

Press release

100-fold improvement in energy efficiency expected

Austrian Consortium Contributes to Computer Chip of the Future

The Viennese deep-tech startup Viewpointssystem, the Graz-based mobility technology company AVL List and the Vienna University of Technology (TU Wien) are contributing their know-how to the development of novel neuromorphic chips. As part of the ambitious EU research project "NimbleAI", which is funded by the EU's research and innovation program "Horizon Europe" and nationally advised by the Austrian Research Promotion Agency FFG, they will develop an innovative neuromorphic sensor processing solution together with other European partners over the next three years. The aim is to advance future technologies such as virtual and augmented reality or autonomous driving and to make these technologies more user-friendly, compact and safe.

Vienna, March 14, 2023. Many key digital technologies pose enormous challenges to our traditional electronic hardware, requiring efficient and secure processing of vast amounts of data. At the same time, the end devices must be small, light and secure. The technologies of the three Austrian project partners also face the challenge to perform highly complex computer vision algorithms (e.g. for object recognition and tracking) with low energy consumption in a minimum of space: smart glasses (Viewpointssystem), validation systems for automated vehicles (AVL List) and autonomous driving (TU Vienna).

Neuromorphic chips can be an answer to this challenge and are already considered by many to be a game changer: they mimic the way the human brain works, capable of processing a large amount of information from the environment simultaneously without overload or delay. Unlike conventional computer chips, neuromorphic chips have the potential to process large amounts of data in real time while conserving energy. That makes neuromorphic chips an attractive solution for the next generation of wearable devices.



Process large amounts of data simultaneously and energy-efficiently

NimbleAI's project partners are approaching the project with specific goals: They expect a 100-fold improvement in energy efficiency and a 50-fold reduction in latency compared to conventional chips. The project's system architecture is based on and motivated by the biological eye-brain system, which captures, processes and stores optical information from the environment only when necessary.

Neuromorph chips made in Europe

NimbleAI is funded by the EU's "Horizon Europe" research and innovation program with a total of 10 million euros and advised nationally by the Austrian Research Promotion Agency FFG. About 700,000 euros of the funding will go to the Austrian consortium. NimbleAI is part of the EU initiatives for European independence and security of supply in semiconductors. A total of 19 companies and research institutions from eight EU countries are involved in the project. The findings from NimbleAI will be incorporated into the next generation of commercially available neuromorphic chips. Test chips are being produced for this purpose.

Further information: <http://www.nimbleai.eu/>

The practical use cases of the Austrian partners

The Austrian partners focus on use cases from their respective fields using scientific and technological concepts such as dynamic parallelism, event-driven sensing, adaptability and reconfigurability, and built-in fault tolerance.

Eye tracking sensors for smart glasses (Viewpointsystem)

Viewpointsystem focuses on the development of energy-efficient, high-performance eye tracking sensors for augmented and virtual reality applications and devices. As AR and VR become more prevalent, eye tracking will be critical for a safe and enjoyable immersive experience, enabling dynamic rendering, intuitive human-machine interaction, health monitoring and other functions.



"Using neuromorphic computing, we will be able to reduce the computational load and energy consumption to the point where powerful eye tracking can be integrated into any AR or VR glasses or other wearable devices," said Frank Linsenmaier, CTO of Viewpointsystem.

Validation systems for automated vehicles (AVL List)

Validating complex driver assistance and automated driving functions under all possible conditions and variations is a major challenge for vehicle manufacturers. After all, the safety and reliability of highly automated driving functions must be guaranteed in every driving situation. Based on the neuromorphic signal acquisition and processing developed by NimbleAI, energy-efficient Smart Monitors (SM) for vehicles will be developed. This will make it possible to analyze the vehicle environment three-dimensionally from different angles and to assess whether the driving decisions made by the vehicle control system are safe.



Peter Priller, Principal Technology Scout at AVL Research, is convinced that "the development of a visual-based assessment of driving behavior with fast and efficient artificial neurons will make an important contribution to safeguarding future automated vehicles".

Autonomous driving with novel neural networks (TU Wien)

In recent years, it has been shown that neural networks are well suited for autonomous driving, especially if they work with visual sensors. In the CPS Research Division at TU Wien, such control systems are tested, among others, on F1/Tenth vehicles (converted 1:10 scale model cars). The vehicles are equipped with a powerful computer that enables the efficient execution of neural networks.



"The hardware acceleration provided by NimbleAI will allow us to test our novel structures in time-critical applications with unprecedented efficiency and to find more application areas for comprehensible neural structures," summarizes Radu Grosu, Head of the Cyber Physical Systems Research Division.

About Viewpointsystem

Viewpointsystem combines pioneering technology development with scientific expertise in vision research. The Vienna-based deep-tech company develops and produces internationally awarded smart glasses based on eye tracking. The smart glasses are used by B2B customers worldwide for remote support and maintenance, for training and documentation, as well as for research and analysis, among other things. As the inventor of Eye Hyper-Tracking and pioneer of Digital Iris technology, Viewpointsystem's goal is to deepen the interaction between people and the digital world and to make Mixed Reality more intuitive. [Viewpointsystem.com](https://www.viewpointsystem.com)

About AVL

With more than 10,700 employees, AVL is one of the world's leading mobility technology companies for development, simulation and testing in the automotive industry, and beyond. Drawing on its pioneering spirit, the company provides concepts, solutions and methodologies for a greener, safer and better world of mobility.

From ideation phase to serial production, the company covers vehicle architectures and platform solutions including the impact of new propulsion systems and energy carriers. As a global technology provider, AVL's offerings range from simulation, virtualization and test automation for product development to ADAS/AD and vehicle software. The company combines state-of-the-art and highly scalable IT, software and technology solutions with its application know-how, thereby offering customers extensive tools in areas such as Big Data, Artificial Intelligence, Cybersecurity or Embedded Systems.

AVL's passion is innovation. Together with an international network of experts at more than 90 locations and with 45 Tech and Engineering Centers worldwide, AVL is supporting customers in their mobility ambitions. In 2021, the company generated a turnover of 1.6 billion Euros, of which 12 % are invested in R&D activities to ensure continuous innovation. For more information: www.avl.com

About the Cyber Physical System Research Division of TU Wien

Since its foundation in 1815, Vienna Technical University (TU Vienna) has been actively pursuing its motto "Technology for people" in a wide range of academic fields. With its focus on engineering, computer science and natural sciences it has been a partner for innovation and innovation-oriented enterprises for over 200 years.

The Cyber-Physical-Systems research group (CPS), which is working in NimbleAI, actively researches specification, design, analysis and control of cyber-physical systems. In the last few years, the group has expanded its control research into the realm of neural networks.

<https://ti.tuwien.ac.at/cps>

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