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DSC 498
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Capstone Introduction

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Raw Image Scanner – Outline

- **Objectives:**
  - **Create** system that accepts an image as a template and compares it to a camera image
  - **Include** generating text lists or tables, filling templates, or highlighting differences
  - **Implement** image correction for flawed camera images (skewing, reflection, warping, etc.)
- **Tools:**
  - Optical Character Recognition (OCR) using libraries such as PyTesseract
  - Image comparison algorithms for image blocks using libraries such as PyImageSearch
  - Decoding algorithms for various formats (JPEG, GIF, PNG, TIF, AVI, MPEG, MP4, MOV, WEBM, etc.)
- **Challenges:**
  - No formal machine learning courses until Spring 2021 (for image correction)
  - Physical limitations during pandemic (for experimentation)

Raw Image Scanner – Concept

- Comparable to commonly used technology for scanning checks, license plates, QR
- Typically for specific patterns or professional usage

Raw Image Scanner – Design

- Intended for users to collect any kind of data quickly and automatically
- Ideal for when digital data doesn't exist or can't be easily accessed

Final Fantasy Tactics (Sony PlayStation)

The image for the character on the right contains 36 variables.

Without a means of accessing the raw data, a human would need to compile the visible data by hand (takes about 2-3 minutes).

What if a computer could recognize the values formed by the pixels?

ID	Name	Job	CHP	MHP	CMP	MMP	...	Acc	Set1	Set2	React	Support	Move
7	Agrias	Holy Knight	559	559	81	81	...	Bracer	Holy Sword	White Magic	Auto Potion	Attack UP	Teleport

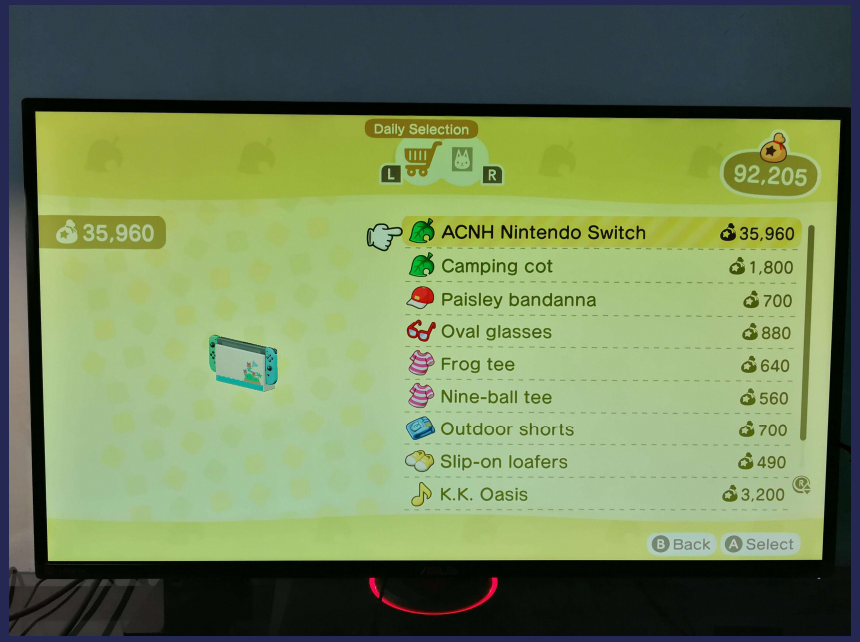
[1 rows x 35 columns]

Example – Text Parsing Lists

The user inputs a screenshot containing a simple list.

The text is parsed and added to a list. New items may be added to the same list, and it may be saved or exported as needed.

* This screenshot has much more text than what was collected. It may be necessary for the user to determine a pattern to the collection process.



