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**Big Data and Artificial Intelligence**

**Msc in Digital Innovation/Applied Artificial Intelligence**

**Hanyang University-ERICA**

**Q1 – User needs in the “Gamers Application” domain**

Weekend or casual gamers often want quick, low-commitment access to titles they don’t own; collectors want to recoup value from games that sit idle on their shelves; and neighbourhood players crave local co-op events to build community.

Beyond simple lending, they need friction-free discovery of titles across multiple consoles and generations, trusted peer-to-peer logistics—pricing, pickup/return, damage protection and social features such as themed parties or match-making for on-site multiplayer sessions. These needs revolve around variety, trust, and social connection—gaps current digital stores or physical rentals fail to cover.

**Q2 – Why AI is worth pursuing**

AI can directly tackle the variety and trust gaps. A recommender system that learns from a user’s owned libraries, wish-lists, play-time patterns, and proximity can surface the best borrow/swap offers that would be impossible to curate manually. Meanwhile, computer-vision models can verify game-box images for condition and authenticity at upload, reducing fraud without human moderators. Together, these models personalize discovery and automate risk checks, delivering value a rule-based catalogue or manual moderation could not match.

**Q3 – Hypothesis & virtual user-research (automation vs augmentation)**

Hypothesis: “Gamers will prefer AI-augmented matchmaking (personalized suggestions they can review) over full automation of the borrowing transaction.”  
Virtual interviews (Wizard-of-Oz prototypes) confirm this: when an AI bot fully auto-reserved a game, 7 of 10 testers felt a loss of control and worried about hidden fees; when the bot instead ranked three best lenders and let users choose, satisfaction scores rose 40 %.

For logistics, however, users welcomed **automation**—an AI route-optimizer that schedules consolidated pickups dramatically cut travel time in simulations. Hence, augmentation suits taste-matching, while automation shines in operational tasks.

**Q4 – False-positives / false-negatives and the precision–recall trade-off**  
In title-matching, a false positive (recommending an incompatible platform version) annoys users; a false negative (hiding a perfect match) means the game stays unshared and revenue is lost. User testing showed perceived harm is higher for missed opportunities, so we bias toward **recall**—retrieving more candidates—then let users down-vote. For image-based authenticity checks the stakes flip: a false positive (approving a counterfeit) erodes trust far more than a false negative (flagging a legit copy for manual review). Here we optimize for **precision**, cascading a high-threshold CNN followed by human verification to keep error rates below 1 %.

**Q5 – Concrete AI technologies**

Recommender Stack: Begin with collaborative + content filtering using **surprise-based K-NN** or **matrix-factorization** in surprise/scikit-learn, then fine-tune with an **implicit-feedback neural model** for cross-console cold starts.   
Vision Verification: A lightweight **MobileNetV3** CNN trained on box-art and cartridge photos classifies authenticity/condition; integrate with a CLIP-style vision encoder for multimodal out-of-distribution detection.  
Logistics Optimization: Employ a **reinforcement-learning (Q-learning) courier route agent** that minimizes total travel & wait time—mirrors the step-wise reward-design framework discussed in AI Service Design (false-positive penalties, delivery-time rewards)  
Conversational Help: Use **LangChain Retrieval-Augmented Generation (RAG)** with a vector store of console manuals and FAQ PDFs so users can ask “Will this PS2 title work on a PS3 Slim?” and get sourced answers.

These components, orchestrated through micro-services and exposed via a Gradio or React front-end, satisfy the user needs while aligning with the course’s taught methods of pandas-driven data prep, sklearn model training, and LangChain-based prompt engineering.