

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)	瞩目行者——农村痴呆症老人随行机器人 Wukong Heart: Rural Robot for Alzheimer's Patients		
作品简介 (中英文对照, 中文限 500 字以内)	<p>中国农村老龄化问题已经相当严重,“空巢老人”占比很高,同时老年痴呆症发病率逐年上升,由此症所导致的安全事件也时有发生,走丢走失的情况经常出现,甚至成为困扰我国乡村振兴战略的严重社会问题。</p> <p>痴呆老人的精神状况较差,穿戴设备特别容易遗忘遗失。同时乡村地理环境比较复杂,人口密度很低,公安监控摄像头分布稀少,老人走失后非常难以找回。针对上述问题,作品基于 Intel 边缘计算平台和 OpenVINO 神经网络计算框架,设计了一款应用于农村地区的痴呆症老人随行机器人系统,从而避免老人走失。</p> <p>作品利用农村广泛安装的庭院摄像头,采用深度神经网络技术捕捉老年人的物理位置和图像特征,在发现老年人离家时启动机器人伴行,特殊情况升空无人机伴飞。作品针对农村的地形特点和运维难点,采用轮毂电机自主设计了机器人本体软硬件系统,攻克了摄像头、陆地机身和无人机的跨设备目标跟踪难题,解决了多轮毂电机伺服控制、机器人导航避障、移动平台无人机自主起降等问题,开发了机器人管理云端系统、移动手机 App 软件、机器人运维管理桌面软件,实现了家里摄像头跟踪、路上机器人跟随、野地无人机伴飞、外地实时查看、意外情况邻里协助的全方位智能看护方案。</p> <p>作品能够预防农村痴呆老人走丢走失,减少安全事故,和谐美好乡村。</p> <p>With the trend of aging population in China, the incidence of Alzheimer's disease is increasing year by year, especially in rural areas. There are a large number of "empty-nest elderly" in rural areas, and security incidents caused by this disease also occur from time to time, and the situation of getting lost frequently occurs, which has become a serious social problem that plagues my country's rural revitalization strategy. Due to the poor mental state of the elderly with dementia, it is difficult for ordinary wearable devices to function for a long time. At the same time, due to the complex geographical environment of the countryside and the low population density, if ordinary tracking equipment is used, there are defects in the adaptability to the terrain and the battery life. Combining the above problems and taking into account the actual situation of most villages, the design of the works adopts the following scheme.</p> <p>The work uses Intel edge computing platform, adopts Intel's OpenVINO framework, uses machine learning algorithm based on deep neural network to realize face recognition and target tracking algorithm, uses housekeeping network camera to conduct real-time data through 5G and WIFI network and</p>		

robot intelligent computing system And based on the Siamese neural network, the cross-camera pedestrian re-identification is realized to extract the feature of the target and track the target. The system consists of robots and drones to form an air-ground coordination system, which effectively solves the problems existing in rural following. When the elderly accompany them when they go out, a remote intelligent nursing program for elderly dementia patients in rural areas has been established.

The work can realize the collaborative care of the entire family and society for the elderly with dementia in rural areas, prevent the elderly from getting lost and possible safety accidents, so that the elderly can spend their old age in peace and build a harmonious and beautiful countryside.

- 注：
1. 请使用小4号字（12号字），单倍行距填写；
 2. 每支参赛队限一名指导教师；
 3. 参赛队员姓名应与正式报名表一致；
 4. 作品题目应与作品设计报告一致。