

Google adopts Swiss-made voice recognition technology

The Recurrent Neural Networks developed by the Dalle Molle Institute for Artificial Intelligence (IDSIA, USI-SUPSI) constitute the foundations of an important technological innovation announced recently by Google through an official release (<http://googleresearch.blogspot.ch/2015/09/google-voice-search-faster-and-more.html>) and financed by the Swiss National Fund for scientific research.

The new generation of speech recognizers, used by Google applications on both iOS and Android, are faster and much more accurate than the traditional ones, especially in noisy environments, and require less computing power. Used in various applications, they will drastically improve human-machine interaction for billions of users. Behind this development lie the “Long Short-Term Memory” (LSTM) recurrent neuronal networks developed in Munich and Ticino by the team of Jürgen Schmidhuber, professor of the Faculty of Informatics at the Università della Svizzera italiana (USI), operating through IDSIA, the USI and Scuola universitaria professionale della Svizzera italiana (SUPSI) affiliated with the SUPSI Department of Innovative Technologies.

The model published by IDSIA trains the machine to learn sounds and words through millions of examples. It is in fact a neural network inspired by human brains. Prof. Schmidhuber and his team devised special neural network architectures with recurrent connections to learn to memorize previous observations for long stretches of time. A training method called *Connectionist Temporal Classification* is used to optimize performance. For its new generation of speech recognizers, the renowned company of Mountain View has adopted these innovations, citing the original research works.

These and similar techniques have recently won the Institute nine prestigious international competitions. Google and other important companies such as Microsoft, IBM and Baidu are currently using LSTM for several applications such as automatic translation, image recognition, and natural language analysis. Last year Google acquired the machine learning company DeepMind, which counts four former members of Schmidhuber’s group among its founders and staff.

More Information

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Swiss National Fund paper: <ftp://ftp.idsia.ch/pub/juergen/icml2006.pdf>