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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作品简介

（中英文对照，中文限 500 字以内）

脑瘫、渐冻症等患者大多有语言机能和身体机能损伤，如何满足这类患者的沟通需求和精神娱乐需求一直是社会关注的热点。我们基于第 11 代英特尔“酷睿”处理器（Tiger Lake）、tensorflowjs 开源神经网络框架、clmtrackr 库，设计了具有眼动跟踪功能、基于情感分析的 AI 音乐设计功能以及人机交互功能的瞳话。为了满足眼动跟踪模块对眼动识别和反馈实时性的高要求，我们利用了 GVN-V40 强劲的边缘计算能力，从而实现眼动跟踪的实时推理，并且借助人性化设计的虚拟键盘实现了中文输出。AI 音乐生成模块，我们利用 Long-short time memroy(LSTM)模型在大量 MIDI 音乐文件的基础上训练得到所使用的音乐生成模型。我们把用户欣赏图画的行为表征成音乐数据，通过音乐生成模型，生成一段富含情感可听的音乐，让用户可以体会到艺术创作的魅力。经过测试，瞳话已经能够满足身体机能有损伤的患者的基本沟通和艺术创作需求，为他们的生活增添更多的快乐和色彩！

Cerebral palsy and ALS which makes patients lose linguistic skills and physical function, causes patients to be unable to have a normal communication with others. Therefore, how to meet the communication needs of such patients has always been a hot spot for social attention. For these patients, the most flexible organs are the eyes, and the development of eye tracking technology has brought opportunities to such patients. In order to solve their communication problems and meet their spiritual needs, we are based on the 11th generation Intel "Core" processor (Tiger Lake), TensorFlow.JS - an open source neural network framework, CLMTRACKR library, to design Tonghua which has eye tracking function ,AI music design function based on emotional analysis and human-computer interaction function. In order to meet the high requirements of eye tracking module to recognize and feedback real-time, we have used the GVN-V40 strong marginal computing capabilities to achieve real-time eye tracking, and use the humanized design virtual keyboard to achieve Chinese Output.As to the AI music generation module, we use the Long-Short Time Memroy (LSTM) model to train the music generation model used on the basis of a large number of MIDI music files. We record the behavior of users when they appreciate the pictures into music data.And then through the music generation model, users will get an emotional and listening music, so that users can experience the charm of artistic creation. After testing, the Tonghua have been able to meet the basic communication and artistic creation needs of patients who have damaged physical functions.Besides, Tonghua can add more happiness and color to their lives!