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The European Patent Office
Erhardstrasse 27
D-80298 MUNCHEN
GERMANY

Parma, 23 December 2002

Subject: European Patent Application n. 93914555.3 (Lake Technology Limited)

We have seen on the EPO web site that You are close to granting to the applicant the European Patent in the subject.

We must object both on the merit and on the procedure, as follows:

1) On the merit

Most of the claims refer to what was already well-published at the priority date in 1992, and thus cover prior art. Indeed, the claims are so generic, that they do include three well known and widely employed methods of performing the convolution of a signal with a time series of coefficients (which can also be called, globally, an "impulse response"):

a. execution of the sum of many multiplications (that is, using the simple formula: $y = x_n \cdot a_0 + x_{n-1} \cdot a_1 + x_{n-2} \cdot a_2 + ... + x_{n-N} \cdot a_N$)
b. executing the multiplication of the spectra of the signal and of the impulse response, each obtained by means of an FFT, followed by an inverse FFT for recreating the time-domain ouput signal. This algorithm is known in two different variations (overlap-and-save and overlap-and-add), and both are published on textbooks since 1975 (see, for example, Oppenheim-Shafer), and implemented in commercial products of various makers since at least 15 years.
c. The same as point b., where the impulse response is preliminary subdivided in M blocks of equal length, each being employed as a separate filter, and afterwords summing the results of these separate convolutions (the sum can be performed either in time domain, after the IFFT of each blocks, or in frequency domain, prior of the IFFT – the second is more efficient).

We were aware of these three basic methods since the end of the eighties, and we are teaching them to our students since then. Specifically searching for prior art, references even from the sixties can be found. We have also released software based on these algorithms, both as freeware and as commercial software (Aurora, available since 1993 – www.ramsete.com/aurora), and we are aware of many other software tools employing the same algorithms, including widely used, general purpose programs such as Matlab (signal processing toolbox, function **fftfilt**), Hyperception, etc. Some producers of DSP hardware, such as Texas Instruments, Motorola and Analog Devices, release free demo applications for their DSP units which perform the convolution (also called FIR filtering) with one or more of the above basic algorithms

Concerning claim 15, the one that covers non-uniform partitioned convolution, independently published by Gardner, Sommen and others in the early to mid nineties, we

must admit that we did not found any prior art in our brief search. This is the only part of the patent that might be considered new, if a proper prior art search will confirm that nothing was published before the priority date.

However, not-uniform partitioned convolution is a too trivial extension to the known prior art to be classified as an inventive step. Knowing uniform partitioned convolution and being faced with the problem of very long convolutions, which became practical only at the mid-nineties, making the partitions non-uniform appears as the natural and absolutely trivial modification of the classic algorithm: thus it cannot be called an inventive step.

For this point, there may be different opinions than ours, and this shall be further discussed. However, concerning the remaining claims that cover the well-established prior art, the case is clear and the facts are overwhelming: Lake Technology embraces with their claims well-known and widely employed methods for performing convolution, which were established well before the priority date. They do not make clear that they are claiming the patent only with regard to the not-uniformly-partitioned convolution, instead they adopted a confuse and generic multiple-claim approach, which apparently covers everything (a lot of prior art and some trivial advancement achieved by them).

This is not acceptable.

Consequently, we request that the three previously known algorithms are not claimed to be covered by this patent, and are explicitely described in the "prior art" part of the patent. This will leave the patent without substance, the remaining claim on making partitions non-uniform is a trivial extension of the prior art, and does not fulfil the requirement of being an inventive step. Thus, we oppose the grant of this patent.

Note that this request is only preliminary, further prior art searches may bring further facts to the table. In fact, we are of the opinion that also the not-uniformly-partitioned convolution was known and employed well before the priority date, but we still need to find proof of this.

2) On the procedure

Looking at the documents available for download on the EPO web site (http://pfipreview.epoline.org/), we have found that in various occasions You did ask to Lake to make their claims more clear and circumstanced, giving a better explanation of what they did invent. It does not appear, however, that they accepted the substance of Your request, as they did reformulate their claims in a way which, if possible, even extends more their scope, so that they actually are very close to claiming even the patent on the sum operator and on the multiply operator….

Furthermore, a very pertinent and well supported third-party observation was filed (document recorded on 26/04/2002), which discusses in great detail the existing prior art, and concludes to results very close to the ones explained here in the previous point 1). This did not cause apparently any reaction, neither from you or from Lake Technology Limited. The document gives clear evidence of the existence of prior art, it demonstrated Your negligence in the research of such a prior art, and it also demonstrated the Lake's attempt to get a patent covering already existing technology: however, this document was simply ignored.

This again appears to be due to your negligence.

As a consequence of the above facts, we warn You of the possible consequences which could happen to the EPO, and, more in detail, to their officers whose negligence caused this situation, namely to the members of the Examining Division:

Chairman: Bourdier R P P
2nd examiner: Wright J P
1st examiner: Dietsche S A

You must understand that, if the requested patent will be granted without modifications, covering previously known technical solutions which we are currently employing for our institutional goals (research, teaching, and publishing), we will react directly against the EPO and its officers, for violation of the regulations about the grant of European Patents, for evident negligence, and for omission of due acts. This action will be pursued in any possible court (administrative, penal and civil), for protecting our freedom of teaching, the results of our research, and our economical assets.

However, please understand that our position is, in principle, very cooperative and open: we will be happy, if requested, to provide You with a more detailed technical analysis of the patent's claims, with a deep bibliographic research, with an huge list of products actually available which employ the technology (improperly) claimed to be patentable, and with a list of Internet references where some of these products are available for download (some even for free and in open-source format).

We are even available, with proper pre-advice, to come to Munich and to explain directly to You everything (and without any expense for You). We do not think that we can be more cooperative than this.

It is normal that the applicant always attempts to get accepted as many claims as he can, and as generic as possible. So we do not see anything substantially wrong in their behaviour. We instead think that it is Your fault if the actual situation did occur, and consequently it is due to You to act properly and quickly, before the consequences do arise.

Sincerely yours. And Merry Christmas!

Prof. Ing. Angelo Farina