2015中国（沈阳）国际机器人大会
2015 China (Shenyang) World Congress of Robotics

机器人项目及海外高层次科技人才汇编
Overseas High-level Talents and Projects Manual

时间：2015年8月31日　地点：中国•沈阳浑南总部基地
Time: August 31, 2015　Venue: Shenyang Hunnan Headquarters Center, China

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组织构架
Organization Structure

主办单位
Hosting Organization

沈阳市人民政府
Shenyang Municipal People's Government

承办单位
Operating Organizations

沈阳市贸促会
Shenyang Sub-Council of China Council
for the Promotion of International Trade
沈阳市经信委
Shenyang Economic and
Information Technology Committee
沈阳市浑南区人民政府
Shenyang Hunnan District
Municipal People's Government
科技部机器人产业技术创新战略联盟
Technology Innovation Strategic
Alliance for Robot Industry

执行单位
Executive Organization

百奥泰国际会议（大连）有限公司
BIT Congress Inc.

前言

　　为贯彻落实《国务院关于近期支持东北振兴若干重大政策举措的意见》和省、市领导关于"把沈阳建设成为具有国际竞争力的机器人产业基地"的指示精神，推进机器人产业大发展、快发展，由沈阳市人民政府主办的"2015 中国（沈阳）国际机器人大会"将于 2015 年 8 月 31 日-9 月 2 日在辽宁省沈阳市浑南总部基地盛大召开，主题为"智能制造，智能未来"。

　　在沈阳市人民政府指导下，2015 中国（沈阳）国际机器人大会执委会在此期间将举办"人才项目对接活动"，此次活动包含机器人制造和技术领域的 30 余个项目、企业展示及众多科研转化成果，现汇编成册供各位与会嘉宾参考。

　　本次项目对接活动是在 2015 中国（沈阳）国际机器人大会大背景下，通过企业展览、项目对接展示、专家交流等形式，加深各领域、企业之间的了解，力争为国内单位引进所需项目，促进地区的经济发展。真诚希望各单位能够通过本次机会加大与国内外专家的交流，就当地发展计划及重大专项支持方向和力度、评审机制、国际合作运行机制等进行地方推介及洽谈协商合作活动，找到合适的投资伙伴、合作伙伴。

　　您可通过我们的引荐或通过我们提供相应联系方式进行直接或间接对接洽谈活动。

活动安排

专场展洽　　2015 年 8 月 31 日 14:00-17:00 浑南总部基地二楼第一展厅

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2015 中国（沈阳）机器人项目及海外高层次科技人才对接会
Overseas High-level Talents and Projects Matchmaking Fair

本项目汇编所收录信息截止 2015 年 8 月 1 日
更多信息请查询活动周官方网站:
www.bitcongress.com/wcr2015

项目信息

Projects Information

项目信息
Projects Information

A. 机器人前瞻

The Frontier of Robots

项目编号：2015-A-01

项目名称	三维机器视觉与智能感知项目 3D Object Detection, Recognition and Mapping Using Depth Sensor
发布人	Yulan Guo
机构	国防科技大学 National University of Defense Technology
国家	中国 China
职务	助理教授 Assistant Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	
近年来，随着激光雷达（LiDAR）、微软Kinect、英特尔RealSense、谷歌Tango等点云（深度图像）传感器的快速发展，点云的获取与处理成为机器视觉领域的一个新亮点。研究团队在如下领域开展了扎实的研究，取得了系列进展，部分已经实现工程化。1、三维人脸识别 2、三维目标检测识别 3、目标三维姿态分析 4、场景三维制图 5、机器人导航与定位 6、道路检测与交通标志物识别 7、实时信号处理机开发	
With the rapid development of 3D imaging techniques, a number of 3D point cloud acquisition sensors are now available, including Microsoft Kinect, Intel Realsense, Google Tango and various LiDAR sensors. Several figures are shown below for illustration (Note that these figures are for illustration only, and do not necessarily represent our work). 1. 3D Face Recognition; 2. 3D Object Detection and Recognition; 3. 3D Pose Analysis; 4. 3D Mapping and Scene Reconstruction; 5. Robot Navigation and Localization; 6. Road Detection and Traffic Sign Recognition; 7. Real-time Hardware Implementation	

项目编号：2015-A-02

项目名称	对于长途公共汽车或卡车安全驾驶的计算机视觉应用 Computer Vision for Safe Driving of Long-distance Busses or Trucks
发布人	Reinhard Klette
机构	奥克兰理工大学 Auckland University of Technology
国家	新西兰 New Zealand
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

  这个项目主要是有三个小组共同完成，A组为Reinhard Klette教授带领；B组为山东大学Chen Hui教授带领；C组待定，最好是来自辽宁的卡车或者公共汽车公司，学校也可以。

  该项目旨在通过安装专用的智能计算机视觉控制部件到一个长途卡车或公共汽车上的解决方案设计，从而提高道路安全。

  目前进展:A组为奥克兰理工大学机器人与视觉中心研究人员，为项目提供了所需的数据支持，以及可视化三维场景等。B组主要提供了交通状况以及安全模块的覆盖设计。

Group A: The Centre for Robotics & Vision (CeRV) at Auckland University of Technology, Investigators: Prof. Dr. Reinhard Klette and PhD students. The centre provides basic support for the binocular stereo and motion detection modules, as well as for the data recording part and the generation of a test database. The group works on analyzing recorded video data for generating models of visualized 3D scenarios. **Group B**: Shandong University, Investigator: Prof. Dr. Chen Hui, Prof. Dr. Tu Changhe, Prof. Jiang Wei, Dr. Zhong Fan, Mr. Qing Zeng

The goal of this group is to provide models for those traffic scenarios that need to be covered by the designed safety modules. The group implements designed prototype solutions in trucks (i.e. camera modules with processing unit) such that designed software solutions can be tested for their performance. **Group C**: TBD

