

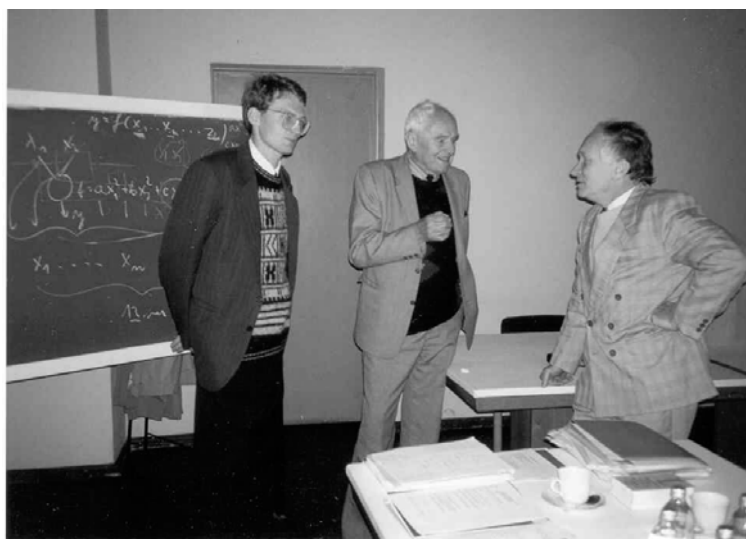
## ALEXEY GRIGOREVICH IVAKHNENKO

Miroslav Snorek

*Czech Technical University in Prague,  
Prague, Czech Republik*

With the name Alexey Grigorevich Ivakhnenko I met firstly in eighties (last century). We were collecting at that time materials for the university course Artificial Neural Networks. The main impulse for my deeper studies of his Group Method of Data Handling (GMDH) was a notice that they are “self-organizing”. Later on I found that this property means something else, than I expected at that time. But later on we have started our own research in Data Mining based on original Ivakhnenko’s ideas.

It is known that GMDH nets are based on induction. Not going into the details (see the original GMDH literature, e.g. [1]), they search by different heuristics (COMBI, MIA) for most promising subspaces in the space of possible solutions. Through self-organizing they improve the reached solution quality. In the case that reached solution does not meet the expectations, the net topology changes (a new layer of processing element is added). This process follows subsequently whether even the new solution does not generate the expected solution quality. Processing elements in a particular layer of the GMDH architecture are equal in each layers, it means they are of the same approximation polynomial order (MIA). In the other case (COMBI) new units do apply higher order approximation polynomials to the original inputs.



In Dresden in 1993. On the picture (from left):  
G. A. and A. G. Ivakhnenko, Czech scientist M. Jirina

Our first contacts were only passive, but this situation has to be changed soon. At the beginning we were only professionally motivated by GMDH literature sources. In 1993 we, it means CTU University in Prague people together with Czech Academy of Sciences colleagues, have started to prepare a common scientific project with people from Ukrainian Academy of Science. The key person was German professor Johan-Adolf Mueller affiliated at that time in Dresden at FTW (FRG). We found soon that Johan-Adolf was supervised by A.G. Ivakhnenko earlier in his PhD study time. In Dresden that was my first time personal contact with Alexey Grigorevich. I remember well, how unforgettable my discussions with him were. Those several days of common grant proposal preparations were really nice. A great pity not only for me was the fact that the proposal was not accepted.

The second of my professional contacts was indirect, but also intensive. One of my doctoral students, namely Pavel Kordik, improved his study time by international experience stay in the New Zealand. His activities there were not only enlarging his intellectual level. He started there as mandarin fruit harvester. This activity as I understood from his later given stories is mostly manual, hard and monotonous. One has enough time for thinking and therefore no doubt that Pavel noticed a local guy which activity was more interesting. He was collecting input data for water supply modeling of mandarin tree growth and fruit production. The goal of this activity was possible improvement of the harvest quantity with water consumption optimization. Based on the ideas exchanged a common research project started. In fact here started the first ideas which led to the formulation of Kordik's GAME neural nets [2]. Dissertation was successfully defended in 2007. Pavel visited several times the Ukraine to GMDH investigating home place to let know results of his performed research. Here he often met Alexey Grigorijevich.

A.G. Ivakhnenko, father of the discipline, was actively visiting scientific events concerning inductive modeling not only in Ukraine. Even in his high age he was brilliant in discussions with his young colleagues. I personally admire his overview and knowledge about who is interested in what.

My next, but unfortunately last personal contact with Alexey Grigorievich, was during the European Simulation Multiconference ESM in

2001 in Prague, Czech Republic. We invited him as Invited Speaker for the Artificial Neural Network Conference. Despite he was nearly 90, we were pleasantly surprised obtaining his enrolment and later of his arrival accompanied by his son Gregory.

I do remember as to be today that the official Conference Dinner took place in Cabaret of the famous Beerpub „U Fleku“. The atmosphere was there really friendly. All over 200 participants were close to the Midnight cheerful, but also tired. Therefore a surprise for me as the Conference Chair was that someone invited me to prolong the event on a private party. Shocking was that the invitation was sent to me by Alexey Grigorievich and it was presented to me by his next formerly doctoral lady student. So we together with my wife achieved late in the night in the private flat above the Vltava river, where lived Vaclav Havel family. The hosting lady was the wife of younger of them, Ivan. He belongs by the way to the top of IT experts not only among Czech Republic residents. We later understood that all approximately 20 late-night party members are former Alexey Grigorievich PhD students now living in different parts of the world.

Imprints of Ivakhnenko's intellectual capital are clearly evident in many today used machine learning methods. He really strongly influenced not only his students, but he succeeded to enforce his

## **Literature**

[1] <http://www.gmdh.net/articles/index.html>

[2] <http://cig.felk.cvut.cz/research/publications/kordik-dizertace-1.pdf>