the time and the results were outstanding. A significant contribution to the outcomes came from HTC Vive which provided feedback on the applications being developed.

Finally, on the last day of the course, the students presented their work at the IT Challenge Showcase: an event organised by IT Services at the Mathematical Institute. The event attracted about 100 attendees, who tried the apps developed during the Immersive Technologies Summer School 2018.
Who is not afraid of public speaking? Practising with a friend is always a good idea, but you cannot recreate the large space, the background noise and the atmosphere you will face at your talk.

Public engagement is a big challenge for many researchers. Take for example the theory of relativity: how can you explain the differences with classical physics to a broad audience?

**Virtual Toastmaster** is a VR app that puts you in a lecture theatre, with an audience that interacts with you as you present. It returns analytics about your eye-contact with the audience and can record your voice and movements.

**VR Relativistic** takes you to the bottom of the ocean where fish, crabs and bubbles move around you. A fun way to experience time dilation, just press one button and you will see everything from a different frame of reference.
**AR APPS DEVELOPED**

**Arrange** is an AR app that helps you planning your next big event by visualising the venue layout. It only requires a smartphone and you can walk around virtual shiny furniture.

The mobile app **Oxford Looking Glasses** allows users to rediscover public spaces around the University of Oxford through engaging with interactive checkpoints to discover information about a building.

The app can handle the layout for different occasions: parties, ceremonies and conferences. It also shows people walking around to help you organising the logistic on the big day!

During the summer school, the team has enhanced a sign of the Department of Engineering Science by adding information about the research conducted in all engineering sectors.
The course feedback provided by the students scored an average of 9 out of 10. Of course, there is room for improvement, but the pilot project has been effective and successfully delivered. As a result, more training courses on immersive technologies will be delivered in the upcoming academic year.

Beside the remarkable learning outcome, the summer school has strengthened the relationship between the University of Oxford and the industrial partners. This is a great benefit for all students and researchers as more opportunities will arise in the future.