项目编号：2015-A-03

项目名称	自主式水下机器人的海底测绘与监控 Autonomous Underwater Miniature Robot for Seafloor Mapping and Monitoring
发布人	Andrey Yatsun
机构	西南州立大学 Southwest State University
国家	俄罗斯 Russia
职务	机器人及机电一体化实验室主任 Head of Robotics and Mechatronics Laboratory
项目所处阶段	研发
合作方式	投资合作

项目简介

该项目已经在俄罗斯申请以下专利

134139 U1 B62D 57/00，130575U1 B62D 57/00，130575U1 B62D 57/00，124656 U1 B62D57/00

该项目自2011年开始，主要的目标是通过设计水下机器人完成以下工作：监控水污染，搜索和救援，检查水下管道状态，研究海洋动物，完成水下建筑，检查和打捞沉船，海洋考古等

Patent number 134139 U1 B62D 57/00 granted by The Russian Federal Service for Intellectual Property; Patent number 130575 U1 B62D 57/00 granted by The Russian Federal Service for Intellectual Property; Patent number 126313 U1 B63G8/08, B62D57/00, B25J11/00 granted by The Russian Federal Service for Intellectual Property; Patent number 124656 U1 B62D57/00 granted by The Russian Federal Service for Intellectual Property

The study and design of prototypes of underwater robots has been carried out at the Department of Mechatronics and Robotics at Southwest State University since 2011.

The objectives of the study of underwater objects which can be achieved by using designed underwater robots are: monitoring water pollution; search and rescue; checking the status of underwater pipelines; oceanographic studies; underwater construction; inspecting and lifting sunken objects; marine archeology.

项目编号：2015-A-04

项目名称	基于视觉移动增强现实 Vision-Based Mobile Augmented Reality
发布人	Yihong Wu
机构	中国科学院自动化研究所 Institute of Automation, Chinese Academy of Sciences
国家	中国 China
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　基于移动终端的增强现实问题是当前计算机视觉领域的研究热点，在信息化的社会有着广泛的应用市场和前景。移动平台上基于位置增强现实的服务更可惠及到每一个持有手机的人，我们开发了其中的关键技术和原型系统：1）大规模城市场景的三维地图；2）大规模城市场景的快速相机定位3）实时手机定位与增强现实。

Vision-based augmented reality is a technology that enhances and extends human vision by fusing images and virtual objects generated by computers. Due to the rapid development of computer vision techniques and the great improvement of mobile platforms, vision-based mobile augmented reality has attracted much attention in many fields such as health, military, industry, education, entertainment, and culture. 3D reconstruction and camera pose determination are the two key problems. We have developed a series of new algorithms and some prototype systems at 3D modeling of urbane scenes, fast localization of camera in urbane scenes, and real time augmented reality on a mobile platform. More than one hundred papers have been published in the international journals and conferences including top international journals and conferences in the field computer vision. Many patents are issued or being applied.

项目编号：2015-A-05

项目名称	基于非荧光眼底图像的糖尿病自动诊断 Automatic Diagnosis of Diabetes Based on non-Fluorescence Fundus Image
发布人	Bin Sheng
机构	上海交通大学 Shanghai Jiao Tong University
国家	中国 China
职务	副教授 Associate Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

获取一组包括多幅图像的糖尿病视网膜特征的提取和分析算法

•根据糖尿病视网膜图像的综合特征，获得一组指标

•发明一种糖尿病非荧光眼底图像的自动筛选和分析系统

Pending approval by US patent office

- Obtain a set of extraction and analysis algorithms including multiple images for diabetic retinal feature

- Obtain a set of metrics automatically based on an integrated feature of diabetic retinal images

-Invent an automatic screening and analysis system for non-fluorescent fundus image of diabetes

项目编号：2015-A-06

项目名称	协同智能交通系统
	Co-operative Intelligent Transport System
发布人	Ljubo Vlacic
机构	格里菲斯大学
	Griffith University
国家	澳大利亚
	Australia
职务	教授
	Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　通过研究，设计，开发和试验新的，创新的和可互操作的运输方案，这个项目将铺平道路，为中国部署合作智能运输系统 C-ITS 从而大大增加安全，可持续发展和陆地运输效率。C-ITS 包含一系列合作运输解决方案，使陆路交通参与者（卡车，汽车，火车，自行车，行人等）了解周边的交通条件

Through the research, design, development and trials of new, innovative and interoperable transport solutions, this project will pave the way for China to deploy Co-operative Intelligent Transport Systems (C-ITS) thus dramatically increase the safety, sustainability and efficiency of land transport. C-ITS encompasses a range of cooperative transport solutions that make land transport participants (trucks, cars, trains, bikes, pedestrians etc.) aware of the surrounding traffic conditions.

项目编号：**2015-A-07**

项目名称	波兰机器人技术的研究和技术成果
	Research and Technical Achievements of Robotics in Poland
发布人	Krzysztof Roman Kozlowski
机构	波兰波兹南工业大学
	Poznan University of Technology
国家	波兰
	Poland
职务	教授
	Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

我们实验室有多个项目，包括工业机器人，移动机器人，行走和飞行机器人，并提供了可用于研究和教育目的行走和飞行机器人的原型。可以与工业合作伙伴进行洽谈。

Chair of Control and Systems Engineering has modern laboratories equipped with industrial robots, mobile robots, walking and flying robots. It offers a number of prototypes of mobile, walking, and flying robots that can be used for research and educational purposes. They can be subject to negotiations with industrial partners.

