

robotics and intelligent machines



Have you ever wondered what is the most popular type of computer; a desktop PC would seem like a good guess? A recent survey which examined the potential problems of the millennium bug revealed the answer: there are between 50-100 times more embedded computers than conventional computers such as PCs!

Dr Callaghan

Dr Victor Callaghan is a lecturer in Computer Science at the University of Essex; where he has been responsible for the introduction of a new degree scheme in 'robotics and intelligent machines'. His industrial experience ranges from the design of aircraft computer systems through to being a founding director of a company manufacturing products for the internet industry. He has a BEng in Electronics and a PhD in Computing. He is a chartered engineer and a corporate member of the IEE and BCS.

WHAT IS THE MOST POPULAR TYPE OF COMPUTER?

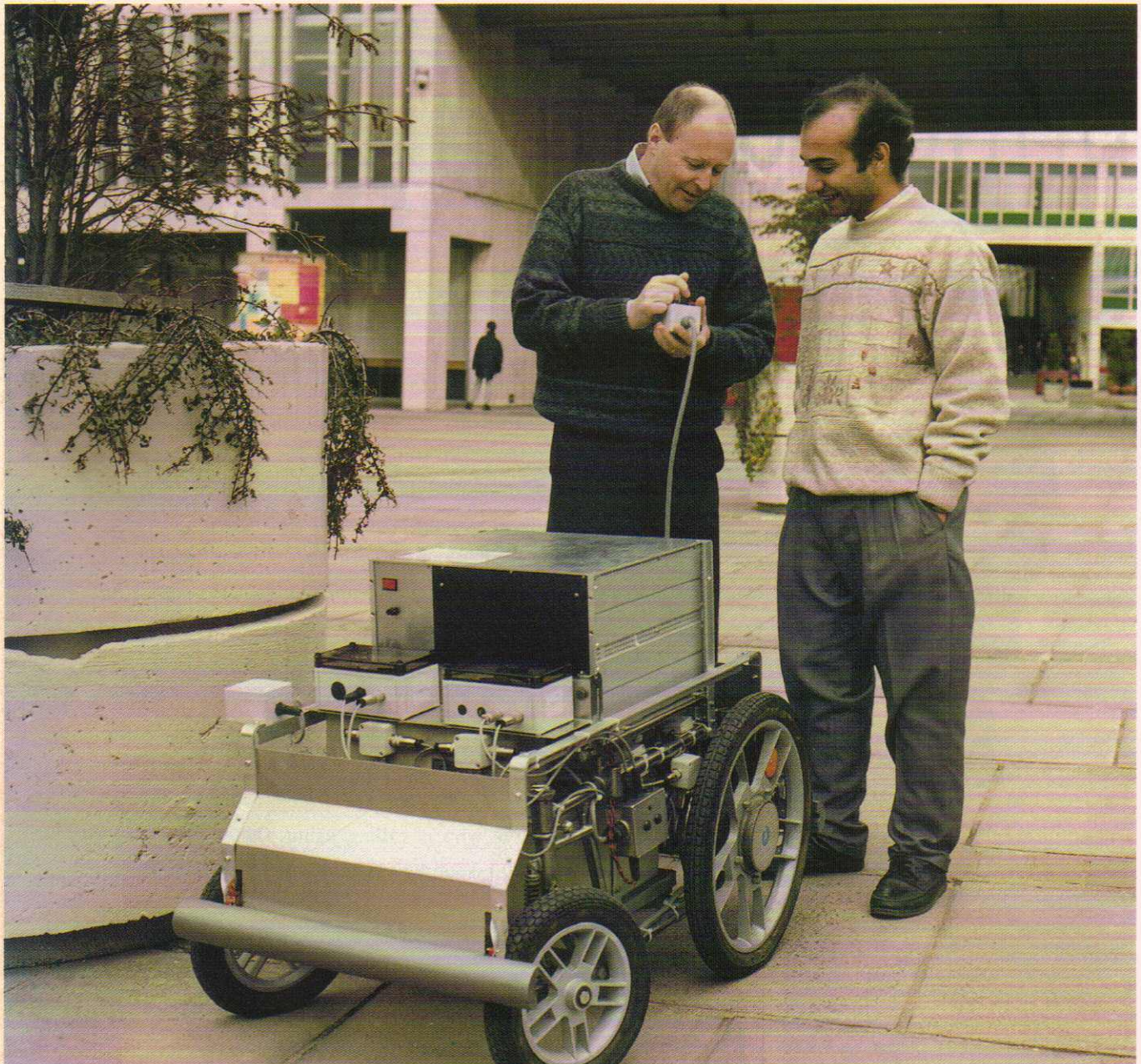
Examples of embedded computers range from household appliances such as video recorders, central heating systems and washing machines through business devices such as fax machines, cellphones, copy machines, internet-telephones, teleconferencing systems to large products such as cars, trains, aircraft and spaceships. Computers are now so pervasive in goods, that we routinely use products without realising they are computer controlled. For instance modern cars can contain more than 30 computers and lowly washing machines may have at least one computer built into them! You may care to consider how many computer chips are embedded into products you routinely use!

EMBEDDED SYSTEMS + ARTIFICIAL INTELLIGENCE = INTELLIGENT MACHINES

Perhaps the most inspiring form of embedded machine is the robot. For years humanoid robots have been featured in stories and films on the future. By adding some artificial intelligence (AI) techniques to embedded systems we get machines with the potential to transform the world;

So just what are these embedded computers that are quietly assuming dominance of the computer world? An embedded computer is simply a computer chip (plus supporting software) that is built into a machine.





machines that might even replace us! But humanoid robots are not the only form of intelligent machine. Any product that uses AI as part of its embedded computer architecture is potentially an intelligent machine, so cars, washing machines and the vast numbers of other embedded products could be the intelligent machines of the future. In fact, in the future we may even live inside intelligent machines; a building with embedded computers and AI techniques whose goal is to care for its occupants, the so-called intelligent building! If all these developments seem exciting consider the addition of one final ingredient, the Internet. The explosive growth of networking has now created the possibility for intelligent embedded systems to be linked together either to collaborate with each other or be accessed by others from great distances. When one combines pervasive embedded computer products, artificial intelligence and ubiquitous networking the commercial

potential is only limited by one's imagination. It becomes evident that the current technological revolution started by the spread of the Internet is only at the beginning of something much bigger. As such, the world's largest IT companies are predicting this area as the biggest growth area in computing.

ROBOTICS AND INTELLIGENT MACHINES = INTERESTING STUDIES + LUCRATIVE SALARIES?

Clearly the skills needed for this new era of computing differ greatly from those offered by traditional computing courses. Thus if you are interested in being part of this technological revolution you need to find appropriate university courses. One such degree is the new 'Robotics and Intelligent Machines' (RIMs) MSc and BSc schemes which have been launched by Essex

University. They build on over 20 years of AI and embedded computing experience and in addition to supplying all the traditional computer science basics, provide the additional knowledge to design and build intelligent machines. They centre on a fleet of over 20 mobile robots, some of which can be seen in the photos. The combination of Embedded Computing, AI and Network promises an exciting future.



University of Essex

further information

For further details see the University of Essex advertisement on page 95.