Martina Mallia and Lara Demajo

Dancing with AI

Women are still a minority in the field of technology. But the strong passion these female students have for their subject — Artificial Intelligence — is making its presence felt. **HELEN RAINE** gets her head around the exciting ideas and innovative creations of these IT girls. You may need to Google some of the words they use, but the bottom line is they are at the top of their game.

I f you love dancing, but your other half has two left feet, students at the University of Malta have a solution – they've created a virtual dance partner, who can follow your moves and react accordingly.

If that's not funky enough for you, they can also use Swarm Intelligence to send virtual flying globes to rock out with you. The dancing avatar and the Swarm are the result of an innovative link-up between students and teachers in the Department of Artificial Intelligence [AI] at the University of Malta and the Performing Arts.

ARTIFICIAL INTELLIGENCE FLOCKS TOGETHER

AI students Martina Mallia, Lara Marie Demajo and Leanne Zammit all worked on the dancing avatar. They used a Kinect camera [like the one in an Xbox] to track the skeletal movements of a real dancer, Lucia Piquero Alvarez.

"We downloaded a package of dance moves and associated a few with different positions," Martina says. If Lucia was on the left, the avatar would perform a set series of moves, changing the routine when she was on the right. "This made the dancer look like she was dancing with the avatar."

Natalia Mallia worked on an AI 'flocking' algorithm, which mimics the behaviour of creatures such as birds and "applies it to a particle system that follows an individual dancer in real-time".

She explains: "The idea is that while the dancers move, their location is mapped by resolving the difference between them and a white background. The particles will gather or disperse around the dancer while avoiding collisions."

Natalia had a month to complete the work and says the greatest challenge was speed; "the algorithm together with the webcam tracking and processing in real-time caused a large delay."

In a department that is focused on technology, the link-up with the Performing Arts helped the students to ➜
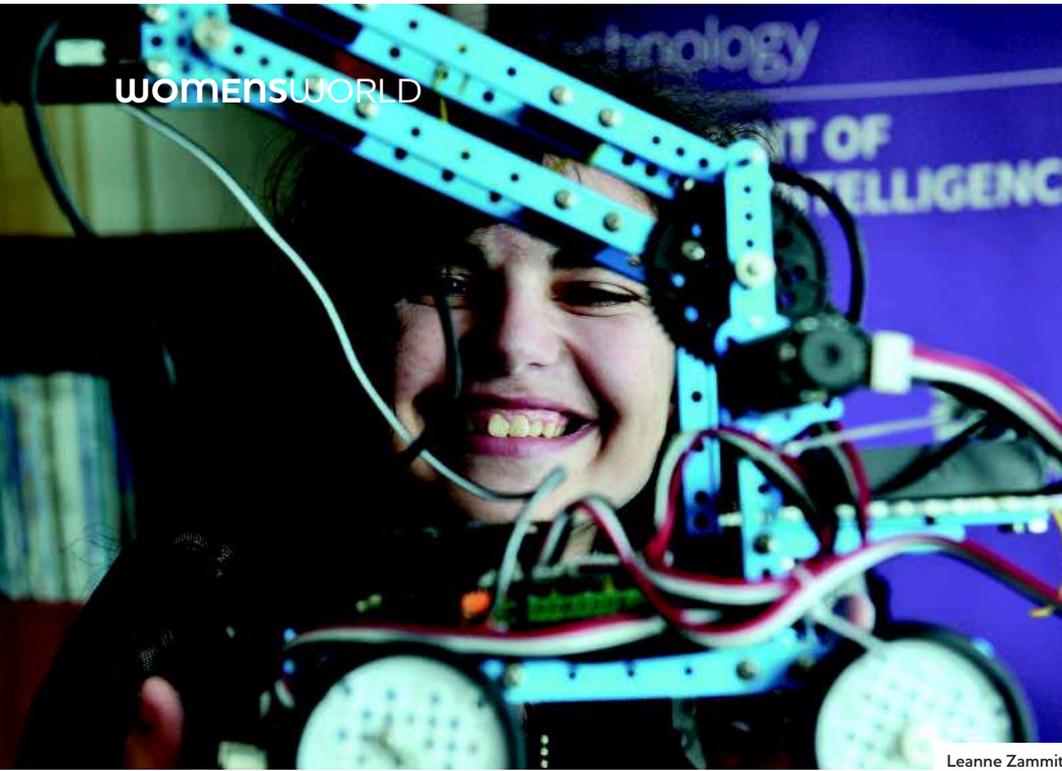
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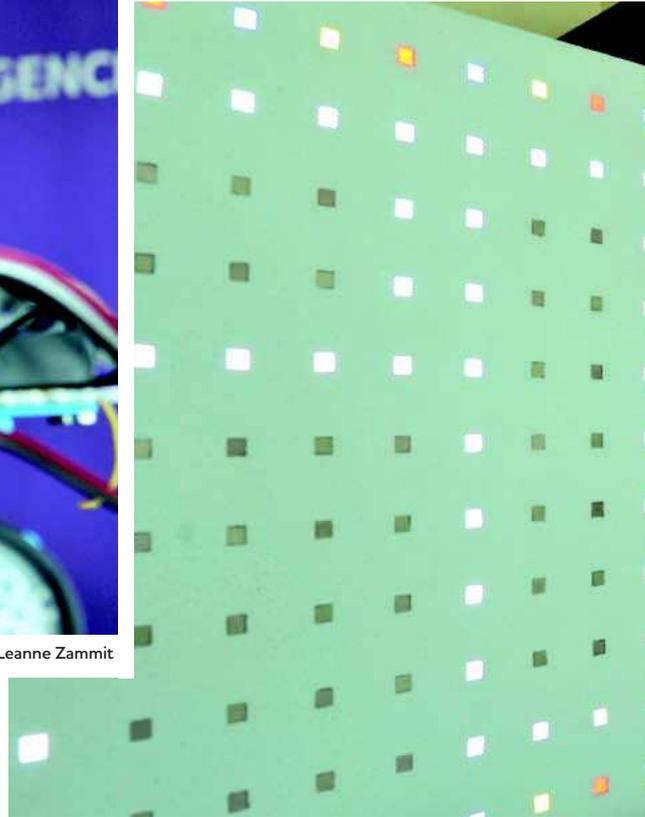
view their work in a new light. "This project made me see how many different things we can accomplish by applying simple AI techniques to the traditional 'doings' of the world… By thinking outside of the box, you can create something attractive. AI is not only used in daily tasks, but also to entertain and make the world a better place," Lara says.

