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Research Success Story



S C R E E N T E C H N O L O G Y T O M I M I C T H E E Y E

European Research Council (ERC) Starting Grants support the innovative projects of highly promising early-career researchers. Piotr Didyk, assistant professor of informatics at Università della Svizzera italiana in Lugano, recently received an ERC grant for his 5-year project “PERDY” (Perceptually-Driven Optimizations of Graphics Content for Novel Displays). The project aims to create display technology that better matches human visual perception.

The potential uses of visual display technology range from entertainment to surgery and firefighting but only if we can improve the quality of the image, explains Prof. Piotr Didyk. “An ideal technology would be one that we cannot distinguish from reality. However, current algorithms are unable to mimic the human eye and this translates as poor visual quality and creates discomfort, like with the nausea that some people experience in 3D cinemas.” With ERC funding, Didyk and his team are now studying the human vision system in its entirety to determine how best to simulate it for a new generation of high-quality display devices.

Less computation needed

Part of the problem, he says, is that fully reproducing human vision requires massive computational capability. “You would have to get the images in high spatial and temporal

resolution, cover a wide view and, on top of all that, address the cues that come naturally to the eye, such as shifting to different locations in a scene or refocusing. To mimic all those processes would mean computing maybe 100 intermediate images just to compose 1 final image.”

“The Euresearch workshop forced me to rethink my presentation to answer the question: What will my breakthrough be?”

He believes a better approach is to give the human eye only as much as it can process. To do so, Didyk and his team are studying the interaction of all the different processes of the human visual system to establish vision’s minimum requirements. “We want to figure out what we need to show the

human eye and what we don’t, and only produce the content our eyes can appreciate.”

Vital perspective from Euresearch

The ERC grant offers freedom and independence, says Didyk. And although applying as an individual researcher means you are on your own, it does not mean that you have to go it alone. Didyk credits Euresearch with giving him valuable insight. He laughs as he describes the salutary shock he received at the Euresearch training workshop, which helps applicants prepare for their proposal presentation to the ERC review panel. “The experts at the workshop gave me such a hard time! And that was great because it forced me to rethink my presentation to answer the question: ‘What will my breakthrough be?’ That was just one month before my oral presentation and I’m sure it helped me win the grant.”

About PERDY



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Piotr Didyk

Asst. Prof. of Informatics,
Università della Svizzera italiana

CONTENT SUMMARY

The goal of the PERDY project is to combine hardware, computation and visual perception to bring the way our eyes actually see the world to high-quality display devices. By achieving lower computational requirements and greater energy efficiency and visual quality, PERDY aims to improve existing applications as well as enable new ones.

FACTS AND FIGURES

Project Name
Perceptually-Driven Optimizations of Graphics Content for Novel Displays

Research Area
Computer Science

Organisation
Università della Svizzera italiana

Start Date – End Date
01.02.2019 – 31.01.2024

Duration
60 months

Project Cost
€1.497 million

Project Funding
€1.497 million

Programme
Horizon 2020 Excellent Science: European Research Council Starting Grant

More Information
<https://www.pdf.inf.usi.ch/>

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