B.机器人先进技术

Advanced Technologies for Robotics

项目编号：2015-B-01

项目名称	机器人微阵列中的学习视觉描述及其应用 Learning Visual Descriptors and Their Applications using Robots in Microarrays
发布人	Ventzeslav V Valev
机构	保加利亚科学院 Bulgarian Academy of Sciences
国家	保加利亚 Bulgaria
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介
本项目研究总结有关机器学习领域方法，它关于视觉描述（VDS）在芯片中应用于医疗诊断的实现。微阵列技术可以应用于机器人。与分子生物学家合作，这个项目可以提交给美国国家健康机构，或通过中国相应的机构的支持。
This project summarizes my research in the field of methods for machine learning and it is about implementation of Visual Descriptors (VDs) in microarrays. VDs correspond to syndromes in medical diagnosis. Applying VDs approach to microarrays will be constructed all syndromes for diagnosed diseases. Some of the constructed syndromes could be simpler than known ones and will be constructed syndromes for diseases to which the microarray technique has not yet been applied. The microarray techniques can be applied using robots. Collaborating with molecular biologists this project can be submitted for support to the National Institutes of Health in the US or to the corresponding agency in China. These collaborative efforts well result in the discovery of the many benefits of molecular genetics.

项目编号：2015-B-02

项目名称	社会服务应用机器人 Social Appliances
发布人	Bruno Apolloni
机构	米兰大学 University of Milano
国家	意大利 Italy
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　这是一个合成的评估系统，命名为Sand S。主要应用于社会网络，可以通过Wi-Fi路由器，通过成组计划，完全定义一个设备的运行。整个系统可以合理的规划家用电器的使用，而用户只需要很少的操作。反馈则通过家电本身的网络智能模块发送给用户，以决定是否优化。

In an extreme synthesis, the ecosystem we are assessing, named Sand S as a contraction of Social & Smart (http://www.sands-project.eu), deals with a social network aimed at producing recipes with tools of computational intelligence, to be dispatched to household appliances grouped in homes via a domestic Wi-Fi router. A recipe is a set of scheduled, possibly conditional, instructions (hence a sequence of parameter settings such as water temperature or soak duration) which completely define the running of an appliance. They are managed by a home middleware (Domestic Infrastructure) in order to be properly transmitted to the appliance via suitable protocols. The entire contrivance is devised to optimally carry out usual housekeeping tasks through a proper running of home appliances with a minimal intervention on the part of the user. Feedbacks are sent by users and appliances themselves to a Networked Intelligence module (in the form of a virtually electronic super-mom in Figure 1) to close the permanent recipe optimization loop, with open source contributions on the part of the users and offline advices on the part of the appliance manufacturers. An electronic board interfaces each single appliance to the domestic infrastructure opening the microcontrollers software.

项目编号：2015-B-03

项目名称	用于收集和分析在线数据的智能软件系统
	Intelligent Software System for Collecting and Analyzing Online Data
发布人	Maxim Bakaev
机构	新西伯利亚国立技术大学
	Novosibirsk State Technical University
国家	俄罗斯
	Russia
职务	副教授
	Associate Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

现在是一个数据的时代，传统的数据采集和分析方法不再合适。自2011年以来，我们已开发智能软件系统并将其投入试运行从而对俄罗斯新西伯利亚地区劳动力市场数据进行自动监测和分析。该系统的体系结构包括三个主要层次：按功能，按计划或按要求进行了实践。然而，该系统并不局限于劳动力市场数据监测，而是一个平台，可以收集和分析任何种类的在线数据。我们正在寻找合作伙伴，在开发和推广这样的通用在线数据收集和分析产品。

They say that data are everything in our digital age. Since 2011, we have developed and put into test operation intelligent software system that performs automated monitoring and analysis of labor market in Novosibirsk region, Russia. It collects data daily from a number of online sources – specialized websites that massively publish job-related ads. The architecture of the system embraces three major tiers, divided by functions and launched independently by schedule or by request. First is the data gathering module, responsible for accessing the source websites and scrapping data from web pages. The processing module performs data structuring and information extraction – currently, the one related to vacancies and resumes and their specified properties. This module is also responsible for certain intelligent operations with data, such as auto-classification, which is done via natural language processing, and identification of double records that emerge within web source or between several of them. Finally, there is the extendable analysis module, directly responsible for decision-making support and providing capabilities for reports generation, filtering, notifications, etc.

项目编号：2015-B-04

项目名称	设计制造和控制部门的改进
	Research Activities at Design Manufacturing and Control Department
发布人	Gabriel Abba
机构	梅斯国立工程师学院
	National Engineering School of Metz
国家	法国
	France
职务	教授
	Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　LCFC 技术研究部主要负责机械生产控制领域的生产改进。其主要改进内容包括以下方面：改善产品和制造工艺

　　产品生命周期中的变化，风险和成本管理；基于成本加权风险的公差分配；锻造工艺设计的建模与加工；识别，建模和优化的 RT-PCR 制造；钢的形成和发展的高性能齿轮；工业化的可变压缩比发动机部件；制造业机械手的建模；双足人形机器人的设计、建模和优化控制；复杂的制造系统，如射频识别系统。

The LCFC department has done much research in the fields of mechanical production and control. The interest of the department is to develop collaboration and projects in the following topics:

To improve Products and Manufacturing Processes; Variation, Risk and Cost management during the Product Life Cycle; Tolerance allocation based on Cost weighted Risk; Modeling and Processing of Product and Process Risk assessment; Computer Aided Process Planning; Modeling and Processing of Forging Process Planning; Identification, modeling and optimization of RT Manufacturing; Identification and modeling of Friction Stir Welding knowledge; Identification and modeling of Thixo-forging knowledge; Industralization of components of variable compression ration engine; Stainless steels forming and development of a high performance gear; Identification and modeling of Cross wedge rolling knowledge.

项目编号：2015-B-05

项目名称	风管清洗机器人导航与控制系统 Navigation and Control System of Air Duct Cleaning Robot
发布人	Wei Sun
机构	湖南大学 Hunan University
国家	中国 China
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

项目专利 ZL 201120217035.2，ZL201020261150.5

风管清洗机器人的主要任务就是清洗中央空调风管。通常都是由手动遥控操作，但这往往导致混乱。我们小组开发了自动导航和控制系统的风管清洗机器人，基于视觉的映射和位置，覆盖清扫路径规划，并提出了机器人的轨迹跟踪控制。通过使用该系统，机器人可以在风管自动运行和工作。

Air duct cleaning robot is a key equipment to clear the dirty in the air duct of central air condition. It is usually controlled by manual remote operating, this often leads disorder. So our group developed automatic navigation and control system for the robot. Vision based mapping and location, covering cleaning path planning, and robust trajectory tracking control of the robot are proposed. By using this system, the robot can running and working in the air duct automatically.

