WEST VISAYAS STATE UNIVERSITY
College of Information and Communications Technology

Classification Model for Detecting Swine Health Using Computer Vision

Arroyo • Flores • Lusuegro • Parreño • Tingatinga

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Classification Model for Detecting Swine Health Using Computer Vision

An Undergraduate Thesis
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College of Information and Communications Technology
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In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science in Computer Science

Karen H. Arroyo
Ellan V. Flores
Mary Ruth N. Lusuegro
Rey Matthew G. Parreño
Aldrex Mark B. Tingatinga

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Disclaimer

This web application and its subsequent documentation entitled *Classification Model for Detecting Swine Health Using Computer Vision* is submitted to the College of Information and Communications Technology, West Visayas State University, in partial fulfillment of the requirements for the degree Bachelor of Science in Computer Science. It is the product of our work, except where the indicated text.

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Karen H. Arroyo
Ellan V. Flores
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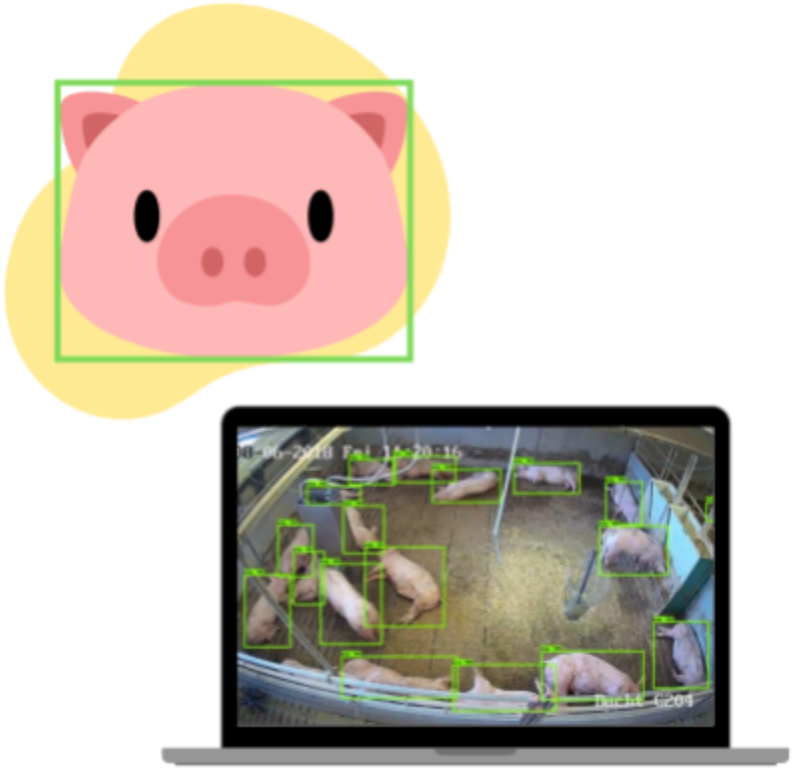
Introduction

Greetings and welcome to the User Manual for the Unhealthy Swine Detector! This detailed manual is crafted to equip you with essential knowledge for efficiently operating our application. It is tailored to support farmers and veterinarians in distinguishing between healthy and unhealthy swine. Developed as a requirement for our Bachelor of Science in Computer Science program at the College of Information and Communications Technology, West Visayas State University, this application leverages computer vision technology to improve swine welfare, health monitoring, and overall productivity.

Getting Started

Welcome to the Unhealthy Swine Detector!



This application is intended to help farmers and veterinarians make decisions about swine welfare, health, and productivity. Users may quickly recognize and distinguish healthy and unhealthy swine using a webcam or external camera, as well as by uploading videos or images.

Guide for Deploying and Main Functions

System Deployment

To set up the Unhealthy Swine Detector application, start by downloading its files from the designated source. Once downloaded, extract these files to the desired location on the computer.

Make sure Python is installed in the system, and then navigate to the directory where the extracted files are located using either the command prompt or terminal.

Following this, install the necessary Python packages by running the command *pip install -r requirements.txt* to meet all dependencies specified in the requirements.txt file. If you're utilizing MySQL or SQLite for managing databases, configure the database settings accordingly.

Adjust any essential configuration parameters, such as database connection strings or file paths, to match the specific setup. Once configurations are finalized, launch the application by executing the command *python main.py* via the command prompt or terminal. This will kickstart the application, allowing access via your web browser.

