

25 November, 1997

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Dear Dr. Al-Shamlan,

I want to thank you for inviting me to participate in the Kuwait Prize selection process and for the kind hospitality you and your staff provided during my visit. My biophysics colleagues and I appreciated your spending time with us in your office and hosting the luncheon at the Kuwait Towers. Altogether, this trip was a unique, memorable, and rewarding experience.

I would like to take this opportunity to inform you of a significant sideline during my visit. A few months ago, I had asked Mansour Hamedi if it would be possible for me to see anyone who might be interested in the innovative human-computer interface work I have been involved in for some time now at Syracuse. We are applying this approach largely to young people with severe physical disabilities.

We are currently working with two quadriplegic children. One is a high-school student who is a brainstem quadriplegic and is thus unable to move his head (or anything below), or to speak. We have enabled him, in a preliminary way so far, to type, vocalize, and otherwise control a computer and devices connected to it, by changing his facial expressions alone. We are also working successfully with a girl aged seven who is a cerebral-palsy spastic quadriplegic. We have developed pressure sensors and a custom joystick that enable her to control the computer with her hands and feet.

Our general approach involves low-cost sensors, transducers and mounting hardware; modular custom interfaces that connect these to the computer; and some remarkably powerful software (*NeatTools*) we have developed that is highly modular and extensible. It features a modern "visual programming" environment, in which the designer can customize a new configuration quickly using a graphical user interface without having to writing a single line of computer code. Incidentally, we also have a prototype system — an "instrumented learning environment" called *SmartDesk* — for children with mental and cognitive disabilities too; this has some technical overlap with our other system.

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While I was at KFAS, Mansour referred me in this regard to Dr. El-Shareedah, who was our principal contact and mentor in connection with the Kuwait Prize process. Dr. El-Shareedah accompanied me last Tuesday to meet with KISR Director General Dr. Al-Otaibi. I demonstrated to them our software and some of our custom sensor and interface devices I had brought. I also met with two KISR Engineering Division department managers, Naji Al-Mutairi and Hani Qasem, both of whom I learned had played a leading role at KISR in developing systems for the deaf and blind. Their computer-based bilingual (Arabic-English) Braille system developed together with IBM has been adopted by a number of other countries with Arab citizens.

Hani arranged for me to meet Wednesday morning with Salwa Al-Waqyan at the Kuwait Special Schools. She is the superintendent of the Physical Therapy Department. I gave Salwa a brief computer demonstration and left her with an information packet I had brought. I also met several of her wheelchair-bound students, all of whom were a pleasure to interact with personally.

Salwa also showed me a striking video of one student, Bader Al-Khamees, who is afflicted with an extremely rare progressive degenerative neuromuscular disorder. His two younger brothers, one of whom I met, are similarly afflicted but at earlier stages. Bader's hands are curled inward, and all his movements are very slow, making a keyboard an inappropriate input device. Although he is known to be highly intelligent (Salwa described him as a genius), he is currently out of school because he is physically unable to answer examination questions in an acceptable time frame. He is "unable" only for lack of an appropriate interface technology customized to his special needs.

That evening at the hotel, I received a call from the father of these three youngsters asking if I could meet with him. I spent a couple of hours in my room with Mr. Al-Khamees, first showing him our modular systems approach and then exploring how we might find some ways to help his sons. One idea we discussed was the possibility of Bader's visiting us in Syracuse next Spring. I would hope that we might somehow make some progress with him and his brothers before then in any case.

While enroute on the Kuwait Airways flight to London, I sat next to someone who knows you: Ghassan Hamad Alibrahim of the Kuwait Investment Authority. We began chatting and, when he asked me why I had been in Kuwait, I explained that I had been invited by you to serve on a committee at KFAS. When I also mentioned my experiences at KISR and the Special Schools, Ghassan mentioned that seated nearby was the man in charge of them: Mohammad Al-Humaidi, Assistant Under Secretary in the Ministry of Education. After I gave Ghassan a computer demonstration of our system, he went over and briefed Mohammad who then came over and took Ghassan's seat for a while. We had an excellent chat (including my computer demo, as usual). He was clearly very interested. This ended with an informal agreement that we should explore ways to try to work together to help the Al-Khamees children and other children at the Special Schools.

When I reviewed all these encounters with Ghassan, he suggested that you, as Director General of KFAS, might be interested in having a role in whatever sort of cooperation

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that might emerge. I feel optimistic that together we could all do a lot to help these children, and also that this could even have impact on the international scene.

I have discussed this promising and compelling project (particularly the Al-Khamees family which is in dire need) with my partner, Dave, and with other members of our team, and they are all interested, of course. I hope we can all find ways to proceed and interact.

I believe I left my academic and business cards with you. In case not, I have attached a set. For your information, MindTel is a limited liability company that Dave Warner and I recently set up as part of a New York State Center for Advanced Technology in Computer Applications and Software Engineering (CASE Center) at Syracuse University. We are also affiliated with InfoMall, the technology transfer program of the Northeast Parallel Architectures Center at Syracuse University (see <http://www.npac.syr.edu>). I call your attention specifically to the Web site <http://www.pulsar.org> featuring some of our work on our so-called Pulsar project, which focuses mainly on human-computer interface technologies for the disabled. MindTel is active in this interface work as well as telemedicine projects. Dave Warner is also the founder and director of the not-for-profit Institute for Interventional Informatics, based in San Diego, California. He is also the Technology Task Force director for the American Telemedicine Association.

Let me add, in closing, that our interface technologies are applicable for much more than the disabilities field. For example, our software and modular extensible hardware can be well applied to science education, by interfacing experiments to computers in a very flexible way. There might be a role for this in exhibits at your new Scientific Center too. I plan to meet with the director of our Museum of Science and Technology in Syracuse (which, like your Center, also includes a new IMAX theater) to discuss similar ideas.

I would appreciate hearing from you, at your convenience, to learn your level of interest in the prospective joint initiative I have indicated above. Please note that I will be leaving on a trip December 2 to Japan and then California. I will be in sporadic e-mail contact during the trip. I return to Syracuse December 21.

Sincerely yours,

Edward Lipson
Professor of Physics
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