项目编号：2015-B-06

项目名称	用于分类任务、控制、数据挖掘、知识工程的新颖人工智能快速神经联想法 Novelty Fast Neuro-associative Methods of Artificial Intelligence for Classification Tasks, Control, Data Mining, and Knowledge Engineering
发布人	Adrian Horzyk
机构	矿业冶金学院 AGH University of Science and Technology
国家	波兰 Poland
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　通过构造联想神经图，用于机器人控制、数据挖掘和知识工程用途。该项目推广能力强，可以在通过C#增加其适应性和灵活性。

Fully automatically constructed and optimized classificators ASONN or multiclassificators MASONN automatically using the economically cheapest and most profitable sets of parameters for the final construction of dedicated classificators that characterizes with very high generalization abilities. Project/Technology/Product Development Status: adaptable and flexible computer application in C#. Construction of associative neural graphs (the adaptable associative neural graphs for engineering tasks in the world) for robotic control, data mining and knowledge engineering purposes. Project/Technology/Product Development Status: adaptable and flexible computer application in C#.

项目编号：2015-B-07

项目名称	仿生导航系统的整合与飞行试验 Integration and Flight Test of Bionic Navigation System
发布人	Lei Guo
机构	北京航空航天大学 Beihang University
国家	中国 China
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　已经拥有项目相关专利号CN 101571704 B，CN 101572533 B，CN 101246011 B，CN 101246012 B，CN 102122171 B，CN 102156478 B，CN 101586954 B，CN 101712381 B，CN 101941527 B，CN 101982732 B，CN 102159044 B，CN 102331786 B

　　1. 设计了基于偏振分光的仿生偏振导航传感器，它可以消除正交误差。我们提出了一种基于六通道偏振导航传感器的偏振计算方法，它采用了新的分割策略，提高了偏振信息的测量精度，简化了计算复杂度，因此可以很容易地移植。2. 设计了大气偏振探测结构三传感器。3. 设计了偏振/地磁/惯性组合的导航系统，研究了多传感器匹配问题，并最终完成地面和飞行试验。

1. Design a bionic polarized navigation sensor based on polarization splitting prim, which can eliminate the orthogonal error. Present a polarization calculation methods based on the six channels polarized navigation sensors, which uses a new segmentation strategy, increasing the measurement accuracy of polarization information, simplifying the computing complexity and hence can be easily transplanted. 2. Design an atmospheric polarization detection structure of three sensors. 3. Design the polarization/geomagnetic/INS integrated navigation system, research the multi-sensor matching problem, and ultimately complete ground and fight test.

项目编号：2015-B-08

项目名称	智能车辆自适应巡航控制 Self-learning Cruise Control for Intelligent Vehicles
发布人	Xin Xu
机构	国防科技大学 National University of Defense Technology
国家	中国 China
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

专利号2013103285713

我们提出一种采用基于近似策略迭代的自适应巡航控制方法，该巡航控制器由一个PI控制器和一个执行器组成。其步骤为：1）样本采集；2）利用基于核的最小二乘策略迭代(KLSPI)方法求解近似最优策略；3）在巡航控制中在线优化PI控制器参数。学习前后以及利用不同学习算法学习后的实验结果表明KLSPI算法的优越性，在城市交通环境中长时间的巡航控制和越野环境中的自主驾驶表明了该控制器能够用于这两种环境中的巡航控制，并且具有优秀的控制性能。

Patent 2013103285713 pending approval by Chinese Patent Office
This project proposed a novel learning-based cruise controller for intelligent vehicles with unknown dynamics and external disturbances. The learning controller consists of a time-varying proportional-integral (PI) module and an actor-critic learning control module with kernel machines. The learning objective for cruise control is to make the vehicle's longitudinal velocity track a smoothed spline-based velocity profile with smallest errors. The parameters in the PI module are adaptively tuned based on the vehicle' state and the action policy of the learning control module. Based on observation data obtained by some initial control policies, the action policy of the learning control module is optimized by using kernel-based least squares policy iteration (KLSPI), which is a recently developed reinforcement learning algorithm with sparse kernel machines. The effectiveness of the proposed controller was evaluated on an intelligent vehicle platform by experiments of long-distance driving in urban traffic and autonomous driving on an off-road terrain. The experimental results show that the learning control method can realize data-driven controller design and optimization based on KLSPI and the controller's performance is adaptive to different road conditions.

项目编号：**2015-B-09**

项目名称	机器人导航与传感器融合制图技术 Technology for Robot Navigation and Mapping with Sensor Fusion
发布人	Jack Jianguo Wang
机构	悉尼科技大学 University of Technology, Sydney
国家	澳大利亚 Australia
职务	讲师 Lecturer
项目所处阶段	研发
合作方式	投资合作

项目简介

　　项目主要包含两个技术。

　　一是基于IMU低消耗的机器人导航系统。该技术已经在Journal of Navigation发表，并被评为2014最佳论文。最近还被授予Michael Richey Medal奖。此导航系统可用于火灾现场，矿井下，还可用于步行机器人导航。二是传感器融合导航和制图。其中包括对GPS，INS，伪卫星相机和激光雷达等多年的深入研究，有许多交付系统和技术的进一步发展和应用。该技术不但包括各种传感器的数据处理和识别，而且传感器融合的设计和算法优化使强大的系统性能达到最优。该技术可用于各种领域，如机器人、交通和自动化。

One is "A Pedestrian Navigation System Based on Low Cost IMU". The related technologies are detailed on the paper published on the Journal of Navigation, which has been awarded the best paper in the journal in 2014. As the author I recently had been awarded the winner of the Michael Richey Medal presented by Prince Philip, This navigation system can be used for robust pedestrian navigation in challenging environment, such as for firefighters in disaster area, miners in mining and combat solders in the fight field. Also it can be used for walking robot navigation.