Lastly, consult the provided user manual for comprehensive instructions on effectively utilizing the application's functionalities, covering aspects such as video and image processing, troubleshooting, and reaching out for assistance if needed. Following these steps ensures you're well-equipped to monitor swine health and behaviors using the Unhealthy Swine Detector application.

System Requirements

For Desktop/Laptop Application:

- **Operating System:**
  - Windows 10 (64-bit)
  - macOS 10.14 (Mojave) or later
- **Processor:** Intel Core i5 or equivalent
- **RAM:** 8 GB
- **Graphics Card:** At least 2GB VRAM
- **Storage:** 20GB of available space
- **Webcam:** Built-in webcam or external camera (e.g. webcam, CCTV)
- **Internet Connection:** Required for initial installation and updates

Installation

Modules and Python Packages required for this application:

- numpy
- pillow
- pygame
- opencv-python
- yagmail
- ultralytics
- yolov8

NOTE: Make sure to install mySQL or SQLite to access the database of the detected swines.

Step 1: In the *dist* folder (shown in Figure 2.1), there are three items. Extract the RAR file *main-1.0* to access all the files.

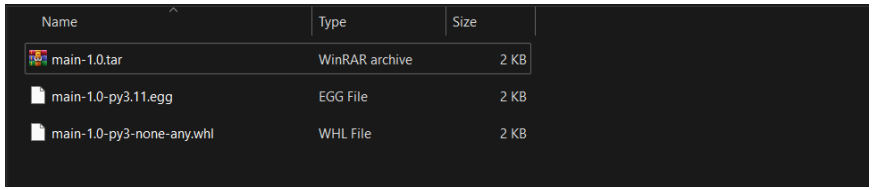


Figure 2.1. Files in the *dist* folder

Step 2: After extracting the files, place the folder in the desired directory for this application.

Step 3: Open the command prompt and the directory to the folder of the extracted main-1.0 folder.

Step 4: Enter *pip install main-1.0-py3-none-any.whl* and press enter. This will start the installation.

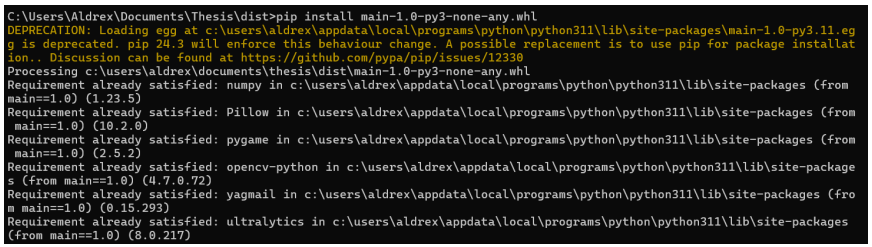


Figure 2.2. App installation

Step 5: Type in the *swinestart* and this will start the application.

Alternatively, open the application by just simply running the .py file in the command prompt but all the python packages and modules are needed to be installed to start the application.

Step 1: Open the command prompt of your computer and change the directory to the folder where the main.py is located. (In this case, the main.py is located in the *Thesis* folder.)

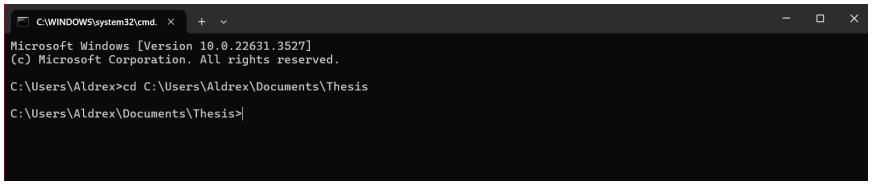


Figure 2.3. Directory change using command prompt

Step 2: Type *python main.py* to start the application. This is the fastest way to start the application and this way installation is not required but you will need to install all the python modules and packages that the researchers used in the application.

Additional Installation Information

Locate and run *mysetup.exe*

- After compilation, find the file *mysetup.exe* in the output folder (or the set custom directory using output in the script).
- Double-click the file to start the installation process. Follow the installer prompts to select the installation directory, agree to the license (if applicable), and configure other custom options.

Handling disk spanning

- If the installer is split into multiple parts (e.g., *setup-1.bin*, *setup-2.bin*), the installer will be prompted to insert or locate the next disk as needed. If all parts are in the same folder, this process will be automatic.

Once the installation is complete, the program will be installed and ready to use.

