

AI-driven system to increase value of recycling: Imperial College London graduates named Young Inventors prize 2022 finalists

Submitted by: European Patent Office

Tuesday, 24 May 2022

Engineers Peter Hedley and Victor Dewulf jointly named as one of three finalists of a new prize awarded by the European Patent Office (EPO) for their AI-driven recycling technologies

Their waste recognition system and robotic sorting arm can increase the proportion of waste that is recycled and make recycling more financially viable

System has been rolled out to recycling facilities in the UK, France, Germany and Italy through the inventor duo's London-based start-up Recycleye

Munich, 24 May 2022 – The European Patent Office (EPO) announces that engineers Victor Dewulf and Peter Hedley have been shortlisted for the inaugural Young Inventors prize for their AI-driven waste recognition and robotic sorting technologies. Starting out with a treadmill, a camera and a pile of waste collected from bins in Hedley's hometown of Poole, the two entrepreneurs have turned their intelligent waste sorting system into a promising business, raising millions of euros in funding.

Their two-part invention consists of a computer vision system that uses artificial intelligence to accurately identify different types of waste items, and a robotic arm that moves on six axes to autonomously pick out valuable material from a recycling conveyor belt with mixed, low-value waste. Recycling facilities can use these two elements alone or together. The aim is to increase the purity, and therefore the value, of recycled waste bales, boosting the financial incentive to recycle.

"With their twin waste recognition and sorting solutions, Victor Dewulf and Peter Hedley are making a vital contribution to reducing the world's waste and moving towards a circular economy," says EPO President António Campinos, announcing the Young Inventor prize 2022 finalists. "The speed at which they have not just developed these innovations, but also turned them into reality, is remarkable and we look forward to seeing their story unfold."

The Belgian/British inventor duo met as undergraduates at the University of Bath and is jointly named as one of three finalists of the new Young Inventors prize, which the EPO established to encourage the next generation of inventors. The prize recognises young innovators aged 30 or under who have developed solutions to tackle global problems and help reach the United Nations Sustainable Development Goals. The winners of the Young Inventors prize 2022 will be announced at the European Inventor Award virtual ceremony (<https://inventoraward.epo.org/index>), which will be held on 21 June.

Smart waste management for higher granularity, speed and affordability

Sorting waste to enable recycling is highly challenging, with one of the biggest problems being that separating plastic and other valuable waste from low-value, mixed waste is largely manual and can be prohibitively expensive. By automating the process using AI, Dewulf and Hedley aim to increase the proportion of waste that is recycled, addressing the negative environmental impact caused by the disposal or incineration of municipal solid waste.

"Our visual recognition system can run on the fastest belts within a waste plant, which our competitors

can't do," says Hedley. "The AI prioritisation of waste picking helps us get to about a 300% performance increase — and a 300% increase in the bottom line for our facilities really helps them and their margins."

Recycleye Vision, the computer vision system, uses a cellphone-quality camera mounted above waste conveyor belts to take 60 photos of the passing waste per second and send them to an algorithm, which ranks them for picking priority. Instructions are then sent to the Recycleye Robotics sorting arm, telling it where to pick up and place the waste. The entire solution can make 55 successful picks from a conveyor belt every minute.

Innovative collaboration of university friends

The invention took root in 2018 when Dewulf and Hedley were both studying at Imperial College London. Visiting a recycling facility as part of his Master's course in environmental engineering Belgium-born Dewulf realised how labour-intensive the waste sorting process was. Inspired by this and his friend Hedley's Master's course in computer science, Dewulf wrote his thesis on waste sorting automation using computer vision. His idea soon attracted attention in a market that was ripe for digitalisation and in 2019, Dewulf enlisted Hedley to develop a prototype computer vision-powered waste recognition system.

After training their initial computer vision system in Hedley's parents' garage using a treadmill covered with trash to simulate a recycling conveyor belt, Dewulf and Hedley founded their company, Recycleye, in 2019. With seed investment of GBP 800 000, they started working on developing their robotic sorting arm in partnership with the robotics firm FANUC in 2020. By the end of that year, they had deployed their Recycleye Vision system not just to France but also locally for the UK waste management firms Biffa and Re-Gen. In March 2022, Recycleye was awarded a share of funding from UK Research and Innovation's Smart Sustainable Plastic Packaging Challenge to lead an R&D project deploying the company's AI-powered system.

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Notes to the editor

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About the inventors

Victor Dewulf, 25, was born in Belgium and moved to the UK to do a Bachelor's degree in Civil Engineering at University of Bath, which he completed in 2017, followed by a Master's degree in Environmental Engineering with Business Management at Imperial College London, where he also started a PhD applying computer vision to waste. He joined Goldman Sachs from 2018-2019. He founded Recycleye with Hedley in 2019 and is currently CEO. Dewulf has won awards including the BP Centurion Award, the Letitia Chitty Centenary Memorial Prize and was selected for the 2021 Forbes 30 under 30 list for Social Impact.

Peter Hedley, 27, from the UK, completed a Bachelor's degree in Civil Engineering at University of Bath in 2017, before going on to a Master's degree in Computer Science at Imperial College London. During his civil engineering studies, he worked as a design engineer for Apex Circuit Design Ltd, leading and

training a team to modify car racing track simulation software. After his Master's, Hedley worked on applying computer vision to art galleries. He founded Recycleye in 2019 with Victor Dewulf, where he is currently Chief Technology Officer. Hedley was selected for the 2021 Forbes 30 under 30 list for Social Impact.

View the video and photo material for Victor Dewulf and Peter Hedly

(https://www.epo.org/news-events/press/european-inventor-award/young-inventors-prize/2022/dewulf.html?mtm_campaign=E

About the Young Inventors prize

The European Patent Office established the Young inventors prize

(https://www.epo.org/news-events/events/european-inventor/young-inventors.html?mtm_campaign=EIA2022&mtm_keyword=

in 2021 to inspire the next generation of inventors. Aimed at innovators aged 30 or below, it recognises initiatives that use technology to contribute toward the UN's sustainable development goals. The winner will receive EUR 20 000, the second and third placed finalists will receive EUR 10 000 and EUR 5 000, respectively. An independent jury comprising former finalists of the European Inventor Award selects the finalists and winner. The EPO will confer the inaugural prize at the European Inventor Award virtual ceremony on 21 June. Read more on the Young Inventors prize eligibility and selection criteria

([https://www.epo.org/news-events/events/european-inventor/young-inventors.html#:~:text=To%20encourage%20the%20next%](https://www.epo.org/news-events/events/european-inventor/young-inventors.html#:~:text=To%20encourage%20the%20next%20generation%20of%20inventors,)

About the EPO

With 6 400 staff, the European Patent Office (EPO) is one of the largest public service institutions in Europe. Headquartered in Munich with offices in Berlin, Brussels, The Hague and Vienna, the EPO was founded with the aim of strengthening co-operation on patents in Europe. Through the EPO's centralised patent granting procedure, inventors are able to obtain high-quality patent protection in up to 44 countries, covering a market of some 700 million people. The EPO is also the world's leading authority in patent information and patent searching.

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