Editorial Notes

There is no doubt that robotics and industrial automation technology is evolving quiet fast. However, the end user expectation of the technology realisation is still far from what expected. This is due to the limited development of intelligence, typical human brain cells, 3-Dimensional (3D) visual, audible and dynamic movement systems that have the same abilities and self-learning as human, to help in decision making in various environment. There are number of applied research programmes underdevelopment around the world that addresses some of these aforementioned developments. Vision is one of the most important sense and the future robot/autonomous systems proficiency will significantly depend on the ability to see, recognise, distinguish objects and estimate distances. Most jobs depend on the talent of visual perception and it must acknowledge that today's manufacture technologies and applications more and more often broaden well beyond the limits of human visual capacities. This is where robot and autonomous machine vision technology comes in. It is one of the constantly growing areas of applied research that dealing with processing and analysing of visual digital data capture. It plays a key role in the development of intellectual systems and empowers decision making for some of the future robot, autonomous systems, industrial process and manufacturing.

In this issue of the journal a selection of some of these technological challenges facing the automation industry are presented and some of the inventive researcher pioneering solutions and findings are introduced. The first paper by *Mahmoud Shafik et al, (College of Engineering and Technology, University of Derby, UK)* is focused on the design and development of a smart ultrasonic actuation system with multi degree of freedom for autonomous vehicle guidance and robot vision industrial applications. This is part of ongoing research programme to develop a technology that has the ability to perceive, reason, move and learn from experiences, at low cost. It is particularly focused on developing an actuation system that could provide 3-Diemstional (3D) motions to overcome the visual data capture transducer focus spot angle and enhance the robot/machine vision system ability to perceive and move in 3D. The paper presents the development life cycle of the 3D actuation system. A prototype of the actuator fabricated. Experimental tests showed the potential of the developed actuator to meet the essential requirements for digital visual data capture industrial application.

The next few papers deal with some of the existing challenges in autonomous ground and flying vehicle applications, remote healthcare monitoring technology and performance measurement system for industrial manufacturing environment. They provide a number of revolutionary solutions. The paper by *S.M. Vaitheeswaran1, et al (National Aerospace Laboratories, Karnataka, India)* presents Vision Based Tracking of Moving Target in Autonomous Ground Vehicle Framework. The paper proposes a vision-based algorithm to autonomously track a moving target with an autonomous ground vehicle. The proposed approach to estimate the target's position, orientation, is built on a robust colour based tracker using the Continuously Adaptive Mean Shift algorithm. The object Tracker can handle occlusions, lighting and environment effects in a single framework when combined with Multiple Kalman Filters. The obtained information from the visual tracker is used to control the position and yaw angle of the UAV in order to track the object and keep it in the field of view. The research successfully demonstrates the implementation of the Back Projection, CAMShift, and Kalman estimator algorithms to track objects and maintain track in a video sequence or in real time in the presence of occlusions, and to reacquire the objects when they reappear.

Hafez Fouad (Microelectronics Department, Electronics Research Institute, Cairo, Egypt) introduces embedded system design of remote healthcare monitoring center using Web Based Technology. Information and communication technologies (ICTs) have great potential to address some of the challenges faced by developed and developing countries in providing accessible, cost-effective, high-quality healthcare services. This research proposes a system that will provide wide range of services in Telemedical clinics. The System structure clarifies 4 components (Medical Sensors, CCU Interface, Communication module, Application Platform). Experimental setup of the embedded system sensors is tested and this showed the effectiveness of the solution for providing specialty healthcare in the form of improved internet-access and reduced cost to rural patients.

Dermawan Wibisono and M Khurshid Khan (School of Business and Management, Bandung, Indonesia & School of Engineering, University of Bradford, UK) presents a performance measurement system for a manufacturing environment: A KB/GAP/AHP approach. The paper describes the details of the KBPMS Model, which is novel and improved methodology compared to the previous PMS frameworks. The proposed model has introduced new aspects that have not been covered by previous researchers, especially in terms of the implementation of a KB expert system approach, and the combination of GAP and AHP analysis in an integrated model, as a supporting decision making tool. The presented results in this paper show that, the hybrid KBPMS model provides a detailed and accurate decision making tool for the improvement of the PMS and hence the performance measurement in a manufacturing environment.

The final paper of this issue is focused on the Autonomous Flying Vehicle cutting edge technology. *Rini Akmeliawati (Dept. Mechatronics Engineering, International Islamic University Malaysia)* introduces Design and Development of Modular Autonomous Flying Vehicle. Vertical Take-off and Landing vehicles (VTOL) have gained popularity among researchers due to their capabilities of vertical stationary flight and manoeuvrability. In this paper, a multi-rotor platform with distributed control has been

designed. The design challenges of the DFA were very similar to those of modular reconfigurable robots and micro-aerial vehicles which included electromechanical interconnection, inter-module communication, and energy storage. The design of the DFA gives it many unique advantages over conventional rotorcrafts such as significantly greater resilience to catastrophic on board failure, greater optimization, flexibility, and considerably lower maintenance costs. The controller implemented was able to successfully eliminate the oscillatory behaviour of the roll and pitch angles as the agent approached the hovering state although significant oscillatory behaviour of the yaw angle of the agent continued even in the hovering state which the controller couldn't diminish. This could be reduced by combining many such agents in coordinated flight so as to reduce the net moment generated in the hovering state.

We hope that you find the issue beneficial and have also given you a good on-site of the ongoing research in this fascinating fast-evolving area of innovation and technology. We look forward to receive your contribution to the future journal issues.

Mahmoud Shafik