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Andrew A Goldenberg

Chief Technology Officer, SuperRobotics Ltd., Hong Kong, China, ANZER Intelligent Systems Co. Ltd., Shenzhen, Guangdong, China, Engineering Services Inc., Toronto, Ontario, Canada, Professor Emeritus, University of Toronto

Mechatronics principles applied to collaboration between R&D and industry

Mechatronics is an essential multidisciplinary element of modern engineering design that is required in the development of products and processes that are multi-user oriented, simple to maintain, programmable, and, most recently, fully automatic or autonomous. The foundation of mechatronics is the concurrency of mechanical, electrical and computer engineering designs and their embedded integration in any product. The essence of the design is to create products that have a market value as opposed to research that is the undertaking of developing the core technology embedded in the products. Thus, core technology, through patents, trademarks, technical secrets and know-how can be valued by the market through its perceived relevancy in creating new products. This market value is further affected by the perceived market impact and estimation of penetration of the new products. Academic and research-oriented institutions focus almost unilaterally on the development of core technology. They are guided by the perceived market needs; competitions between research institutions expressed by the publications and citations of each, and shear curiosity. The related undertakings are usually not linked directly to product development. This leads to excessive generation of core technology that may or may not be directly useful. Nonetheless, it may be ahead of the state-of-the-art, sometime by a decade, therefore, one cannot fully assess its impact. The fact is that core technologies directly related to market-driven products under development or already in use are rarely addressed outside those businesses whose main undertaking is to develop the products first place. This presentation recommends a closer collaboration of sides, research and industry, by closely adhering to mechatronics principle of simultaneous development that is embedding the research in the product development. This would provide a better justification for research funding from the participating businesses instead of almost totally relying on government support of research.

Biography

Andrew A Goldenberg is the Founder of the field of Robotics at University of Toronto where he has been a Professor of Mechanical and Industrial Engineering since 1982. He has supervised many graduate students and 46 PhD students. From 1975-1981, he has been an Employee of SPAR Aerospace Ltd., of Toronto, working on the development of the first Space Shuttle Remote Manipulator System. He is also the Founder of Engineering Services Inc. (ESI) established in 1982 and operating in the development of robotics-based automation. Under his leadership, the company has achieved significant growth and a global leading role in a wide range of industrial sectors. In 2015, ESI has been acquired by a Shenzhen-based Chinese consortium, and as of November 2016 the company become public listed in Hong Kong. He is the Chief Technology Officer (CTO) of the public company.

golden@mie.utoronto.ca

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