# Real-Time Embedded Deep Learning on Elk Audio OS

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Recent years have witnessed significant advancements in **deep learning for music**, along with the availability of more powerful embedded computing platforms for to low-latency audio processing. These opened promising avenues for new **Smart Musical Instruments** and **audio devices** that rely on the execution of deep learning models on **small embedded computers**. Despite these new opportunities, there is a lack of instructions on how to deploy neural networks to many promising embedded audio platforms, including the embedded real-time Elk Audio OS. In this paper, we introduce a procedure for deploying audio deep learning models on embedded systems utilizing the Elk Audio OS. The procedure covers the entire process, from creating a compatible code project to executing and diagnosing it on a Raspberry Pi. Moreover, we discuss approaches for the real-time execution of deep learning inference on embedded devices. To facilitate implementation and support future updates, we **provide an online repository with a detailed guide**, code **templates**, functional **examples**, and **precompiled library binaries** for the TensorFlow Lite and ONNX Runtime inference engines:

github.com/CIMIL/elk-audio-AI-tutorial

Embedded Deployment Procedure
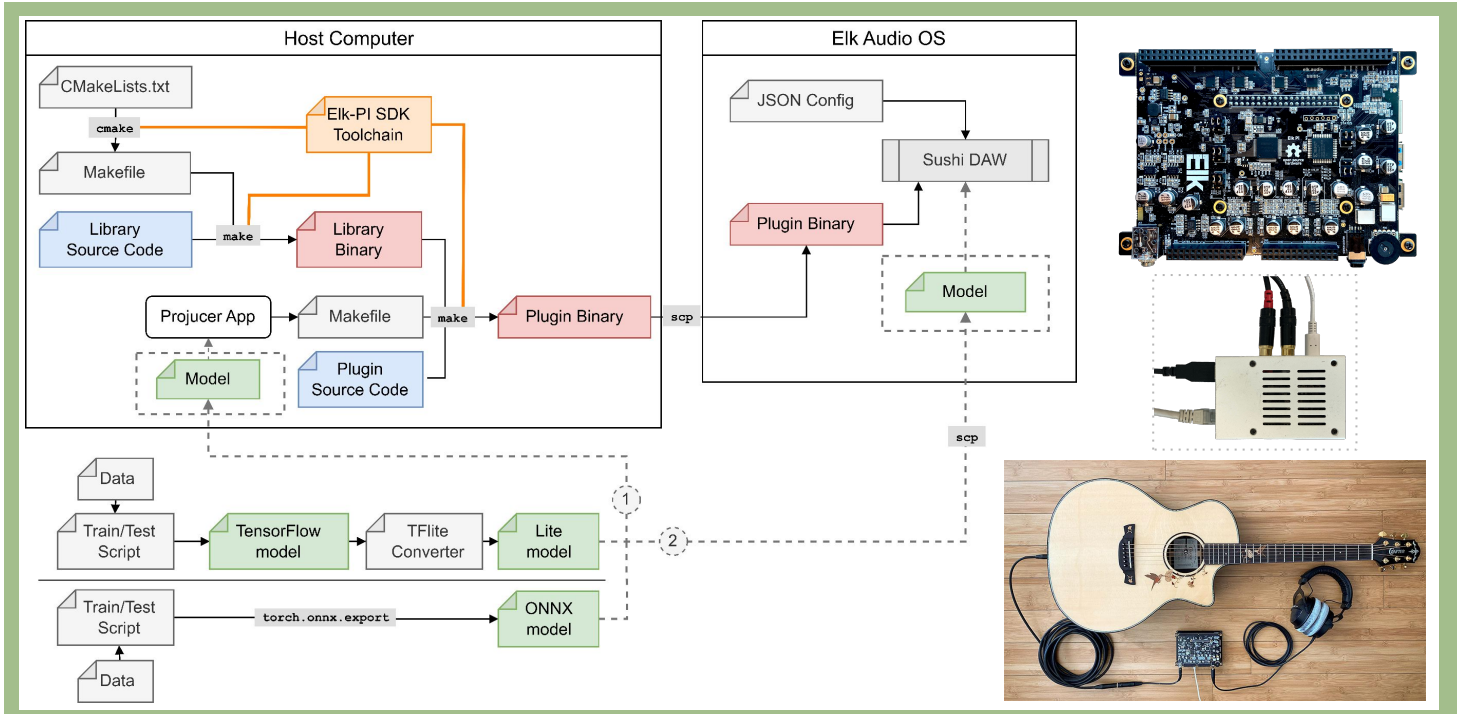
Deployment Steps

1 Project Creation

2 Cross Compilation for Elk Audio OS Linux aarch64

3 DAW Configuration

4 Elk OS Setup & communication

5 Troubleshooting

Considerations on real-time inference

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