

AN OPENING ADDRESS

Our workshop bears an audacious title, "Architecture of Neurocomputers", and to open it is not so simple a job.

I will begin from afar. Archimedes is usually attributed the enthusiastic expression: "Give me a fulcrum and I'll move the Earth". One and a half dozen centuries were needed to get a more sober, realistic formulation of the Golden Rule of Mechanics: "You lose in speed what you win in force". This century has seen at least two attempts to move the Earth. First atomic power and then computer technology pretended to be the lever. Each Mechanics has its own Golden Rule, but one needs to grow up to understand it. Computer Science is painfully giving up the Universality myth, and I hope that our workshop will be one more step on this winding path.

When going from Moscow to Pushchino, you have crossed the Oka. This is not simply a river, this is an ecological border. On its left (North) bank, the trees clamber up the hills to get more sun, and on the South bank they descend into ravines, down to water. What a pity that "engineer" Igor Andreevitch Poletaev is no longer with us. His ideas about limiting factors are up-to-date now. Computer Science also has its limiting factors, but these change in time, not in space. First it was speed that was the limitation. Then mountains of "printed matter" forced the user out of the computer hall, but "extraction" of knowledge from heaps of information was not easy even in the quiet of a study. Then graphics became the bottle-neck. First diagrams were made by hand, then plotters emerged, and at last we got video-displays. The means oppressed the field. Many games, animated pictures and other models were created. Only a few researchers continued investigations of real biological problems, because this was very painstaking.

Nevertheless, calculations were needed, and people began to talk about interactive-systems. This is an important point. For the first time the weak point is not hardware. User and computer begin to be conceived as partners, each with their own fields of activity. The user is assigned the role of the intuitive (right) cerebral hemisphere, and the computer that of the left (logical) hemisphere. The terrifying ghost of a man-computer hybrid loomed up in the minds of people, but through the cybernetic apocalypse of this image the contours of a realistic hybrid computer system

appear. Its analogue ("intuitive") component gives a solution roughly approximated to what is desired, which is transformed to a number by the digital ("logic") component.

It is curious that such a scheme does not seem to confront "universality" and "specialisation". Digital information may be universal, or at least be composed of universal blocks. The weight of specialisation falls wholly on the analogue component, which, besides, can be changeable or readjustable. Therefore, it may turn out that the neurocomputer is a tentative name for a controlling superstructure for such a "vegetative" hybrid. The first such hybrid exists already - the example I have in mind is specialised image processing systems ("eye is part of the brain taken outwards").

In conclusion, I wish our workshop every success and hope that it will confirm (or refute) these sweeping considerations.

Thank you for your attention.

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