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AutoMaxLair Documentation

Summary

AutoMaxLair is designed for shiny hunting legendaries in Dynamax Adventures found in Pokemon Sword and Shield: The Crown Tundra. The program runs on a computer connected to the switch through a Teensy 2.0 (outgoing controls to the Switch) and a HDMI capture card (incoming video from the Switch).

Required hardware

- Teensy 2.0 and USB to serial conversion device. See RemoteControl documentation for details.
- HDMI capture card or similar. You can also use a cheap USB device instead.
- A computer that you will have to run continuously for many hours.

Required software

- Python 3 with the following packages installed (see requirements.txt for details):
    - opencv-python
    - pytesseract
    - pyenchant
    - pyserial
    - numpy
- Teensy Loader for programming the Teensy 2.0

Setup

1. Fill your inventory with Poke Balls so the bot can run uninterrupted.
2. Go to the Max Lair and stop in front of the scientist, then disconnect the controller.
3. In Config.ini, modify the values to suit your setup. The bot will choose whatever legendary is at the top of your saved list.
4. Plug the HDMI of your switch into the capture card, but do not view the input from any other application (or else the bot will not be able to access the video).
5. Program the Teensy with RemoteControl.hex and plug it into the Switch.
6. Plug the USB cable attached to the Teensy's serial port into the computer.
7. Run AutoMaxLair.py, either directly or in the Python shell (which is better for debugging). Figure 1 shows a screenshot of the window that should appear.

The bot will run until it finds a shiny legendary. It will also keep any other shiny Pokemon it finds but will continue running after. Figure 2 shows an example screenshot of the screen immediately before the program quits.

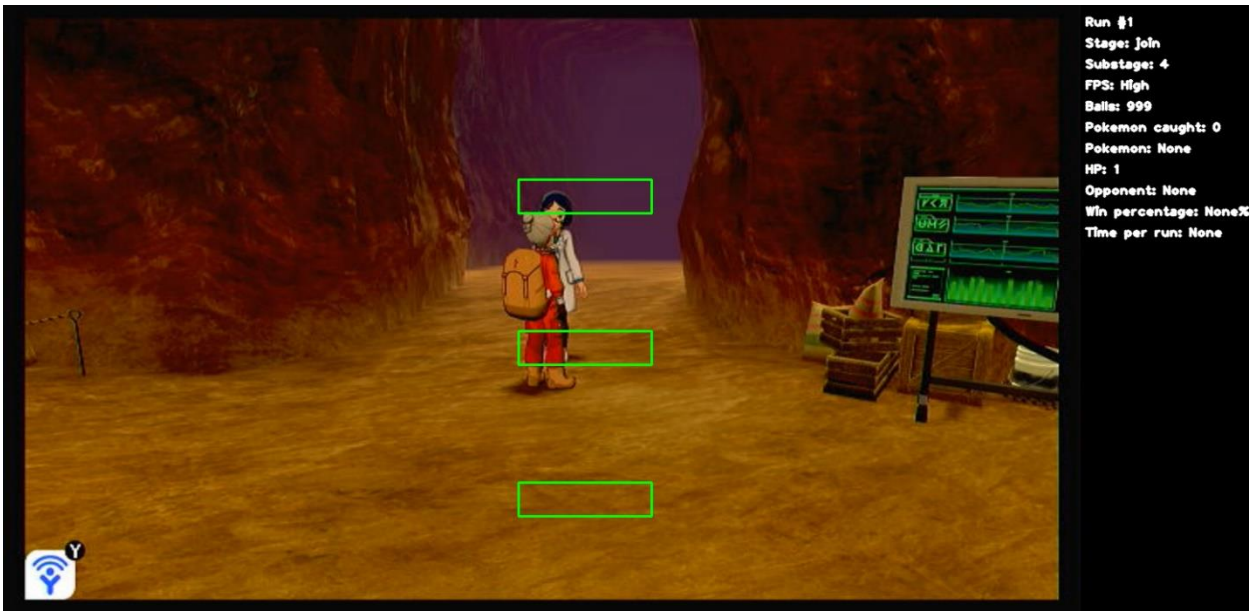

Figure 1: Screen capture initially after starting the run. The green rectangles indicate the areas the bot will scan for rental Pokemon it can pick.