The second set of technologies is about the sensor fusion for navigation and mapping, which include GPS, INS, pseudolite camera and LIDAR etc. With many years' intensive research and development in this field, there are many deliverable systems and technologies for further development and application. The technologies include but not limit to various sensors' data processing and recognition; sensor set selection for optimal system design and development; sensor fusion design and algorithm implementation to achieve optimal and robust system performance. With many reputable publications and system developments, the related technologies are flexible to be implicated in different applications and to meet different requirements. The technologies can be used for various fields, such as robotics, transportation and automation.

项目编号：2015-B-10

项目名称	机器人机械臂的轨迹优化
	Trajectory Optimization for Robotic Manipulator
发布人	Ganesan Kanagaraj
机构	Thiagarajar 工程学院
	Thiagarajar College of Engineering
国家	印度
	India
职务	副教授
	Associate Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　项目主要内容包括：

　　该项目的主要目标是开发优化的轨迹启发式算法。执行重复任务，如弧焊、工业机器人机械手，这是至关重要的，可以降低错误的发生率。已经通过仿真实验验证了在MATLAB环境中的静态障碍的启发式算法的性能。

　　机器人轨迹优化的新的元启发式算法

　　使用锂离子微电池研制的机器人传感器

　　机器人组件的金属氧化物涂层

The main objective of the project is to develop heuristic algorithm for trajectory optimization. To performing repetitive tasks for industrial robot manipulator such as arc welding, it is crucial that the robot's end-effectors is able to reach the desired points with minimal error while avoiding collision with obstacles in the workspace to produce output with acceptable quality. The developed heuristic algorithm performance is validated by conducting simulation experiments in Matlab environment with static obstacle.

Development new meta heuristic algorithm for trajectory optimization of robotic manipulator

Development of Li-Ion micro batteries for robot sensors

Metal oxide coating for robot components

项目编号：**2015-B-11**

项目名称	作为交互式技术代理的社交机器人
	Exploring Human Perception of Novel Autonomous Agents
发布人	Jamy Jue Li
机构	斯坦福大学
	Stanford University
国家	美国
	USA
职务	研究员
	Researcher
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　该项目是在斯坦福大学设计研究中心提出的产品设计新概念和技术方案后的情况下进行研究，是社会科学实验的试用评价。主要研究自主机器人和车辆的探索性设计和社会科学评价。可以合资和合作：机器人系统的联合设计。作为学术合作伙伴，我们可以协助评估。我们希望企业可以提供机器人技术平台或基础设施。

Trial evaluations using social science experiments. Exploratory prototyping primarily used as proof of concepts.

The main research described here looks at exploratory design and social science evaluation of autonomous robots and cars.

Joint venture/cooperation: joint design of a robot system. As the academic partner, we could assist with evaluation. We would like the Company to provide use of its robotics technology platform/infrastructure.

项目编号：2015-B-12

项目名称	俄罗斯科学院项目：智能 Robotronics Intelligent Robotronics
发布人	Valentin E. Pryanichnikov
机构	俄罗斯科学院 Russian Academy of Sciences
国家	俄罗斯 Russia
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

主要包括 2 个技术：

1 脱硫部件电池医生

双倍使用寿命，消除沸腾和自放电。

2 移动 AMUR 机器人

远程生态监测机器人

Russian trade-marks: "Suprim" "Magic powder" "Sensorika"

Russian and German patents on Suprim:

Technology of producing of bio-glove protective cream - new substance

Russian patent on Magic powder:

Improving chemical agent for acid and alkaline batteries

All the products, listed in our Commercial letter are field tested

And are suggesting to the market.

项目编号：2015-B-13

项目名称	机器人的混沌应用 Chaos Application in Robotics
发布人	Marat Akhmet
机构	中东科技大学 Middle East Technical University (METU)
国家	土耳其 Turkey
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　我们将混沌和混沌控制的基础上考虑如何提高机器人的功能，它是已知的混沌动力学是一个丰富的潜在运动，包括无限多周期的供应。因此可以显着地改善机器人的应用程序的灵活性。具体理论可以参考 M. Akhmet 和 M. O. Fen 在 2015 的斯普林格发表的 Replication of Chaos in Neural Networks 一书。

We will consider problem how to increase functional abilities of robots on the basis of chaos generation and chaos control. It is known that chaotic dynamics is a rich supply of potential motions, including infinitely many periodic ones. Control of chaos allows to make a choice among them. Thus, flexibility of robots application can be improved significantly if chaos is involved in their construction. We suggest to make this approach much more stronger by utilizing our last theoretical research summarized the book, M. Akhmet, M. O. Fen, Replication of chaos in Neural Networks, Economy and Physics, Springer, 2015, concerning replication of chaos, synchronization of chaos and control of large communities of chaotic systems. These all can be useful for making autonomous robots more versatile and more self-organized as well as for activity of several robots.

C.机器人系统与安全

Robots System and Security

项目编号：2015-C-01

项目名称	Mechatronics 4.0 项目-复杂控制应用中的开源软件框架 Mechatronics 4.0
发布人	Nico Huebel
机构	天主教鲁汶大学 KU Leuven
国家	比利时 Belgium
职务	科学家 Research Scientist
项目所处阶段	研发
合作方式	投资合作

