



Case Study: Smart Home

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Exercise: Case Study

- Smart Home Case Study
- Next page has the case study and the task for students
- Save answers / responses to questions within a Word document named: 12 Case Study



Student Activity: Smart Home

Scenario: The Campbell family live in a remote part of the Scottish Highlands. They have recently renovated their house into a "Smart Home" to save energy and improve security. Their home now uses the following technologies:

Smart Heating: Sensors in every room detect when people are present and adjust the temperature.

Security Cameras: Cameras use AI to distinguish between the family dog, a delivery person, and a potential intruder.

Voice Assistant: A smart speaker (like an Alexa) controls the lights and plays music.

Satellite Internet: Because they are remote, they use a high-speed satellite link (like Starlink) to connect to the Cloud.

Your Task: Answer the following questions based on the technologies we have discussed in class:

Q1. Hardware: The security camera needs to process video frames very quickly to identify a face. Which type of specialised processor (CPU or GPU) is likely doing the "heavy lifting" for this AI task, and why?

Q2. Connectivity: If the family's satellite internet has high **latency**, how would this affect their experience when asking the Voice Assistant to turn off the lights?

Q3. Big Data: For the security camera to know the difference between a "dog" and a "burglar," it had to be trained. Explain what was needed to train this AI before it was installed in the house.

Q4. The Cloud: The smart speaker is very small and doesn't have a giant computer inside it. Explain how it is able to understand and answer complex questions.

Q5. IoT (Internet of Things): Identify one **sensor** used in this house and explain what data it collects to help the AI make a decision.