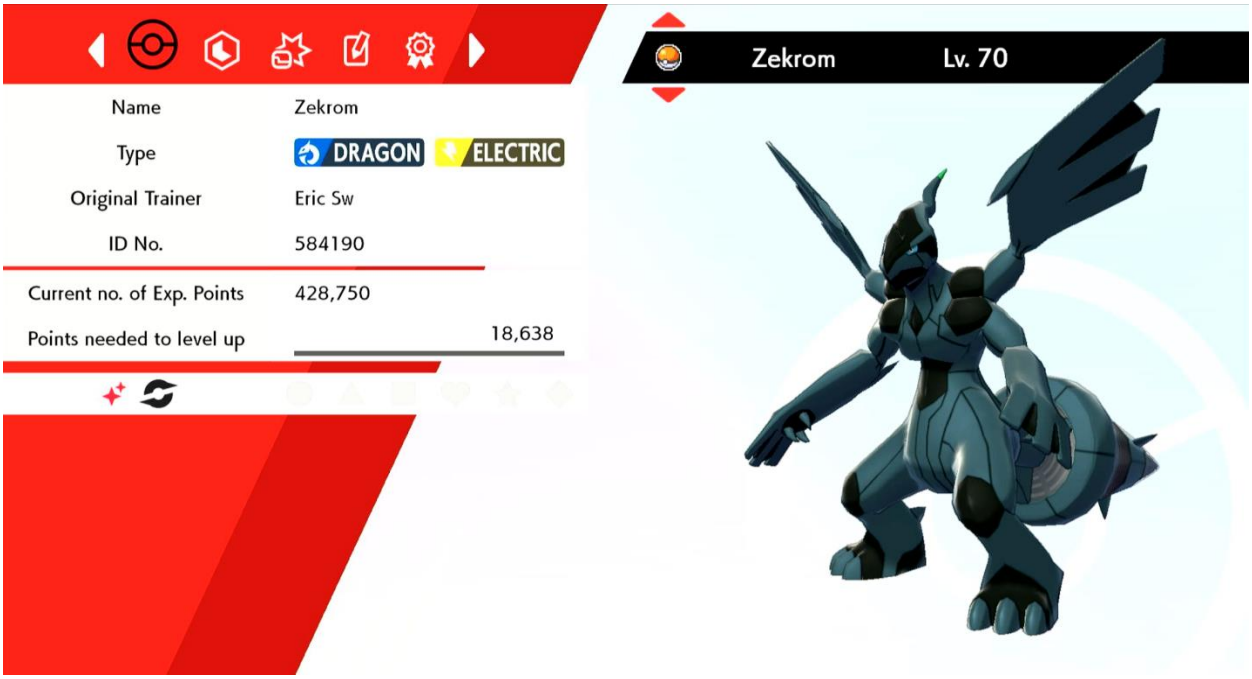

Figure 2: Screen capture saved at the end of a successful run. The bot detects the red shiny star on the left side of the screen. The program will quit if it detects the star while checking the legendary's summary; if another Pokemon is shiny the program will take the Pokemon and start another run.

To Do

Major Features

- Improved move selection
    - Certain bosses, such as Zygarde and Groudon, are almost impossible to beat without Wide Guard. Updating the scoring algorithm to reflect this move's utility is almost certainly required for beating these bosses.
    - Moves that execute over two turns (Giga Impact, Meteor Beam, etc.) or require special conditions (Steel Roller) are overvalued by the current scoring algorithm and are often chosen inappropriately.
    - Stat changes, status, and field effects are not currently considered in damage calculations.
- Improved path selection
    - Intelligent path selection is not currently implemented—the default path (up the left side) is always used. This path is unlikely to be the optimal one.
- Improved selection of Pokemon
    - Variants of different Pokemon (e.g., Lycanroc forms, regional variants) are not distinguished between and are treated as one of the two.
        - This lack of distinction leads to ill-informed decisions half of the time.
        - A fix would require image-based detection of Pokemon in stead of the current text-based approach.
    - HP and status of the current Pokemon is not currently measured. This information could better inform decisions on whether to take a new Pokemon.
    - When considering a potential new Pokemon, only the player's current Pokemon is compared. The rest of the team could be considered to see whether another member would benefit more from the Pokemon.
- (Not sure if this idea is a good one) online capability
    - Connecting with other players online might be beneficial for having more intelligent teammates but may be inconsiderate if the bot makes poor choices.

Minor updates and bug fixes

- PP use is currently overestimated because the bot deducts PP when the move is selected as opposed to when it is actually used.
- Move selection is based on the BP of the regular move and does not adjust to reflect the corresponding Max Moves while Dynamaxed.
- Boss move usage is not fully reflected by their movesets.
    - Bosses use a 5th move when at low HP with boss-dependent frequency and timing.
    - The 5th move of some bosses, including most Ultra Beasts is currently not considered.
- Items are not chosen intelligently
    - Though the impact of this change is not enormous, better item selection from the backpacker would never hurt.