3rd German-Pakistani Workshop on Field & Assistive Robotics (WFAR)

Nov 16-17, LUMS School of Science & Engineeing, Lahore, Pakistan

Dear colleagues and friends,

Thank you for agreeing to be part of our panel discussion on "Opportunities and challenges in setting up a robotics industry in Pakistan" at the 3rd Workshop on Field and Assistive Robotics at LUMS (Nov 16-17, 2012). To help you prepare for the discussion let me introduce the panel and put down some questions/comments for you to think over before the event.

Panel
Dr Sohail Qureshi, Dean SSE at LUMS (Academia + Biotechnology industry)
Dr Karsten Berns, Professor of Robotics, TU Kaiserslautern, Germany (Academia + Robotics Industry)
Dr Aamer Iqbal Bhatti, Professor of Control Engineering, MAJU, Pakistan (Academia + Automation Industry)
Mr Nauman Saeed, CEO, MicroTech Industries (Ltd), Pakistan (Electronics Industry)
Dr Aamir Khan, CTO, Ayton Willow, UK (Robotics & Automotive Industry)
Dr Faheem Sheikh, Mentor Graphics, Pakistan (Electronics Industry + Academia)
Muhammad Fuzail, LUMS (Student Entrepreneur in Robotics)
Dr Abubakr Muhammad (Moderator)

Issues / Observations
1. The robotics world is witnessing a revolutionary change in focus from bulky expensive industrial robots of the manufacturing industry to highly sophisticated and affordable machines in the form of personal and assistive robots for the home and office; drones and intelligent ground vehicles for the battlefield; self driving cars for future highways; autonomous agricultural machines for future farms; wheeled intelligent racks in warehouses; tele-presence avatars letting you beat space and time; and so on. None of this is science fiction. All of this is happening NOW in industry and academic research in many advanced countries.

2. The key driver of this revolution is a) explosion of open source tools for robot development b) easy availability of cheap sensors, embedded systems and high performance computers that were un-affordable by most only a few years back c) maturity of algorithms and methods in perception, mobility and control of mechanisms d) computer aided design and manufacturing revolutionized by rapid prototyping. e) availability of a new generation of developers able to work comfortable at the interface of computer science, electrical engineering, mechatronics and control engineering.

3. Robotics industry worldwide is projected to be a multi-billion dollar global industry (projections for personal robotics alone touch $20 billion by 2015). In 2007 Bill Gates predicted a robot in every home by 2020. 5 years on, this prediction looks even more certain and happening sooner. Setting up a robotics industry is no longer for a select few, requiring massive investments. Robotics start-ups are springing up in backyards and garages much like the computer industry of the late 70s.

4. Pakistan is largely unaware of this arising opportunity. Having missed the microelectronics, software, telecomm and biotechnology waves, will we miss this one too?

5. Some of us believe is that at least we are ready to ride this one. It is only a matter of realizing that this is possible. Here may be some reasons.

a. Our universities (at least the few good ones) are turning out quite good graduates providing critical mass for manpower. The universities are hungry for change. Most good public and private institutes are thinking about enabling entrepreneurship opportunities. At the highest level, everyone agrees that this is the need of the hour.

b. There are at least four or five good mechatronics programs in the country where the focus is on robotics. A similar enthusiasm for robotics is found in electrical and mechanical engg programs.

c. There are more than a few examples of Pakistani research groups in academia trying serious ideas in robotics. Some are trying industry incubation already.

d. Sensors, platforms, software, machining are cheap and available. There is an underground cottage industry helping out students and researchers in projects on robotics, industrial automation, computer vision, AI and control. Somehow a lot of good things are happening without anyone calling the shots.

e. There are positive examples of industry successes in industrial control and automation. Similarly for embedded systems, software and instrumentation. Something spontaneous may bring these together and produce magic.

f. There is a lot of interest from defense industry specially due to importance of drone technology for Pakistan. Already, there is a mini-industry in Pakistan on UAVs, mostly trying to graduate from amateur interest in aero-modeling to serious drone technologies. The hobbyists are making everyone happy by making freely available critical parts for robot development like gyros, batteries, servos etc..

g. The software industry in Pakistan is booming. In the end, many of the ideas in robotics are essentially about innovations in software.

6. What are our specific vulnerabilities? What haunts the general high tech industry in Pakistan will haunt any roboticists too. But are there any other specific pitfalls awaiting us?

7. Robotics research industry worldwide is being driven by issuing grand challenges and pushing companies and universities to meet some very high expectations. Would it help to issue such grand challenges to roboticists in Pakistan as well. e.g. a self driving car by 2017? If so, who should take the lead in issuing such challenges?

8. Robotics development needs a philosophy. The North American focus is on fighting machines and reducing casualties on the battlefield. Europe and Japan are investing in robotics to take care of their elderly population and automate production due to high cost of labor. Our national challenges are certainly different. Can we give entirely new perspectives on robotics & automation for developing countries? Issues such as maintenance of our ageing infrastructures, pushing people out of dangerous jobs and inhuman living conditions, developing surveillance and security applications more in line with our cultural norms etc.

9. Are there any specific recommendations for academia, industry, students, entrepreneurs?

Abubakr Muhammad
Assistant Professor of Electrical Engineering
LUMS School of Science & Engineering, Lahore, Pakistan