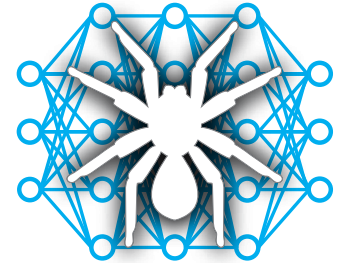




# Tarantella Spins Fast Networks – Computing Power for Deep Learning



The development of tools that facilitate Deep Learning users’ entry into High Performance Computing was the goal of a BMBF project; the share of the “High Performance Computing” department is explained by project manager Dr. Peter Labus.

**Your team has developed the Tarantella framework – an unusual name for a piece of software. How did it come about? And how dangerous is Tarantella?**

Tarantella enables artificial neural networks to be trained on high-performance computers. This makes the time-consuming process faster because more data can be processed at once. The artificial neurons are activated more frequently – so they start dancing, so to speak. Tarantella expresses this very well because it is a boisterous Sicilian dance that is danced in large groups. So a spider metaphorically spins the neural web, which is why it’s in our logo. And of course completely harmless!

ing the neural network among the various computers of the supercomputer. Support for the performance evaluation of our software came from the Center for Information Services and High Performance Computing (ZiH) in Dresden. And finally, the University of Heidelberg: The team dealt with application scenarios of particularly large neural networks, for whose training Tarantella is needed.

**So the framework is ready to use. What application areas have emerged?**

Neural network training is becoming increasingly relevant as the computing time invested in AI grows exponentially. This has enabled many breakthroughs in speech and image processing, which we are already using in social media, online shopping, but also in the smart home. Science also benefits from the use of large neural networks, e.g. cosmology, climate research, particle physics. Our goal was to make supercomputers usable by Deep Learning users without assuming knowledge of these systems (or of parallel programming), thus democratizing the development of new AI solutions. Tarantella makes this possible by building on one of the most widely used Deep Learning frameworks – TensorFlow – and its interface. Existing AI applications can be ported to run on a high-performance computer with minimal changes due to Tarantella.

## What can Tarantella do?

Besides the already mentioned feature that neural networks can be trained faster with more computers, we also support the training of arbitrarily large neural networks. This was previously not possible due to the limited memory of a graphic card. Now, even deeper neural networks can be trained, which can learn more complex mathematical functions and thus solve more difficult problems. We were supported on the one hand by the German Research Center for Artificial Intelligence (DFKI), which dealt with the issue of partition-

## Contact

Dr. Alexandra Carpen-Amarie  
Department “High Performance Computing”  
Phone +49 631 31600-4996  
alexandra.carpen-amarie@itwm.fraunhofer.de



Further information [www.itwm.fraunhofer.de/HP-DLF\\_en](http://www.itwm.fraunhofer.de/HP-DLF_en)



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