项目简介
机电一体化应用程序渐渐的变为系统中包含系统（多个独立的子系统结合在一个大的运动控制应用程序），如移动机械手臂系统，即多个移动基础系统配备了机器人手臂，彼此间合作。当然最后还有主流信息和通讯技术的加入，比如云和物联网。我们的项目将通过使用运动控制以及其他的级别的模型驱动设备和系统，是运动控制堆栈中的任何模块都可以进行控制参数配置，通过对上下模块进行优化，可以自动组成一个新的系统。我们有多年的开源项目开发经验，具体可查看网站 www.orocos.org 和 www.roboticopenplatform.org。
Mechatronics applications evolve towards "systems-of-systems" (several independent sub-systems combined in one large motion control application), in several complementary ways. In single machines, since they get always more functionalities. In emerging examples like mobile manipulator systems, i.e., several mobile bases equipped with robot arms, cooperating amongst each other as well as with fixed machining cells and humans. And finally in the mainstream Information and Communications Technology (ICT) trends towards "cloud" and "Internet of Things". The project tackles these challenges via a Model-Driven Engineering approach to motion control, at all levels of modern mechatronic devices and systems, in an "Industry 4.0" context, and with a "systems-of-systems" methodology: any module in a motion control stack is designed to become part of a larger system, with control parameters that can be configured (at compile time, deployment time, as well as runtime) to differ from the original context for which the module was optimized, and with an automated composition of the new system based on a model of its envisaged set of tasks. Our groups have years of experience in developing open-source projects, as visible from www.orocos.org and http://www.roboticopenplatform.org/.

项目编号：2015-C-02

项目名称	智能 3D 抓取技术 Smart Pick 3D
发布人	Stefano Tonello
机构	IT+Robotics IT+Robotics 公司
国家	意大利 Italy
职务	首席执行官 CEO
项目所处阶段	研发
合作方式	投资合作
项目简介	

    智能三维拾取是一种理想的随机选择机器人指导方案。由于使用了一个先进的视觉系统，智能三维拾取允许一个机器人机械手收集对象随机安排在一个容器内。在系统的开发过程中，特别注意了鲁棒性和功能连续性方面，无需操作员干预。为此，创新的专有算法已经开发出来，以确保在每个对象的不接触的情况下的采集。

Smart Pick 3D is an ideal robot guidance solution for random bin picking. Thanks to the use of an advanced vision system, the Smart Pick 3D allows a robot manipulator to collect objects randomly arranged within a container, or else objects being moved along a conveyor belt. The use of vision systems allows for numerous benefits to be obtained with respect to conventional automation systems. One of the most important factors is the extreme flexibility with which various types of products can be handled using the same automation. Since the system collects the products directly from the containers in which they are stored, there is no need for mechanical systems dedicated to each single type of product. New product codes can be established directly by the end customer via the programming software supplied along with the system itself. Smart Pick 3D unit is compatible with all robots and PLCs, thus allowing for easy integration within the production line.

项目编号：**2015-C-03**

项目名称	Workcell Simulator 项目 Workcell Simulator
发布人	Stefano Tonello
机构	IT+Robotics IT+Robotics 公司
国家	意大利 Italy
职务	首席执行官 CEO
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　Workcell Simulator利用最先进的人工智能算法自动确定生产过程中的工作单元，控制操纵一个或多个机器人和机器。控制器的程序生成使用最先进的机器人运动规划技术，保证在自动碰撞情况下完全有效的轨迹。Workcell Simulator是工业自动化领域最完美的选择，它使项目变得更加容易，使复杂的工作单元变得简单。

Workcell Simulator is a 3D simulator for the off-line programming of workcells and machines with several axis. Starting from the drawing of the piece which is to be worked, Workcell Simulator simulates the entire work process, autonomously generating the code for the controller without the need to keep the plant busy during the programming.

Workcell Simulator exploits the most advanced artificial intelligence algorithms to autonomously define the production process, controlling one or more manipulating robots and all the machines contained in the work cell. The program for the controller is generated using the most advanced robot motion planning techniques, which automatically guarantee fully efficient trajectories and the absence of collisions. Workcell Simulator is the perfect choice in the field of industrial automation: it makes programming easier, from the most complex work cell to a single machine.

项目编号：2015-C-04

项目名称	高级认知水下机器人 Advanced Cognitive Underwater Robots
发布人	Changyun Wei
机构	河海大学 Hohai University
国家	中国 China
职务	讲师 Lecturer
项目所处阶段	研发
合作方式	投资合作

项目简介

　　这是一个正在进行中的项目，主要目标是制造一款拥有高级认知能力的深海挖掘机器人。深海采矿项目最困难的处理不可预测的海洋干扰，包括洋流，压力，风等等。传统的控制测量范式不是很容易应用到海洋挖掘机控制中，因此要制造一个可以根据海洋动态环境自己做出决定的深海挖掘机器人。此项目的目标是为一个具备感知能力、理性的、有计划的、可以做决定的、学习型的并且能够由人工相互配合的深海挖掘机。

It is an ongoing project.

The most difficult challenge for large-scale deep-sea mining projects is that the deep-sea mining process has to deal with unpredictable interference in ocean environments such as wind, wave, current and pressure. Traditional measurement-control paradigm cannot be easily applied to control a deep-sea excavator. Therefore, advanced robotic control frameworks have to be proposed so that a deep-sea excavator can make its own decisions in dynamic ocean environments. The objective of the project is that a deep-sea excavator is capable of perceiving, reasoning, planning, decision making, learning and also interacting with human operators.

项目编号：**2015-C-05**

项目名称	人与机器人情感互动 Human-Robot Empathic Interaction
发布人	Doreen Ying Ying Sim
机构	马来西亚砂拉越大学 Universiti Malaysia Sarawak
国家	马来西亚 Malaysia
职务	副教授 Associate Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　已于 2015 年 3 月 18 日得到专利批准，专利号 PI 2015700860

　　该项目已经 100%完成，主要通过脑电图和自我分析报告，开发了一个完整的方法来量化人
与机器人的情感互动。

Patent Code, according to the application number and the filing date of 18 March 2015, is PI
2015700860. This patent filing information is for our project titled 'Human-Robot Empathic
Interaction'.

Project Development Status is completed or almost more than 100% completed as many research
findings and research papers have been published in many prestigious international conferences,
peer-reviewed and ISI-indexed or SCOPUS-indexed international journals.

