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RISC-V Summit

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AN OPEN SOURCE FRAMEWORK FOR EDGE-TO-CLOUD INFERENCE ON RESOURCE CONSTRAINED RISC-V SYSTEMS

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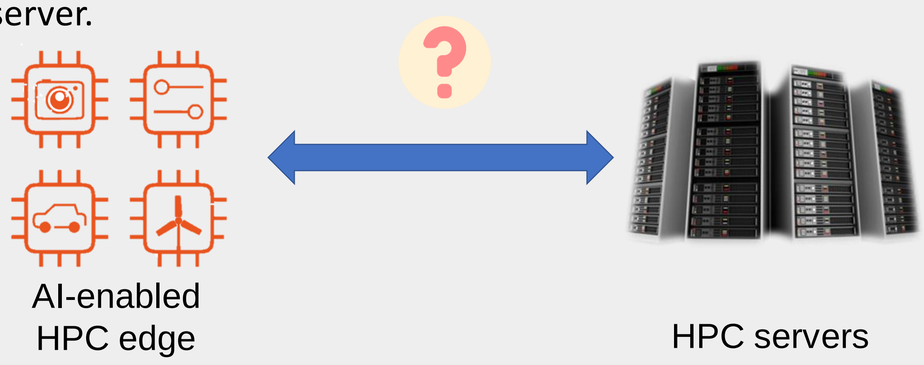
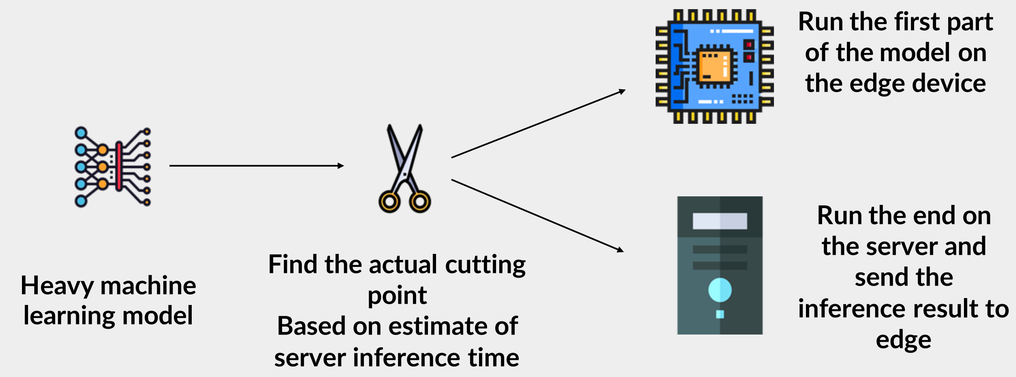
MOTIVATION AND CONTRIBUTIONS

- Current RISC-V based edge devices struggle to meet the performance requirements of complex AI inference.
- Efficient edge-to-cloud workload management is required.
- We propose a partial inference framework and algorithms to decide workload partitioning
- Real setup that automates the partitioning of ONNX and TFLite Models between a RISC-V accelerated nanodrone and a cloud server.