Animal Crossing: New Horizons (Nintendo Switch)

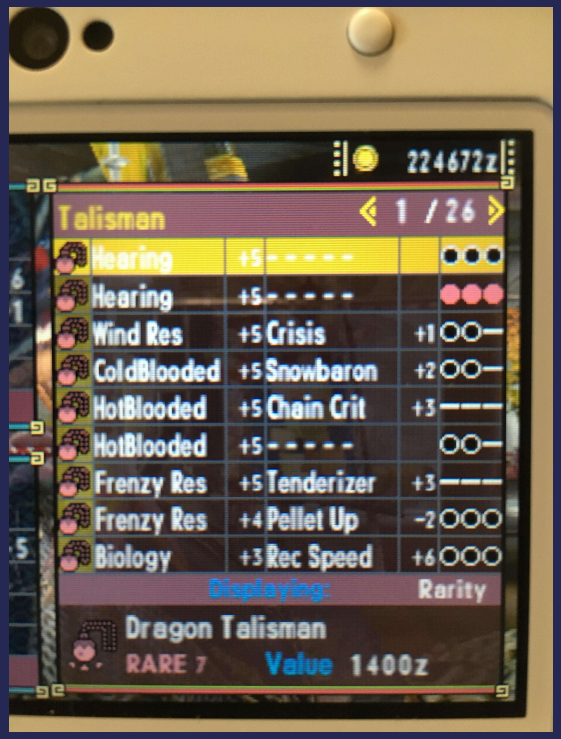
ACNH Nintendo Switch
Camping cot
Paisley bandanna
Oval glasses
Frog tee
Nine-ball tee
Outdoor shorts
Slip-on loafers
K.K. Oasis

Example – Text Parsing Tables

The user inputs a screenshot containing a table.

The text is parsed and added to a table. New items may be added to the same table, and it may be saved or exported as needed.

* The top line is difficult to read, and the second line has different colors for its 5th column. Visual differences may require the user to define their importance.



Monster Hunter Generations (Nintendo 3DS)

Hearing	+5	- - - - -		000
Hearing	+5	- - - - -		000
Wind Res	+5	Crisis	+1	00-
ColdBlooded	+5	Snowbaron	+2	00-
HotBlooded	+5	Chain Crit	+3	---
HotBlooded	+5	- - - - -		00-
Frenzy Res	+5	Tenderizer	+3	---
Frenzy Res	+4	Pellet Up	-2	000
Biology	+3	Rec Speed	+6	000

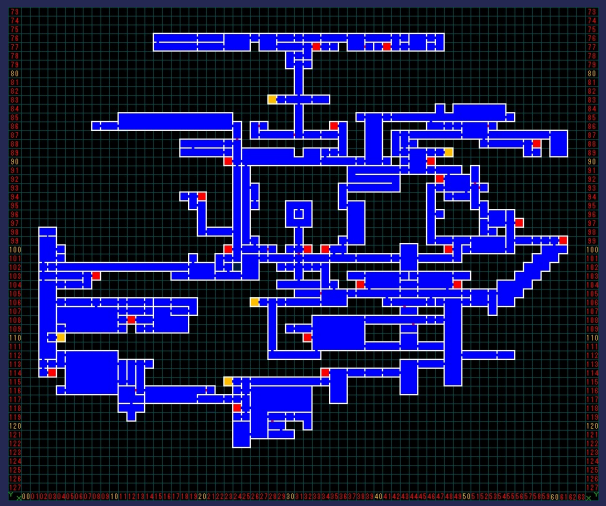
Example – Find Differences in Matrices

The user inputs a screenshot of a map they're exploring **A**. They know they're missing two squares but don't know which.

An image of the completed map **B** is provided to compare against. **A** must be skewed to fit a similar shape.

The missing two squares are identified based on the differences between the two images, or **B – A.**

Castlevania: Symphony of the Night (Sony PlayStation)



Example – Find Differences in Sets

The user inputs a screenshot of a screen that changes its structure, adding every character's name/portrait to a partial list **A**.

Super Smash Bros. Ultimate (Nintendo Switch)

A screenshot of the final roster is added next, which creates the complete list **B**.

The missing characters are identified based on what's in the complete list but not the partial list, or **B – A**.