

Evaluating Edge & Cloud Computing for Automation in Agriculture

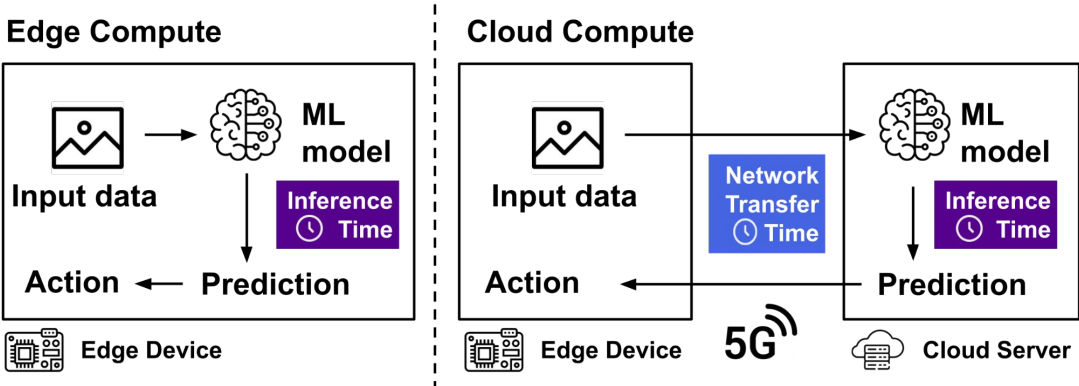
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Future of Agriculture

New technology can help increase productivity/automation in agriculture:

- Wireless networks
- Robotics
- Artificial intelligence

Requires computation - **where** should it be placed, edge or cloud?



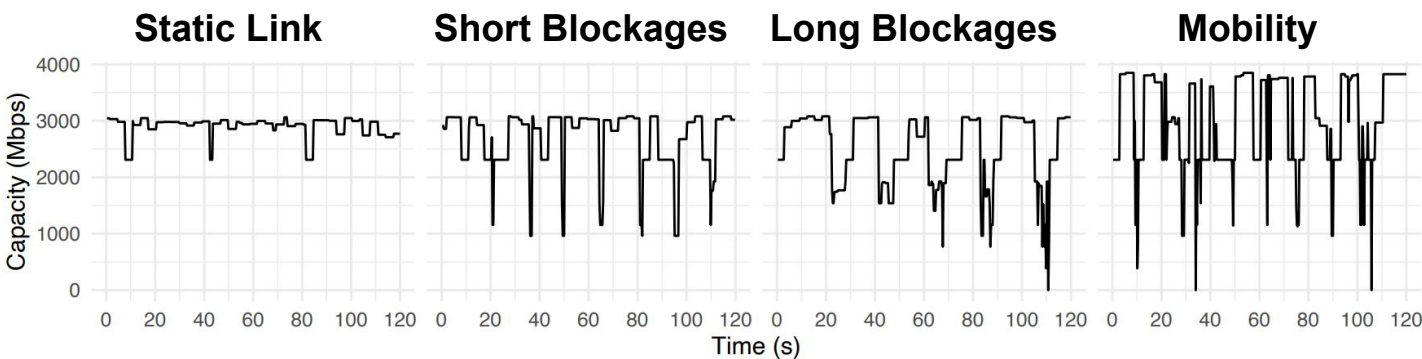
	Edge	Cloud
Inference time	Slower (low-resource device)	Faster (more powerful)
Network transfer time	None	May be slow (pending network conditions)

Methods


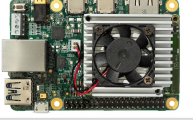
Dataset: NREC Person Detection Dataset



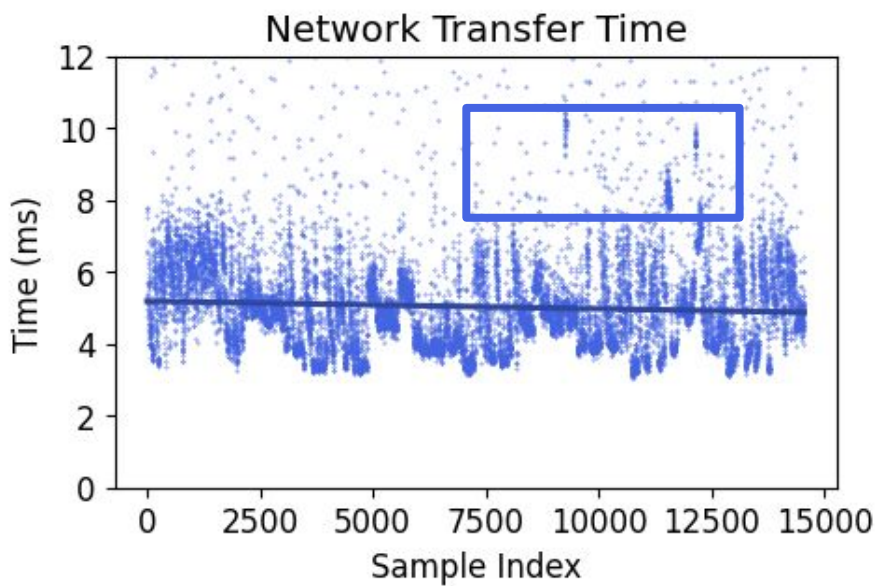
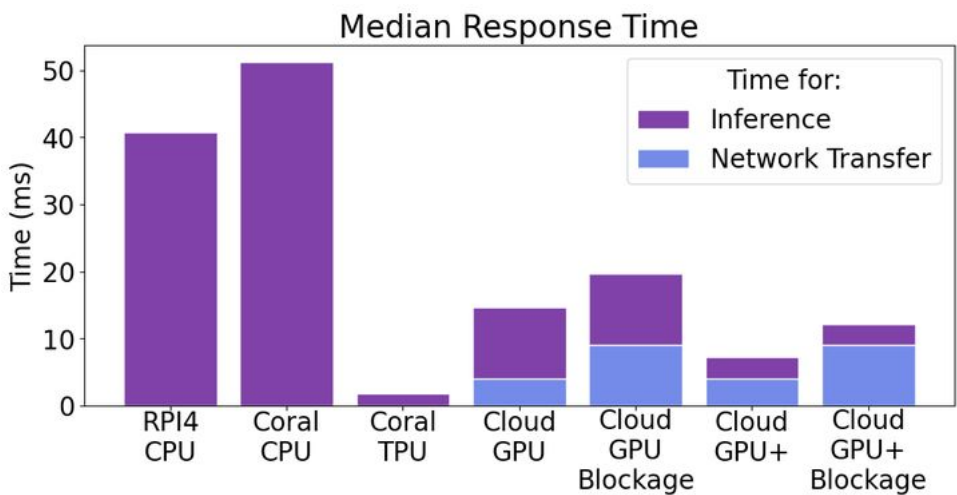
Network scenarios: mmWave link traces



Inference devices:

Raspberry Pi 4	CPU	
Coral Dev Board	CPU, TPU	
Cloud server	GPU (RTX6000), GPU + optimization	

Results



Works Cited

Z. Pezzementi, T. Tabor, P. Hu, J. Chang, D. Ramanan, C. Wellington, B. Babu, and H. Herman. Comparing apples and oranges: Off-road pedestrian detection on the National Robotics Engineering Center agricultural person-detection dataset. J Field Robotics. 2017;00:1–19. <https://doi.org/10.1002/rob.21760>.

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