NOTE: Due to GitHub's file size limitations, the researchers cannot upload larger files necessary for installation. Please use the provided link to access all the larger files needed.

Google Drive link:
Classification Model for Detecting Swine Health Using Computer Vision

Usage

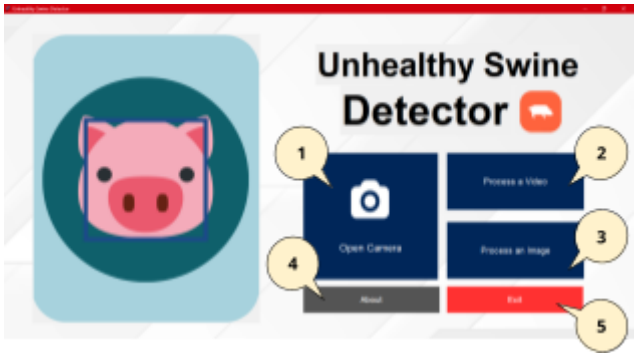


Figure 1. The application's main page

The main page of the program will appear when it launches and has the following buttons:

No.	Features	Description
1	Open Camera	Makes use of the camera on your device or an external one (such as a webcam or CCTV). If you want to process a video or image, you can connect and enable the device's camera or an external camera
2	Process a Video	Uses a video to identify swine behaviors
3	Process an Image	Uses an image to identify swine behaviors
4	About	Provides additional details about the application (FAQs, guidelines, etc.)
5	Exit	Closes the application

Processing a Video

In processing a video, behaviors are detected using an uploaded video to monitor swine behaviors. By clicking the *Process a Video* button, a window appears as shown in Figure 3.1.

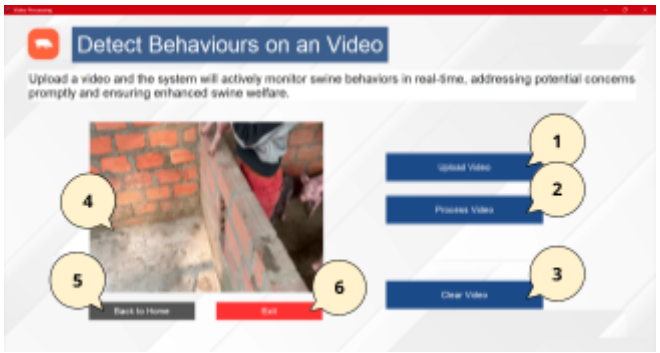


Figure 3.1. Video processing window

No.	Features	Description
1	Upload Video	Selects and then uploads a video from the device
2	Process Video	Detects and classifies the object/s from the video provided
3	Clear Video	Removes the video
4	Video Player	Displays the uploaded and processed video
5	Home	Returns to the home screen
6	Exit	Closes the program.

NOTE: To process a video using a camera, connect and enable the device's camera or an external camera.

Processing an Image

In processing an image, behaviors are detected using an uploaded image to monitor swine behaviors. By clicking the *Process an Image* button, a window appears as shown in Figure 3.2.

Figure 3.2. Image processing window

No.	Features	Description
1	Upload Image	Selects and then uploads an image from the device
2	Process Image	Detects and classifies the object/s from the image provided
3	Clear Image	Removes the image
4	Image Preview	Displays the uploaded and processed image
5	Home	Returns to the home screen

6	Exit	Closes the program

NOTE: To process an image using a camera, connect and enable the device's camera or an external camera.

Generating and Exporting Results

The findings generated by the system are displayed in a video player or an image preview along with the detected swine. The generated results will then be saved by the user as a Comma-Separated Values (CSV) file at the user-specified location. These findings will provide valuable information that might enhance swine welfare.

Troubleshooting

Experiencing issues? See the *About* page's *Troubleshooting* section or get in touch with our help staff.

To fix common issues, use these troubleshooting steps:

1. Issue with the Installation of the Application

Problem: The program cannot be installed.

Solution:

- Verify that the minimal system requirements are met by your device.
- Download the most recent version of the program from the official website.
- While installing, briefly turn off your firewall and antivirus software.

2. Issues with Camera Connection

Problem: There are problems with the camera's (internal or external) connection.

Solution:

- Check the cords and connectors for the camera.
- Ensure that no other program is using the camera.
- Update software or drivers for your camera.

3. Upload Errors for Images or Videos

Problem: Images or videos are unable to upload.