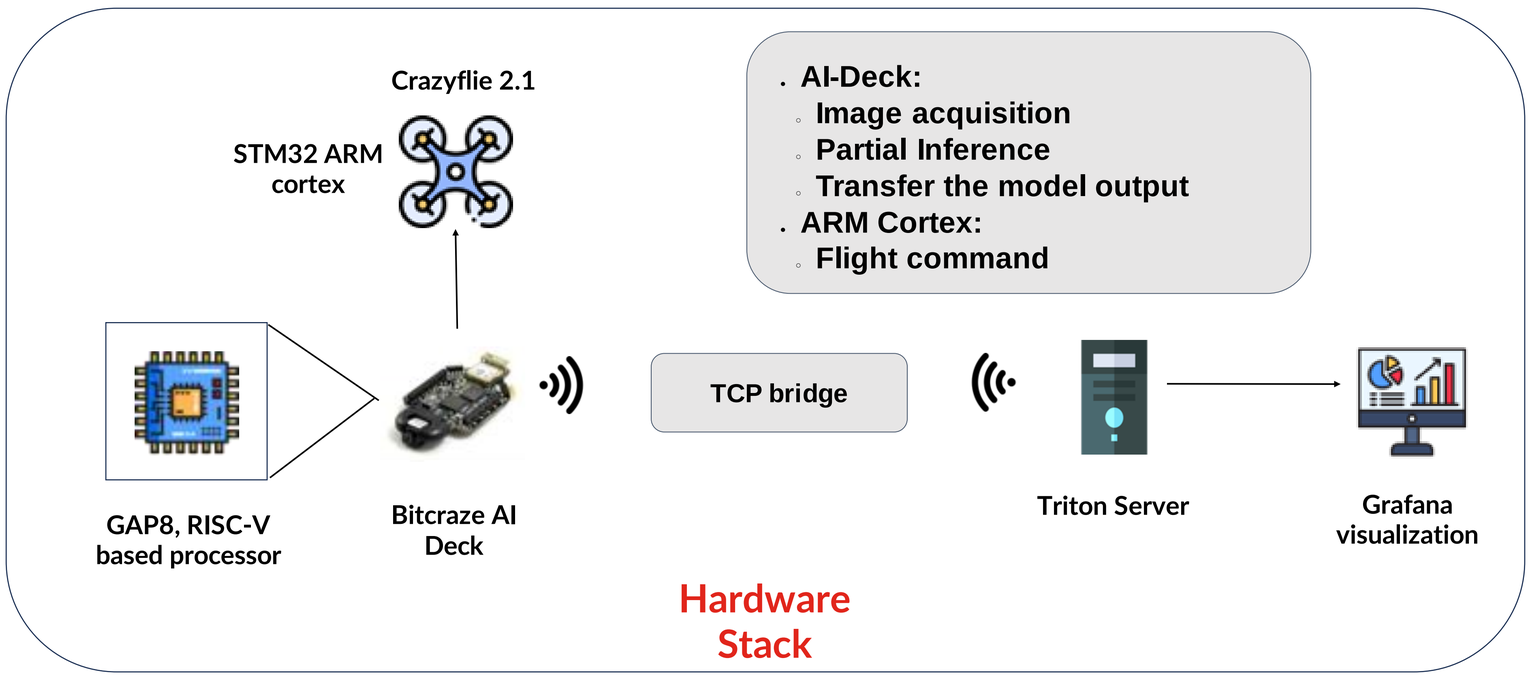


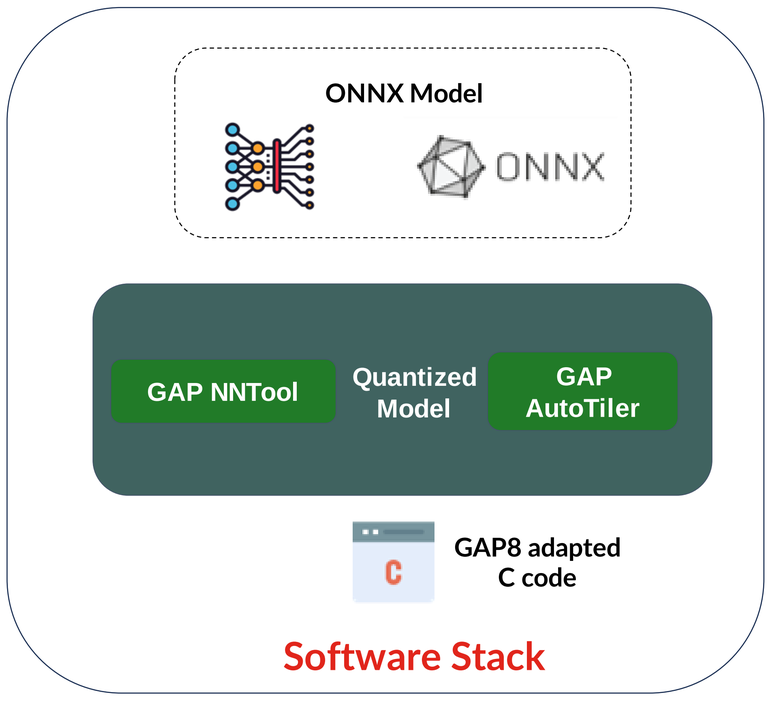
AUTODIDACTIC NEUROSURGEON

- ModifiedA modified version of the online autodidactic neurosurgeon algorithm [1] determines the optimal cutting points between edge and cloud inference.
- Considers both the model's architecture and external factors such as network conditions and server load.
- Predicts the time required for data transfer and server inference to select the cutting point.

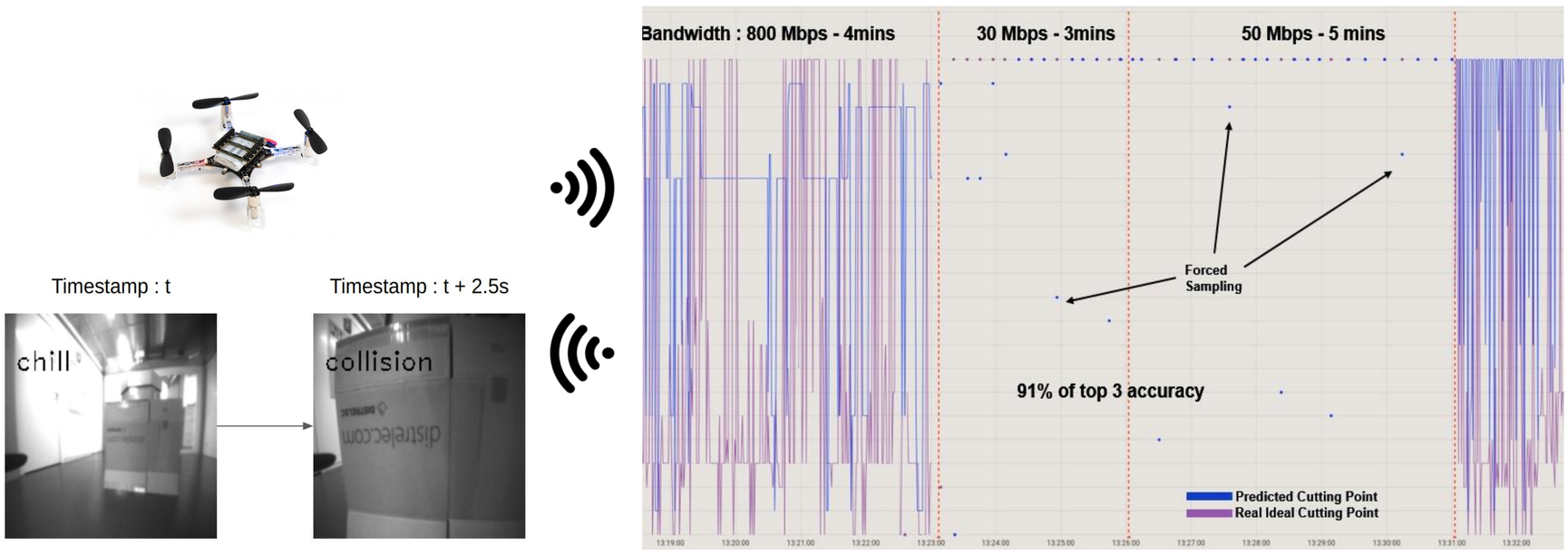


THE ECO4AI FRAMEWORK





RESULTS



CONCLUSIONS

- **Partial inference improved performance, encouraging the use of such setup**
- **Our framework will be released open-source as an out-of-the-box solution**
- **It is currently used for teaching a BSc course on autonomous navigation using the Crazyflie**

ACKNOWLEDGEMENTS

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2. Palossi et al. “A 64mW DNN-based Visual Navigation Engine for Autonomous Nano-Drones”. In: IEEE IoT (2018).