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）	基于多模态情感分析的学习状态评估系统 Learning Status Assessment System Based on Emotion Analysis with Multimodal Information Input		

作品简介（中英文对照，中文限 500 字以内）

　　在后疫情时代，局部频发的疫情导致了教学逐步以线下和线上相结合的形式进行。在以线上模式为主导的课堂教学中，突增的视频信息给以云计算为中心的传统教学质量评估系统带来了巨大的计算压力。为分担计算中心的巨大计算强度，分布式的边缘计算成为发展趋势。本作品基于 Intel GNS-V40 边缘计算主机，开发了一套基于多模态情感分析的学习状态评估系统。本作品能够在家庭、课堂等边缘端进行部署，对学生的学习状态进行实时的评估，并能够将最终结果上传至学校云服务器端，云服务器端只需要处理各个边缘端的汇总信息，进行总体的教学质量评估，从而大大减轻了中心计算的压力。

　　本作品中基于 EmoNet、YOLO 在内的多类神经网络，用深度学习的方法对学生进行学习状态评估，拥有优良的性能。本作品通过对学生情绪、学习环境等多模态信息进行基于深度学习的处理，能够生成学习评估报告、反馈学生状态信息以及给出相应的指导意见。同时，本作品开发了相应的学习辅助功能、语音助手功能和友好的人机交互界面，能够在广泛的场景（包括学校教学环境、心理咨询中心等）中应用，具有广阔的发展前景。

　　In the post-epidemic era, local and frequent epidemics have led to the gradual combination of offline and online teaching. In the classroom teaching dominated by the online mode, the sudden increase of video information has brought huge computing pressure to the traditional teaching quality evaluation system based on cloud central computing. In order to share the huge computing intensity of computing centers, distributed edge computing has become a development trend. Based on the Intel GNS-V40 edge computing host, this work develops learning status assessment system based on emotion analysis with multimodal information input. This work can be deployed in edge occasions such as families and classrooms, evaluate students' learning status in real time, and upload the final results to the school's cloud server. The cloud server only needs to process the aggregated information of each edge to conduct overall teaching quality assessment, thus greatly reducing the pressure on central computing.

　　In this work, based on multiple types of neural networks including

EmoNet and YOLO, the deep learning method is used to evaluate the learning status of students, which has excellent performance. By processing multi-modal information such as student emotions and learning environment based on deep learning, it can generate learning assessment reports, feedback student status information, and give corresponding guidance. At the same time, this work has developed learning assistance functions, voice assistant functions and friendly human-computer interaction interface, which can be applied in a wide range of scenarios (including school teaching occasions, psychological counseling centers, etc.), and it has broad development prospects.

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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；
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