2022 年英特尔杯大学生电子设计竞赛嵌入式系统专题邀请赛

参赛队作品简介

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作品题目 （中英文对照）	私人定制--科技馆智能互动型讲解机器人 Personal Tailor--Intelligent interactive explanation robot for science and technology museum		

作品简介

（中英文对照，中文限 500 字以内）

传统的科技馆参观存在预约讲解难、讲解员数量不够的问题，存在服务人数有限、参观者体验感弱的弊端。对比现有的博物馆参观模式，拥有自主动态路径和定制化参观讲解服务授权的智能互动讲解机器人提供了高效、方便的参观方式，提供智能人机交互的一站式讲解服务。在实际应用中参观互动主要靠讲解员指引，针对此问题设计的嵌入式智能讲解机器人可以很好的解决该问题。本产品的主要功能为“定制”+“讲解”。“定制”需要做到对参观者身份的核验，并且根据参观者信息提供服务。本作品在收集人脸样本时取亮度和对比度为随机数以确保样本的多样性,以 Seavo GNS-V40 为边缘计算核心,在边缘计算上采用基于 Resnet 的残差网络提取人脸中 128 维度向量特征,保证识别率的同时让边缘终端调取网络摄像头时网络能够较快收敛；在语音上我们采用模糊处理进行识别，保障系统能够从用户的语音中提取出有效指令。“讲解”需要做到实时定位，移动导航以及正确行驶规定路线。团队将功能拆分为以下七个部分，包括：获取预约信息、人脸识别解锁、智能语音交互、定制参观路线、自主导航运行、动态路线规划、实时定位分析。

Traditional science and technology museum visits have problems such as difficulty in making reservations for explanations, insufficient number of explainers, and the disadvantages of limited number of services and weak sense of visitor experience. Compared with the existing museum visiting mode, the intelligent interactive explanation robot with independent dynamic path and customized visit explanation service authorization provides an efficient and convenient way of visiting, and provides a one-stop explanation service for intelligent human-computer interaction. In practical application, the visit and interaction mainly rely on the guidance of the instructor. The embedded intelligent explanation robot designed for this problem can solve this problem very well. The main function of this product is "customization" and "explanation". "Customization" needs to verify the identity of the visitor and provide services based on the visitor's information. This work takes the brightness and contrast as random numbers when collecting face samples to ensure the diversity of the samples. Taking Seavo GNS-V40 as the edge computing core, the Resnet-based residual network is used in edge computing to extract 128-dimensional vector features in the face, which ensures the recognition rate and allows the network to converge faster when the edge terminal calls the webcam. "Explanation" requires real-time positioning, mobile navigation and correct driving of prescribed routes. The team divided the functions into the following seven parts, including: obtaining appointment information, face recognition unlocking, intelligent voice interaction, customized visiting routes, autonomous navigation operation, dynamic route planning, and real-time positioning analysis.