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Volkswagen Group and Google work together on quantum computers

- **The companies intend to build up specialist knowledge together and to carry out practically oriented research**
- **Volkswagen Group IT is launching quantum computing in three development areas on a Google quantum computer**
- **Further development of traffic optimization, material simulations especially for high-performance batteries for electric vehicles and new materials, and new machine learning processes**

Wolfsburg/Mountain View/Lisbon, November 7, 2017. At the technology conference "Web Summit 2017" (Lisbon), the Volkswagen Group and Google today announced comprehensive research cooperation in the field of quantum computing. The two companies will explore the utilization of quantum computers together, with aims to build up specialist knowledge and to carry out practically oriented research. As part of this collaboration, a team of specialists from Volkswagen and Google will work together using a Google quantum computer. Quantum computers can solve certain highly complex tasks considerably faster than conventional supercomputers. In some cases, a solution will only be possible with quantum computers.

Further development of traffic optimization with additional variables.

Simulation and optimization of the structure of batteries and materials.

Development of new machine learning processes to work on artificial intelligence.

Volkswagen Group IT wants to make progress in three development areas on the Google quantum computer. The specialists intend to continue the development of traffic optimization, to explore

structures for new materials, especially high-performance batteries for electric vehicles, and to work on artificial intelligence with new machine learning processes.

Martin Hofmann, Chief Information Officer of the Volkswagen Group, says: “Quantum computing technology opens up new dimensions and represents the fast-track for future-oriented topics. We at Volkswagen want to be among the first to use quantum computing for corporate processes as soon as this technology is commercially available. Thanks to our cooperation with Google, we have taken a major step towards this goal.”

Hartmut Neven, Director of the Google Quantum Artificial Intelligence Laboratory, says: “Volkswagen has enormous expertise in solving important, real-world engineering problems, and it is an honor for us to collaborate on how quantum computing may be able to make a difference in the automotive industry.”

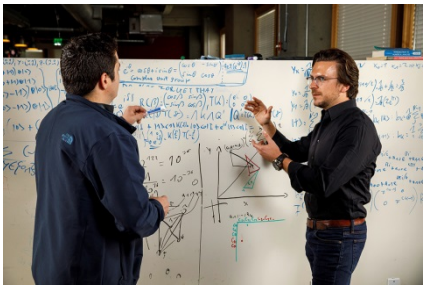
This collaboration will focus on research for practically applications. Specialists from the Volkswagen Information Technology Centers (IT labs) in San Francisco and Munich will develop algorithms, simulations and optimizations together with the Google experts. They will carry out this work using Google universal quantum computers. This architecture is suitable for many experimental computing operations.

Volkswagen Group IT development areas

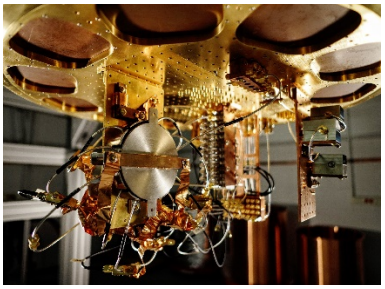
Volkswagen Group IT intends to explore the potential of this quantum computer in several different areas. In the first project, the Volkswagen specialists are working on the further development of traffic optimization. They are building on the research project which they have already successfully completed and now want to consider additional variables in addition to reducing travelling times. These include urban traffic guidance systems, available electric charging stations or vacant parking spaces.

In a second project, the Volkswagen specialists aim to simulate and optimize the structure of high-performance batteries for electric vehicles and other materials. Volkswagen Group Research and Development experts expect this approach to provide new information for vehicle construction and battery research.

A third project concerns the development of new machine learning processes. Machine learning is a key technology for the development of advanced AI systems, which are a prerequisite for autonomous driving.



CODE Lab in San Francisco: Volkswagen specialists are forging ahead with practically oriented research.



The Google universal quantum computer is suitable for many experimental computing operations. Copyright: Google, Eric Lukero.

The Volkswagen Group is the first automotive company in the world to work intensively on quantum computing technology. In March 2017, Volkswagen announced its first successful research project completed on a quantum computer: a traffic flow optimization for 10.000 taxis in the Chinese capital Beijing.

Note for editorial teams:
You will find attached a separate press folder with a simplified explanation of the basic principles of quantum computing and a detailed description of the three development areas.
You will find an interview with Martin Hofmann and Hartmut Neven at:
http://vwgroup.to/97A630gkeRX
This text and pictures are available at: www.volkswagen-media-services.com

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