Solution:

- Verify whether the file format (e.g. MP4, JPG) is supported.
- Check the file size restrictions.
- For online uploads, confirm that your internet connection is stable.

4. Processing Issue

Problem: Videos or images take longer to process than intended.

Solution:

- Make sure that the device meets the recommended requirements.
- Close any background apps that aren't needed.
- Check how much storage space your device has available.

5. Unexpected Crashes in the Application

Problem: When processing images or videos, the program fails.

Solution:

- Download the most recent version of the program.
- Search for and install any available system updates.
- Contact our technical support if the issue persists.

6. Displaying Results Incorrectly

Problem: The video or image display results cannot be seen.

Solution:

- Verify whether the format of the image or video is compatible.
- Verify that processing and exporting the results were completed successfully.
- Check the results by trying to open the application again.

7. Exported Results Not Found

Problem: The exported results cannot be found.

Solution:

- Check the export destination that was set during processing.
- Check the exported files' default directory or folder.

8. Feedback or Requests for Assistance

Problem: There are difficulties in sending requests for assistance or feedback.

Solution:

- Make sure you have a reliable internet connection.
- Use alternate channels for assistance, including the official website or email.

9. Application Freezing

Problem: The application starts to behave strangely.

Solution:

- Restart the program after closing it.
- Verify the system's available resources such as RAM and CPU.
- If the problem still exists, try reinstalling the program.

10. Error Messages

Problem: Notifications of errors at different application phases.

Solution:

- Thoroughly read the problem message for precise instructions.

- To solve frequent errors, see the manual's FAQ section.
- Contact technical assistance if the issue persists.

Kindly contact our technical support staff using the methods mentioned in the *Feedback and Support* section of the manual if the issues persist even after you have tried these troubleshooting procedures.

Feedback and Support

We appreciate your opinions! Please use the channels given to report problems or submit ideas.

FAQs (Frequently Asked Questions)

Visit the *About* page's *FAQ* section for further details and answers to frequently asked questions.

Here are the FAQ's:

1. What does the Unhealthy Swine Detector application aim to accomplish?

The Unhealthy Swine Detector is intended to assist farmers and veterinarians in making decisions. To guarantee better swine welfare and productivity, it aids in tracking and recognizing swine behaviors as well as differentiating between healthy and harmful environments.

2. How can I install the program?

Use a laptop or desktop to download the app. During the setup procedure, follow the installation instructions that are given.

3. What are the application's system requirements?

Verify that your device meets the installation guidelines' minimal system requirements. These usually involve compatibility with different operating systems and hardware specifications.

4. Is this program compatible with external cameras such as webcams or CCTVs?

You may use the built-in camera on your desktop or laptop in addition to external cameras like webcams or CCTV with the Unhealthy Swine Detector.

5. How does the feature that processes videos operate?

On the home screen, select *Process a Video*. Click the *Upload Video* button to select and upload a video. Use the *Process Video* button to process the video. Use the video player to see the results.

6. Can I process images?

Sure, of course! Select *Process an Image* from the main page, then use the *Upload Image* and *Process Image* buttons to process the image.

7. In what way are the results provided?

After processing, the video player or image preview shows the identified healthy and unhealthy swine behaviors. Additionally, the user may provide a file location for the results to be exported.

8.How can I delete or clear submitted images or videos?

To upload and process new videos or images, use the *Clear Video* or *Clear Image* buttons in the processing windows to delete submitted files.

9. Can I close the program while it is still processing an image or video?

Yes, you can exit the program without finishing the processing by using the *Exit* button in the corresponding processing windows. Any unsaved progress, though, will be lost. It is advised to finish exporting the findings or processing the data before leaving.

10. Where can I get more details regarding the application and more assistance?

Select the *About* button located on the home page. To help users, this area offers further FAQs, usage guidelines, and application information.

11. How can I report problems or provide feedback?

We would appreciate hearing from you! The manual's *Feedback and Support* section has ways for you to report problems or give opinions.

12. Is there access to technical support?

Yes, you may contact our technical support staff for help with any problems you may have by visiting the *Feedback and Support* section.

Contact Details

Should you have any questions or feedback, or require technical support, please reach out to us through the following channels:

maryruth.lusuegro@wvsu.edu.ph
aldrexmark.tingatinga@wvsu.edu.ph
reymatthew.parreno@wvsu.edu.ph
karen.arroyo@wvsu.edu.ph
ellan.flores@wvsu.edu.ph

We value your interest and eagerly anticipate the opportunity to offer further assistance.