历届“建设工程与管理创新竞赛”优秀作品

第六届一等奖作品

作品名称：多代碳平衡 SOFC 废弃资源回收系统在建筑物中的应用

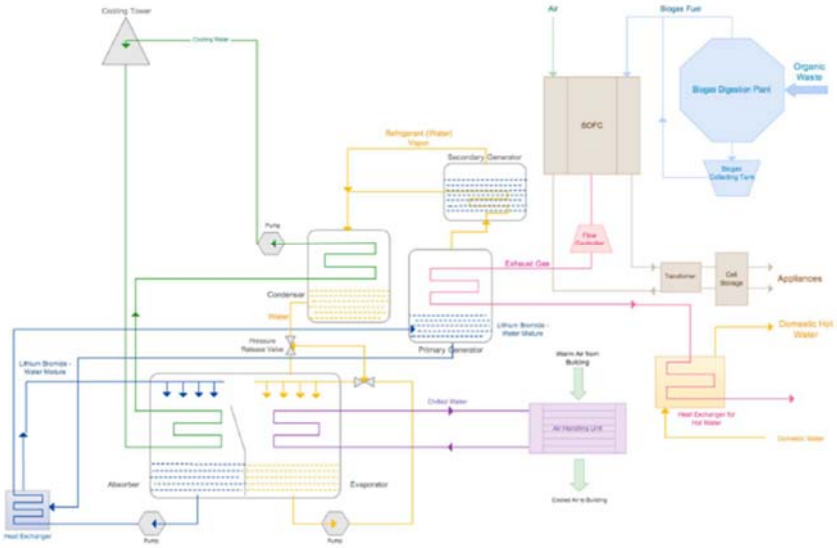
A Carbon Neutral SOFC-Based Multi-generation System for Building Application

作品分类：建筑工程健康、安全与环境技术创新

参赛队学校：香港理工大学

全球性能源危机背景下，寻找替代能源和提高能源利用率成为当务之急。固体氧化物燃料电池（SOFC）的出现为低碳能源生产和能源高效利用带来了可能。本文通过调研和采访，论证了由沼气提供能源的碳平衡固体氧化物燃料电池的经济可行性和在提高能源利用率、降低二氧化碳排放量等方面的作用，为这种新技术在中国大陆和香港的推广提出了建议。

Energy crisis has become an undeniable global issue. Many efforts have been made in finding renewable energy such as solar heating and bioenergy. The paper proposed a carbon neutral SOFC multi generation system, integrated with biogas digestion. Economic analysis based on a case study of Hong Kong International Airport shows the financial feasibility of this system. Sensitivity analysis incorporating 9 influential factors indicate that the increases in the level of government subsidy, rate of electricity and rate gas fuel are favorable to shorten the pay back period.



第七届一等奖作品

作品名称：基于手机二维码的室内精准定位系统研发

Research of Precise Indoor Location System Based on Handset QR code

作品分类：智慧物业/智慧城市

参赛队学校：华南理工大学

随着手机网络的发展，基于位置的服务在我们的现代生活中扮演了非常重要的角色。在室外我们可以使用 GPS 或者百度、谷歌地图 APP 进行导航，然而在室内这些导航工具就无法发挥作用了。现代建筑的体量越来越庞大，设计越来越复杂，我们常常遇到这样的问题：想要在商场里迅速地找到洗手间；在停车场便捷地找到自己停车的区域；在超市里准确地找到所需商品的货架，因此也就产生了对于室内定位技术的需求。这款适用于安卓系统的手机 APP 就可以通过手机二维码扫描，获取室内的平面图，并显示用户所在位置。用户输入想要到达的地点，确定后即可开始导航。软件也提供了多种信息处理的技术，例如点亮重要公共设施图标；对区域进行命名和上色进行区分；点击超链接获取详细信息等。此外，平面图的信息也通过两层进行记录，根据平面图缩放的情况可以提供详细或者概要的信息方便用户阅读使用，也方便商家将自己的宣传信息放入详细信息中推送给用户。从此再也不用担心在室内迷路了！

With the development of the mobile Internet, location-based services (LBS) play a vital role in modern life. Due to we could not receive the GPS data indoors, indoor positioning technology has been unable to meet our demand. This paper put forward the precise indoor location system based on handset QR code creatively after investigating a number of smartphone users. Based on the Android system which is popular all over the world, this study designed and developed an App (mobile application) that is a successful application of the precise indoor location system based on handset QR code. With three basic functions: precise positioning, user-friendly navigation and a wealth of information, the App can meet the basic demands in the large public buildings in daily life.

第八届一等奖作品

作品名称：建筑业安全培训中虚拟现实技术的发展

Development of Virtual Reality in Construction Safety Training

作品分类：建筑安全

参赛队学校：香港城市大学

建筑安全近年来得到政府和公众的广泛关注。香港建筑业界强制规定建筑工人需要进行 7 个小时的建筑安全教育，内容包括建筑事故的产生原因和预防措施等。然而，传统的教育只是用 PPT 和视频进行说教，效果并不明显。本文则使用了新兴的虚拟现实技术对工人进行安全教育。工人使用 Unity 3D 虚拟现实应用以及 Oculus Rift 头盔，模拟三种危险工作情境，包括在脚手架上高空工作，缺乏保护措施和缺乏对周围环境的认识。工人在三种危险情境下做出反应，并模拟出不同反应产生的结果。虚拟现实技术使工人有了身临其境的感觉，从而对安全教育的内容有了更深的印象和理解。

第九届一等奖作品

作品名称：Bus Occupancy Levels in Real-Time Using Wireless Data Transmission

作品分类：智能交通

参赛队学校：华南理工大学

Urban public transport is closely associated with urban life, which accounts for an important position that cannot be replaced in the development of the city. In 2012,the State Council put forward the development strategy of “bus priority”, making the optimization of Smart City’s bus system extremely urgent. The solution described on this paper focused on providing commuters with real-time forecast of bus occupancy levels through wireless data transmission system. For public bus systems, collected data can be applied to time-scheduling, vehicle management and network building. Such solution would be significant for commuters to travel more effectively and for reasonably guiding. It will also be a step toward the completion of developing future smart cities.