THE FUTURE IS ROBOTIC

The project is under the tutelage of Dr Vanessa Camilleri. She says that we already experience AI daily. "AI has been changing our lives, but it is often cleverly 'hidden' behind popular applications."

Siri and Cortana are good examples, as is the Google search engine [which uses AI to sort through search results and 'learns' from its user] and Facebook [which uses facial recognition, textual analysis and targeted advertising].

These female students are at the forefront of a technological sea change, where self-driving will become commonplace, AI implants could make us faster, stronger and brighter and the effects of old age could be mitigated with exoskeletons, or hearing implants.

In the future, Google will better understand the context of our searches, so that instead of throwing up 26 million hits, it will filter out only the specific information we need. And technology will give us more time to be creative, relieving us of 'meaningless jobs' like cleaning the loo or mowing the lawn.

Natalia says that we're well on the way to solving "important hurdles concerning AI when emulating the brain", particularly with regard to image and natural language processing.

"I personally think that AI will take the world by storm. We already have fridges that can tell you what groceries you need to restock… In Amazon's new convenience store in Seattle, there are no cash registers or employees and …

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one simply walks in, takes what is needed and walks back out. If Artificial and Human Intelligence work together, hand in hand, we're in for some treats," Martina adds.

Lara has an idea that combines AI with a love of fashion. She describes an "interface that would tell the user which contouring product is ideal. This would take an image … to capture the face shape, skin colour, type and texture and then give a report with the ideal product. It would also display an image of the user's face with the places she should use the product on and how she would look afterwards".

TECH IN THE GENES

The passion these women feel for their subject is clear and their ideas are exciting, yet they remain in a minority – most students in this field in Malta and beyond are male.