项目编号：2015-C-06

项目名称	智能安全头盔 Smart Safety Helmet
发布人	Martin J.-D. Otis
机构	加拿大魁北克大学希库蒂米分校 University of Quebec at Chicoutimi
国家	加拿大 Canada
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

美国专利号61908075，23-NOV-2013

专门为评估工业厂房风险制造的安全帽和可穿戴式传感器设备。预计需要3年，需投资约15万美金。

Martin Otis, method and system to control industrial plant using risk evaluation from a safety helmet and wearable sensor therefore, Provisional US patent application 61908075, 23-NOV-2013

We need investment (about 150k$ on three years) for the first pre-commercial prototype.

项目编号：2015-C-07

项目名称	无需 GPS 或人工控制的无人飞行器
	Drones Flying Without GPS or Human-controlled
发布人	Wai Kiang Yeap
机构	奥克兰理工大学
	Auckland University of Technology
国家	新西兰
	New Zealand
职务	教授
	Professor
项目所处阶段	研发
合作方式	投资合作

项目简介
我们已经开发了一种基于自然物种如何了解他们环境的新异方法了解环境。当前机器人地图是基于SLAM，当然这是在有精确并且完成的地图的基础之上。Gibson在1979的研究中表明，我们想去到一个地方并不需要一个完整的视图，因此连续整合的地图并不是必须的，可能只需要一个单一视角的环境地图或是局部环境便可以做一次冒险的进入。我们已经使用该理论对配备了激光和里程计的轮式移动机器人进行了测试。我们寻求开发商业无人机，使用我们的理论，只需要简单的相机，无需人工或是GPS控制，也不需要建立一个完整的确切的地图。
We have developed a novel approach to learning the environment based on studying how natural species learn about their environment. Current robot mapping is based on SLAM and they aim to build an exact and complete map. Following Gibson's (1979) theory of affordance, we observe that a view does not make explicit just what and where things are but also affords venturing into. Consequently, instead of integrating successive views to form a map of the environment, it suffices to remember a single perspective view of the environment as a map of the local environment that one is about to venture into. From such a list, it is possible to combine two or more adjacent local maps into a global metric map if they have overlapping regions containing shared objects. We have tested the theory on a wheeled mobile robot equipped with a laser and an odometer. We seek collaborations to develop commercial drones that can use our theory to fly on its own, without human or GPS controlled, without building an exact and complete map, and with simple cameras.

D. 工业机器人应用

Applications of Industrial Robots

项目编号：**2015-D-01**

项目名称	经济适用型工业机器人及应用
	Low-Cost, High Usability Industrial Robots
发布人	George Q. Zhang
机构	ABB 公司研究中心
	ABB Corporate Research Center
国家	美国
	USA
职务	资深首席科学家
	Senior Principal Scientist
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　主要是对经济适用型工业机器人制作思路和初步设计，需要资金进行下一步研究。目前高端和多功能机器人系能很难使用，并且很多额外功能中的大多数是没有被利用的。设计的经济适用型工业机器人主要有以下策略：

　　1.设计机器人驱动单元安装在特定位置。2.使用低成本的变速箱和马达。3.开发领域专用机器人。4.将目标锁定到中小型企业。5.在教育和培训中可以使用低成本机器人系统

Industrial robotics have been invented and used for several decades. There are a handful of major robotics companies that dominate this industry. In the competition, robotic companies intend to develop comprehensive, high-end and multi-functional robotic systems which are difficult to use and with a lot of extra features that will not be needed in most applications. This proposes is about low-cost, high usability and ease-to-use industrial robot and its manufacturing automation systems. Here are some highlights of the strategy and mothed.

1) Design robots with their drive units on fixed position. 2) Use low-cost gearbox and motors. 3) Develop application specific robot. 4) Target small and medium size business. 5) Use low-cost robot systems in education and training

项目编号：2015-D-02

项目名称	下肢外骨骼康复主动平衡系统 Rehabilitation Lowerbody Exoskeleton with Active Balancing System
发布人	Savin Igorevich Sergei
机构	西南州立大学 Southwest State University
国家	俄罗斯 Russia
职务	科学家 Scientist
项目所处阶段	研发
合作方式	投资合作

项目简介

　　已经被The Russian Federal Service for Intellectual Property批准获得专利201504473和201507323

　　该项目可以帮助即使下肢有伤残的人类可以正常运动，项目的主要特点是改善了从坐到站立期间垂直化的外骨骼控制运动的动力学性能。

Patent application number 201504473 pending approval by The Russian Federal Service for Intellectual Property

Patent application number 201507323 pending approval by The Russian Federal Service for Intellectual Property

This project is focused on improvement of the dynamical properties of the exoskeleton controlled motion during verticalization, when the machine moves from sitting to standing position. That includes formulating performance quality measurements, synthesizing the input values of the system, synthesizing the structure of the control system and tuning the regulator.

项目编号：2015-D-03

项目名称	收割如甜瓜和西瓜等作物的机器人平台 Robotic Platform for Harvesting Crops Such as Melons and Watermelons
发布人	Raphael Linker
机构	以色列理工学院 Israel Institute of Technology
国家	以色列 Israel
职务	副教授 Associate Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

我们开发了一款仿真和优化的机器人平台，主要用来收获地上的水果或蔬菜，比如甜瓜、西瓜等。我们的设计原理是先确定一个平面直角坐标，机器人将沿着横轴和纵轴以一个恒定的速度前进，尽可能多的收集作物。

Fruits which are lying on the ground, such as melons or watermelons, are easier to harvest than fruits which are surrounded by leaves inside a three-dimensional canopy such as sweet peppers, tomatoes or apples. We have developed simulation and optimization tools for determining the optimal design of an autonomous Cartesian robotic platform which would travel in the field at a constant speed and collect as many melons or watermelons as possible.

