

Deploying EMOLight on Edge TPU Device

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Project summary

This proposed extension of EMOLight project to be deployed on Edge TPU (Tensorflow Processing Unit) devices to facilitate advanced accessibility and real-time multisensory technologies. Our previously funded EMOLight project is an innovative system that synchronises ambient lighting with audio-emotional cues and has already demonstrated its potential to enrich media experiences for the audibly impaired. Deploying this solution on Edge TPU devices ensures low-latency, and energy-efficient processing, making it ideal for real-world applications where responsiveness and scalability are essential. This project aligns with the growing edge computing trends, bringing intelligent, adaptive systems closer to users and enhancing the practicality of inclusive media technologies.

The extension optimises EMOLight's YAMNet-based emotion recognition model for Edge TPU deployment. Key objectives include redesigning the audio processing pipeline to leverage the Edge TPU's low-power, high-speed capabilities for real-time multi-label classification using several optimisation techniques like quantisation and distillation. The project also aims to validate the system's performance through accuracy, latency, and user experience evaluations. A further goal is to address the challenges of deploying affective computing solutions on resource-constrained devices, documenting insights for broader applicability. These efforts will ensure that EMOLight not only delivers an engaging experience but also meets the technical demands of edge environments.

Over the period of six weeks, the project aims to achieve its goals through iterative development and testing. In Week 1, the team will familiarise itself with the Edge TPU and the current EMOLight implementation. Weeks 2 and 3 will focus on porting YAMNet to the Edge TPU and optimizing the audio processing pipeline. Week 4 will integrate and test the enhanced model in several settings, ensuring seamless operation. Week 5 will emphasise performance evaluation under diverse conditions, with user feedback shaping refinements. The final week will involve comprehensive documentation, result analysis, and a system demonstration. This project equips participants with expertise in edge AI, model optimisation, and real-world affective computing deployment.

Specific skills and experience required for this project

Please also refer to the advert on our jobs pages for the person specification for these internships

Required Skills and Experience:

- Basic knowledge of machine learning, especially pre-trained models like YAMNet.
- Familiarity with deploying AI models on Edge TPU or similar devices (e.g. RPI).
- Proficiency in Python; experience with TensorFlow or PyTorch is a plus.
- Understanding of audio processing basics, including noise reduction.
- Ability to design and conduct performance evaluations for AI systems.

Desirable Skills:

- Interest in accessibility-focused technologies or human-computer interaction.
- Experience with embedded systems and edge computing.
- Strong problem-solving and analytical skills.

Project location

City Campus

This project is not suitable for home working/remote delivery.

Project delivery

This project can be delivered on a full-time or part-time basis