"Out of a course of 15 second-year BSc IT [Hons] AI students, under the supervision of Prof. Alexiei Dingli, only four of us are female. I think that females tend to be

The Department of AI is the only one in the Faculty of ICT that has female lecturers: Dr Claudia Borg and Dr Vanessa Camilleri.
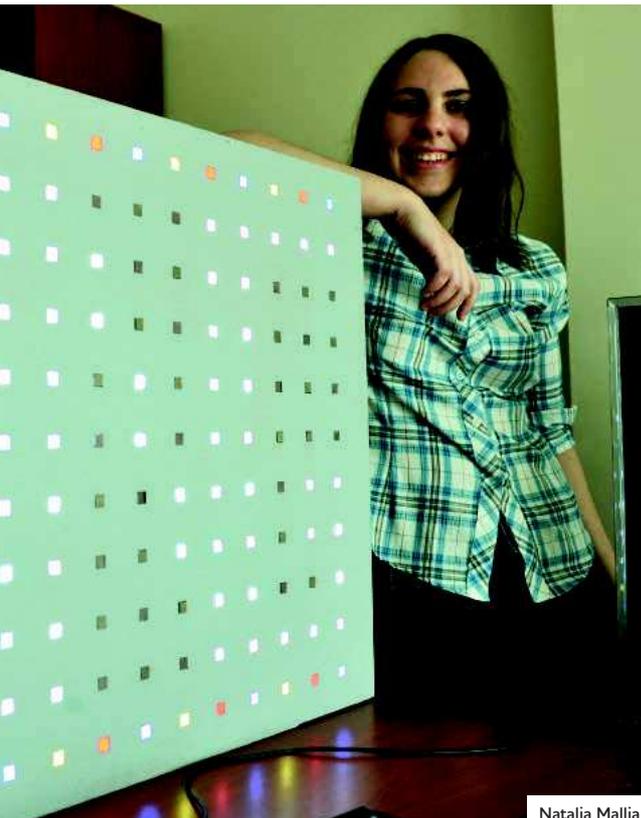
Natalia Mallia

looked down upon and taken for granted in this line of work," Martina says.

Despite the imbalance, Natalia maintains: "Everyone seems to be treated equally, from my experience. The only issue I've found with women entering the technology field is their own mindset that it's a field reserved for men. Seeing that times are changing, it is difficult to imagine finding any issues with gender in the working world."

Lara agrees. "IT is, in fact, quite male dominated and I experienced this when I studied Computer Science as an A level subject as well as at university. Having said this, my gender has never been an issue. We all had the same abilities, doing equally well in every subject [even better sometimes]. I do encourage more girls to follow."

And while Leanne acknowledges the gender skew, she says: "At this point, it is no harder for a female to get into the industry. If you're considering AI, it's a complex but very interesting field and I would definitely suggest you go for it!"

VIRTUAL FUTURE

Future project developments by the Department of AI at the university include a collaboration with the Department of Inclusion and Access to Learning, involving Virtual Reality [VR].

"Virtual Reality refers to a computer-generated environment a user can experience ... and interact with through sights and sound as if that environment were real," Dr Camilleri says. "Our projects in VR target human behaviour ... to change ... the way humans interact with

the real world after they have experienced the virtual world," she explains.

Two of the projects target teachers. Because VR can evoke empathy, Dr Camilleri says, "we believe that we can guide teachers to walk in the shoes of children who have diverse needs, such as those with autism or those coming from third country national backgrounds".

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The university also has plans to compete on the international stage when it comes to AI. Dr Camilleri says that in October of this year, "we will be launching a new MSc in AI, which specialises in Fintech, the world of BlockChain, Cryptocurrency and Algorithmic Trading. It will probably be one of the first such programmes in Europe.

"We're also thinking of launching an MSc next year in Game Based Media and Technologies, which will be taught jointly by members of staff from the University of Malta and Donau University, Austria."

FUTURE FOR THE WOMEN

For the women on the course, the possibilities following graduation are as limitless as the technology itself. "It could range from becoming a software developer to implementing AI into digital games," Natalia says.

"Jobs related to gaming, processing and understanding of spoken languages ... are all very much based on AI," Martina points out.

In the meantime, they've potentially saved a new generation of women from dancing around their handbags – our new partners might be virtual, but they sure can dance. •