From research to startup: Polybot receives order for AI-based harvesting robotics

ELLIS Institute Tübingen and Tübingen AI Center achieve important milestone for innovation in automated agriculture

The harvesting robot project Polybot is supported by the Federal Agency for Breakthrough Innovation (Deutsche Agentur für Sprunginnovation: SPRIND) with a seven-month validation grant of approximately 220,000 euros. This funding will help the team to prepare the transition from scientific research to founding a start-up company. The project, which has so far been supported by the Tübingen AI Center at the University of Tübingen, the ELLIS Institute Tübingen and the Max Planck Institute for Intelligent Systems, combines top-level research with practical application and strengthens Tübingen as an innovation location within the Cyber Valley.

Tübingen, Germany, February 25, 2025 - The Polybot project, an initiative to develop a versatile agricultural robot, receives support from SPRIND. During the seven-month validation phase, the AI technology will be evaluated using the example of harvesting. After successful validation, SPRIND could then support the project along with private investment in the creation of a company.

Polybot at Venture SPRIND Event
In addition to the contract award, SPRIND will support the Polybot team with intensive mentoring, guidance, and strategic development support. The team will also have access to investors and will pitch their business idea to over 300 potential investors at the Venture SPRIND event in Berlin in April 2025. "This contract underlines the fact that Polybot is not an ivory tower idea, but a concrete solution for future-proof, sustainable agriculture," says project leader Wieland Brendel from the ELLIS Institute in Tübingen, Germany.

The close collaboration with SPRIND is an important success for the Tübingen AI ecosystem. Polybot is a good example of how the Tübingen AI Center combines leading research with societal applications. "This first external validation motivates our team enormously," says Martin Kiefel, technical leader of the project." With the support, we can now train our learning algorithms on the most difficult tasks in agriculture, the harvesting of fine vegetables, and test them together with farmers in the field." Bernhard Schölkopf, Scientific Director of the ELLIS Institute, adds: "Excellent research unfolds its full power when it not only creates knowledge, but also helps to solve the challenges of our time."

More Sustainable Farming
Polybot is a fully autonomous solution for growing crops, fruit and vegetables using state-of-the-art AI technology. In the future, the robot will automate a wide range of activities, from weeding and picking tomatoes or cucumbers to free pruning. By combining computer vision and robotic mechanics, Polybot reduces the need for chemical herbicides and can make smaller-scale and more sustainable forms of farming more economical. By automating manual tasks, farmers can use labor more efficiently and increase yields over the long term.

The Polybot agricultural robot in action in a lab environment (Photo: Polybot / Wolfram Scheible)

At the heart of the automation solution is an autonomous robot with a precise manipulator that can perform even complex and precise tasks, such as harvesting tomatoes. The control system is based on an innovative machine learning pipeline that allows the robot to quickly learn new tasks through demonstrations by farmers - without the need for time-consuming programming.

Innovation in Agriculture
The current validation project is assessing the practical suitability of Polybot for harvesting fine vegetables. The high precision and advanced 3D perception required for this task make it an ideal test environment. The technology aims to demonstrate that new tasks can be flexibly integrated and automated, even in areas where automation has previously been economically unfeasible.

Polybot helps a farmer weed his vegetable field. (Photo: Polybot)

Beyond technical feasibility, the project also examines the benefits for farmers. At present, the harvesting of fine vegetables is almost entirely manual, while labor shortages are becoming increasingly severe. In close collaboration with dedicated farmers, the project will define the requirements for the first market-ready product, ensuring its practical value. The goal is to demonstrate that AI-driven robotics can significantly enhance both the efficiency and sustainability of agriculture.

“The Polybot project leverages recent breakthroughs in machine learning to make polyculture farming economically viable. I am delighted that we can bring such ideas to life at the Tübingen AI Center, which are socially valuable and only become possible through cutting-edge research,” emphasizes Matthias Bethge, Director of the Tübingen AI Center. The SPRIND contract represents a significant milestone for the team and for the AI network within Cyber Valley, both strategically and in terms of communication. The Tübingen AI Center, the ELLIS Institute Tübingen, and the Max Planck Institute for Intelligent Systems are working closely together to drive this effort forward. The coming months will be crucial for the further development of Polybot, with the goal of achieving a true breakthrough innovation for agriculture.

The **ELLIS Institute Tübingen** is set to become a world-renowned center for pioneering basic research in the field of artificial intelligence. The Institute aims to attract the world's best machine learning talent, providing them with outstanding conditions to conduct research in a state-of-the-art facility located in Tübingen, Germany. The vision is part of a broader initiative, the European Laboratory for Learning and Intelligent Systems (ELLIS), which aims to build a pan-European institution for machine learning research.

The **Tübingen AI Center** is a research facility at the University of Tübingen in cooperation with the Max Planck Institute for Intelligent Systems (MPI-IS). The goal of the researchers is to advance reliable learning systems for the benefit of society and the economy. The Tübingen AI Center is home to 25 research groups with more than 300 scientists. As part of the recently founded ELIAS Alliance, they work together with other

researchers in Europe to contribute to societally valuable technologies as "AI made in Europe". The Center works closely with the ELLIS Institute Tübingen and Cyber Valley. It is funded by the Ministry of Research of Baden-Württemberg and the Federal Ministry of Education and Research.

The **Federal Agency for Breakthrough Innovation SPRIND** was founded in 2019 and is based in Leipzig. The sole shareholder is the Federal Republic of Germany, represented by the Federal Ministry of Education and Research (BMBF) and the Federal Ministry for Economic Affairs and Climate Action (BMWK). SPRIND closes a gap in the German innovation landscape: It finds new, groundbreaking technologies for the major challenges of our time and at the same time ensures that the added value of the resulting companies and industries remains in Germany and Europe. SPRIND is financed by funds from the federal budget. It is headed by Rafael Laguna de la Vera and Berit Dannenberg. Further information about SPRIND can be found here: https://www.sprind.org/en.

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Polybot weeds a lettuce field. (Photo: Polybot)