AMBIENT HARDWARE AND THE CASE FOR TRANSCODING MEDIA STREAMS

Milica Orlandic, Kjetil Svarstad

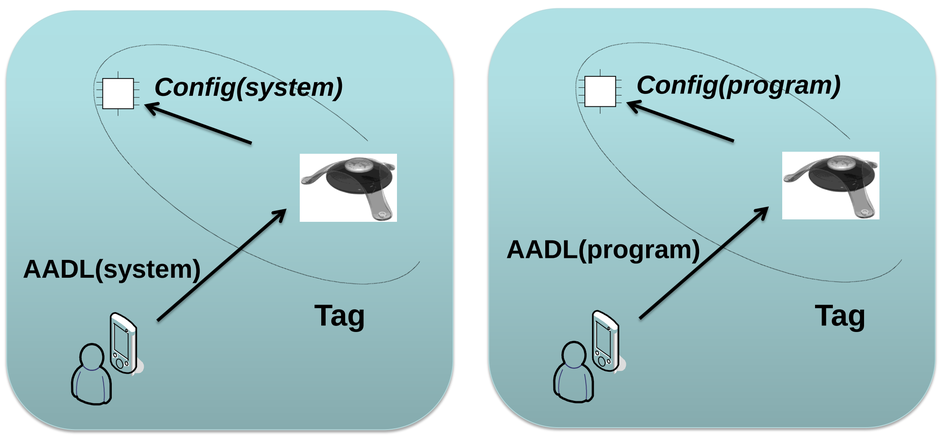
Department of Electronics and Telecommunication,
Norwegian University of Science and Technology,
N-7491 Trondheim, Norway, Email: orlandic@iet.ntnu.no

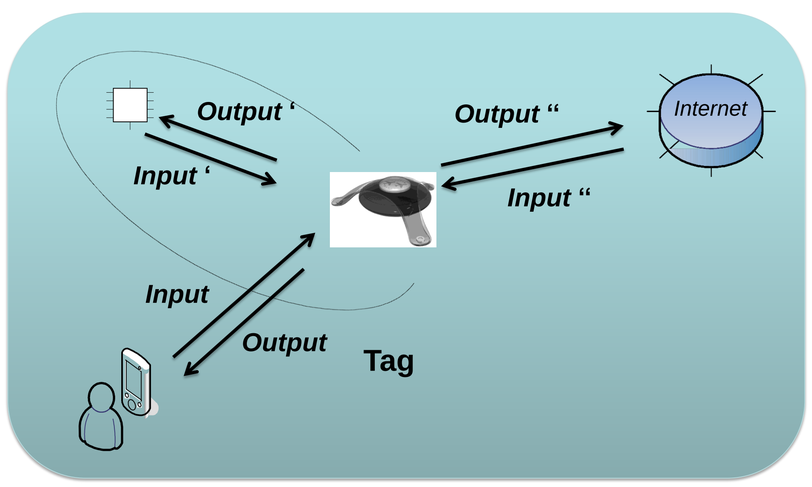
The objective of this project is to build a platform for autonomous, on-demand systems within video processing and other digital processing algorithms that require intensive computations and where mobile clients can save energy by off-loading computations to servers in the environment. Self-reconfiguration provides a necessary degree of flexibility for such systems.

FRAMEWORK FOR PARTIAL SELF - RECONFIGURATION

The idea is to use an FPGA based server as an on-demand hardware accelerator enabling runtime reconfigurable modules to run as tasks that are fetched, placed and scheduled in time. These modules are provided on-demand from either the client or the network.

