

The Next Evolution of Technology “AI Robotics Vision and Automation”: From Applied-Education, Academic-Research to Industrial Applications

Artificial Intelligence (AI) robot is the next evolution of technologies and applications for business, healthcare, Internet of Things (IoT), finance, education and social science (See Figure 1). The challenges of implementing the AI robot to be fully automated and with intelligence depends on the AI computational model design, speech and vision recognition, emotion detection and classification, scenario analysis and decision-making modelling. Although there are many research studies attempting to solve these problems, some problems such as low computation power of AI, methods to build the AI models in parallel and/or distributed architecture to accelerate the analysis, and data security and privacy issues are still unsolved.

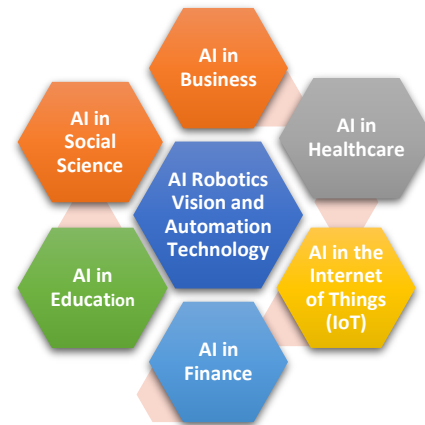


Figure 1 AI Robotics Vision and Automation Technology Challenges

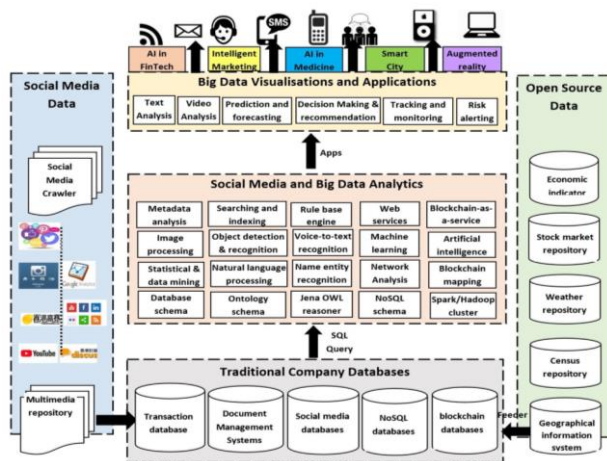


Figure 2 AI Developing an open source big data analytics platform and artificial intelligence tools in natural language processing, context-based name entity recognition, blockchain analysis, ontology building, distributed networks, image and video analyses. (<https://saasweb.hku.hk/datasci/vision.php>).

Although there are many research and education programs that are teaching and researching AI solutions, how we can nurture our next generation to learn from theory to practice, and to cultivate them with innovative thinking and applied-research skills for inventing new products and applications to meet the business need. The HKU’s (3+1)Is strategy (see Figure 3) introduces the use of the Internationalisation, Innovation and Interdisciplinarity to create collective Impact. The Data Science Lab added a novel STEMIP education model (see Figure 4) on top of the HKU (3+1)Is strategy. STEMIP is an innovative learning model that integrates Science, Technology, Engineering, Mathematics, Innovation and Practical together to cultivate students’ inquiry, critical thinking, analytical skills, communication skills and insight creation for creating innovative and practical solutions to business. It nurtures our future generations to be an applied-research scientist starting from junior, youth, to adult.

The HKU SAAS Data Science Lab (DSL) applied AI techniques on an ontology for modelling and analysing human dialogs and emotions. It invented some novel statistical and mathematical models and AI-based image/video analytics techniques in the edge computing AI chip device to detect and classify images, sounds, emotions and body movements, to predict risks and motions in images or videos (see Figure 2). The collaborators include some local companies, such as Marvel Digital AI Ltd, PricewaterhouseCoopers (PwC Mainland China and Hong Kong), etc. In 2021, the DSL provided several consultancies, internships, capstone projects, and an AI Robotics Vision and Automation Technology Challenges Competition to the local companies, institutions, and local secondary schools with STEM education in order to promote and develop some innovative solutions of using AI in finance/fintech, healthcare, business, IoT (Smart City), education, and social science areas.