项目编号：**2015-D-04**

项目名称	可在果园执行监控任务的小型无人机 Use of Small Autonomous Unmanned Airborne Vehicle (UAV) for Scouting and Monitoring Tasks In Orchards
发布人	Raphael Linker
机构	以色列理工学院 Israel Institute of Technology
国家	以色列 Israel
职务	副教授 Associate Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　最近几年在农业中用于监控的无人机研究吸引的很多人，但是大多数无人机都是为大田作物开发的，只有很少一部分可以用于果园。我们将开发一个专门为果园服务的无人机，可以收集非常广泛范围内的信息，更高的分辨率，可以在树顶 10 米以上或者更高进行监控。

In recent year there is a lot of interest in the use of UAVs in agriculture and today there are commercial systems available for monitoring and scouting tasks. Most of these systems were developed for field crops but there are also some systems available for orchards. All these systems use a UAV which flies over the crop. We want to develop a UAV specifically for orchards, which will fly within the trees so that it will be able to collect information from a very close range and will have a much higher resolution than platforms which are typically flying 10m or more over the tree tops.

项目编号：2015-D-05

项目名称	Trend Matrix 项目 Trend Matrix
发布人	Pedro Fuentes-Dura
机构	巴伦西亚理工大学 Universitat Politécnica de Valéncia
国家	西班牙 Spain
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

项目已在 UPV 注册：R-15784-2011 -Matriz de tendencias

该技术已经成功应用（在意大利玩具企业）

该项目的主要是创建一个为公司定制的平台，以检测从新产品设计到产品推出适宜机会。该平台有助于将公司的各个分散的部门整合，为中小公司的知识管理获取大量资源，减少产品从生产到上市的周期。

Registered at Technological offer UPV. R-15784-2011 -Matriz de tendencias. New code from Europe Enterprise network is coming soon. The technology has been successfully applied (e.g. Toy sector in Italy).The main application of the tool is to create a company customized observatory to detect opportunities for new products from design to product launch:

Synthesize the value chain of any sector

Identify key agents in every sector and countries that contribute to add value to final products.

Knowledge management for SMEs, access to large number of innovation sources.

Customization by classification by interest, tagging by hierarchy.

Information selection criteria establishment and implementation.

Reduction of time to market processes.

项目编号：**2015-D-06**

项目名称	用于工业机器人的遥操作远程站 Telepresence Station for Teleoperation of an Industrial Robot
发布人	Prabir Kumar Pal
机构	巴巴原子研究中心 BARC
国家	印度 India
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作
项目简介	

　　目前该项目正在实验室进行评估实验，有几个组件的技术已经完成，需要在实际的应用中进行评估，才能决定如何进行组装。可以到现场更好解释该项目。

It is at the level of trial and evaluation at the Laboratory. There are several component technologies which we have tried. They need to be assessed for their usefulness in practical jobs, and then put together in a convenient-to-use package. I can explain the idea.

项目编号：2015-D-07

项目名称	为胶囊机器人设计的通用磁场导航系统 Universal Magnetic Field Navigation System for Capsule Robot
发布人	Yongshun Zhang
机构	大连理工大学 Dalian University of Technology
国家	中国 China
职务	教授 Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　该项目已经在中国申请了以下专利

　　ZL200710159159.8，ZL200810011110.2，ZL200910306805.8，ZL201210039753.4，ZL201310282753.1，ZL201510157709.7，ZL201510263117.3，ZL201510262778.4，

　　目前大多数胶囊内窥镜依赖自然蠕动和重力移动，速度移动方向基本随机，因此对于胃肠道诊断不是十分有效。本项目通过对胶囊内镜外部加装磁场导航系统，实现对胶囊机器人在胃肠道的磁操控，实验结果已经证明，可保证胶囊内窥镜在肠道中保持稳定，连续，可控的运动。

Existing capsule endoscopes used in a medical capacity today are passive devices, relying on natural peristalsis and gravity to move the capsule, thus, the speed, direction of travel and orientation of the device are substantially random. Accordingly, the diagnosis becomes less effective in some spots of the GI tract such as esophagus, stomach and colon. The control system for generating universal magnetic spin vector has been developed, including three-axis Helmholtz coils and power sources with three-phase variable frequency, along with several types of capsule robots such as a latest developed dual hemisphere capsule robot with active and passive modes, which can separate the orientation adjustment from rolling locomotion of the device and prevent the device from rolling away and missing the suspicious spots in the GI tract. The experimental results in the GI tract have demonstrated that the external magnetic torque can effectively used both to adjust the robot posture accurately，uniquely and stably under the dynamic magnetic following effect in the passive mode for diagnostic and therapeutic applications and roll it in active mode to another location in the curved GI tract for further operations in a stable, continuous, and controllable motion.

项目编号：2015-D-08

项目名称	电镀生产线上物料搬运机器人的调度模型及算法 Scheduling Models and Algorithms on the Material Handling Robots in the Electroplating Lines
发布人	Pengyu Yan
机构	中国电子科技大学 University of Electronic Science and Technology of China
国家	中国 China
职务	副教授 Associate Professor
项目所处阶段	研发
合作方式	投资合作

项目简介

　　该技术基于我们近十年对物料搬运机器人调度问题的研究结果，可以被广泛的应用在电镀生产线或生产印刷电路板表面处理车间（PCBs），航空航天部件，眼镜和珠宝生产中。我们对于具有不同特点的生产系统模型提出了混合整数规划（MIP）的调度问题。我们应用CPLEX软件来解决这些MIP问题，同时获得机器人操作进程表。我们的技术可以进一步编入ERP或MRPⅡ以提高生产率或降低厂房车间成本。

This technology was based on our research results on scheduling problems of material handling robots in the last decade, which were widely equipped in electroplating lines or surface treatment workshops for producing printed circuit boards (PCBs), aerospace parts, spectacle and jewelry. We proposed the mixed integer programming (MIP) models for the scheduling problems in such production systems with different characteristics. We applied the CPLEX software to solve these MIP models and get the schedules of the robots' operations. We also proposed more efficient heuristic or meta-heuristic algorithms for some models with special structure. We believe that our technology can be further programmed into ERP or MRP II to improve the productivity or reduce the costs of the real workshops.