Overall block diagram of the AHEAD system



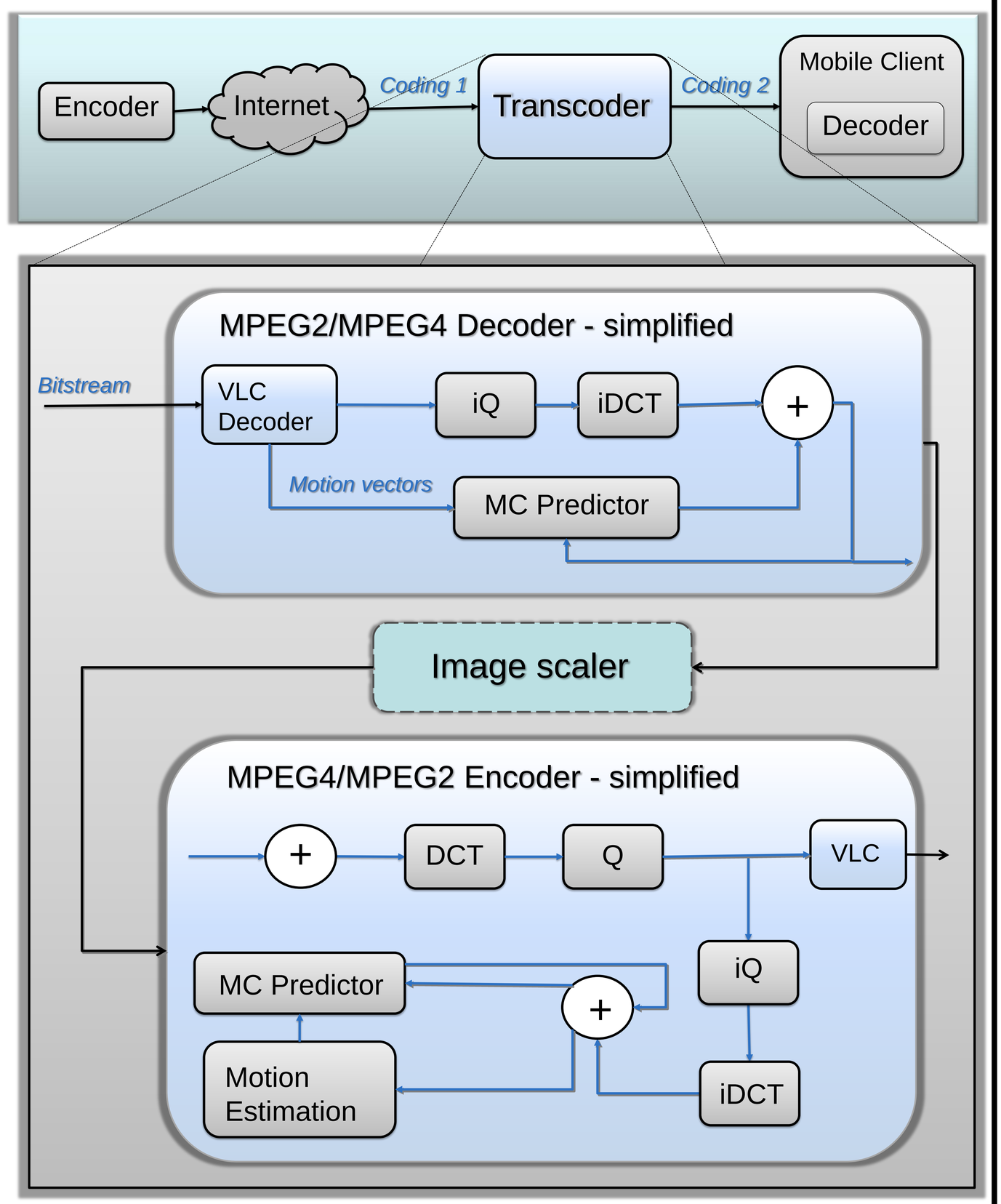


VIDEO PROCESSING ALGORITHMS AS RECONFIGURABLE MODULES

The switching from Coding 1 to Coding 2 will be relevant and beneficent whenever the sum of transmission and decoding power on the mobile client becomes substantially smaller:

$$P_{Decode}(Coding\ 2) + P_{Rx}(Coding\ 2)$$
$$< \quad P_{Decode}(Coding\ 1) + P_{Rx}(Coding\ 1)$$

Overall block diagram of the Transcoder



CONCLUSION

The parts of the complex self-reconfigurable system have been implemented and tested. Intercommunication providing interrupt mechanism has been established. Further work on building a platform that will provide simplified manipulation of reconfigurability is planned. Complex systems such as video processing algorithms are intended to be built and tested on this platform.

References

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