Figure 3 The HKU’s (3+1)Is: Internationalisation, Innovation and Interdisciplinarity, which converge to create collective Impact.

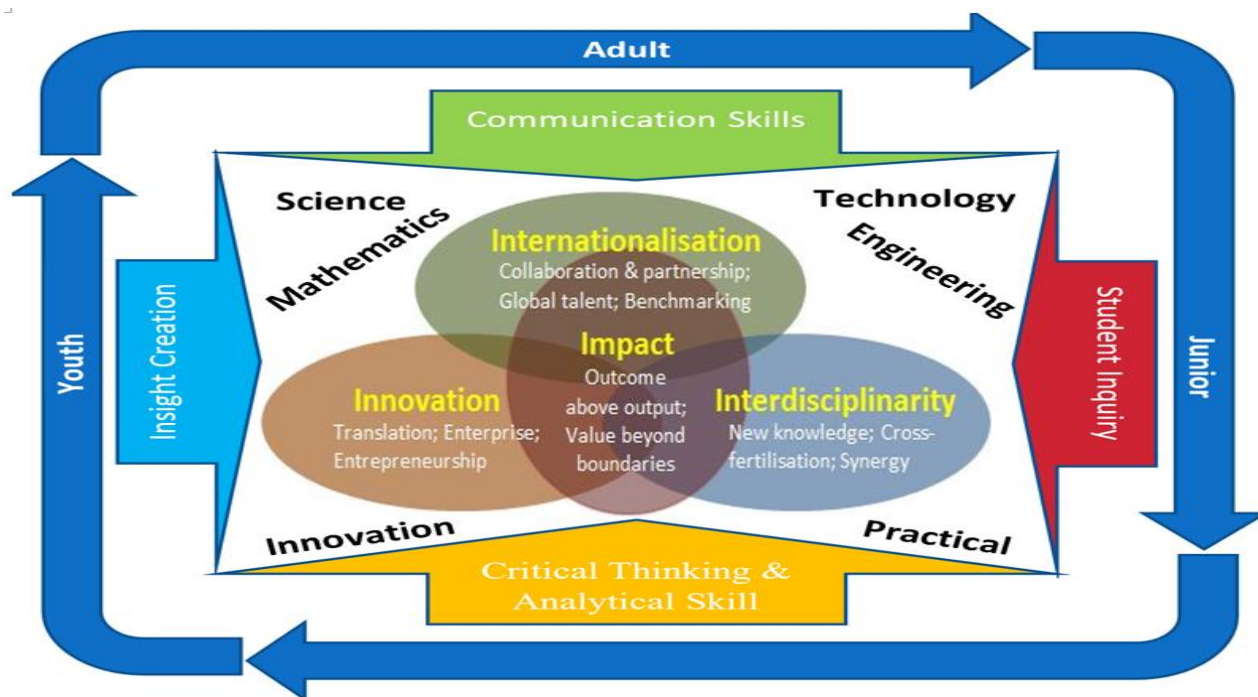


Figure 4 The novel education model of STEMIP that was added on the top of the HKU's (3+1)Is strategy : Internationalisation, Innovation and Interdisciplinarity, which converge to create collective Impact.

"We aim at integrating internationalisation, innovation and interdisciplinarity to create impacts to the society and nurture our next generation to be the great leader and applied-research scientists," said Professor Guosheng Yin, Head of HKU Department of Statistics and Actuarial Science.



"Data Science Lab promotes education through applied research, connects local and overseas companies and professionals to students so as to create new inventions, and to learn to apply the theories to practice. Through the competition, workshops, internships, knowledge exchange, consultancy, and capstone projects with our industrial and institutional partners, we cultivate future leaders, inventors, and entrepreneur," said Dr Eddy Lam, Director of HKU SAAS Data Science Lab.

"We streamline the STEMIP education from junior, youth to adult by collaborating with the secondary schools in STEM education, institutions, and our business partners in local and overseas to offer business problems and potential solutions to the students in local schools and tertiary institutions," said Dr Adela Lau, Deputy Director of HKU SAAS Data Science Lab.

