AOE III Replay Viewer

How to use

Overview

- What to use it for (page 3-4)
- How to use it (page 5-12)
- How does the program work (page 13-17)
- HELP (page 18-19)
- Custom settings for decreasing loading time or increasing accuracy (page 20)

Functionality (Why use it?)

- This Replay viewer enables one to analyze a recorded game and its key points, as well as giving an overview of the most important details.
- The interactive GUI can be used to navigate the game footage to timepoints such as:
  1. **Battles** within the game
  2. **Raids** on villagers (villager deaths)
  3. **Idle villagers**
  4. **Floating ressources** (bad ressource management)
- Furthermore the **score difference** between both players is visible and functions as the „progress bar“ of the video. This helps in determining which player is in the lead at each point as well as defining **turning points** in the game.

Advantages to in-game replays

There are advantages and disadvantages to the replay-viewer within the game.

Pro:

- Visualization and information next to the replay at any given point.
- Easy navigation. Fast forwarding (forwards and backwards) as well as directly jumping to timepoints (not possible in-game).
- Summary of key information such as idle villager time, point lead time etc…

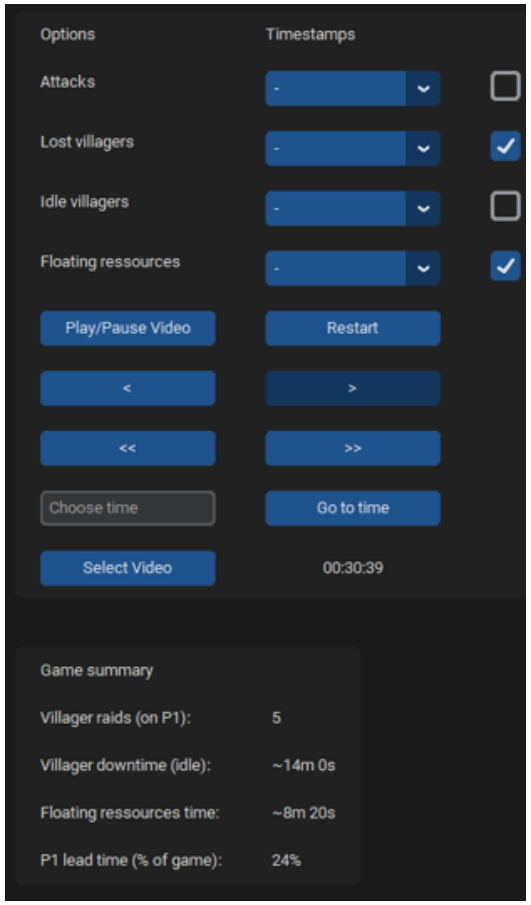
Con:

– Fixed perspective (no freecam or switching player)

– No Audio

– (Depending on hardware) Bad video framerate

– (Depending on hardware) Long loading times

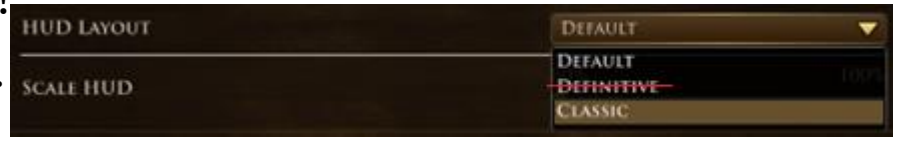


Custom viewer options

In-game viewer options

How do I use it?

1. When opening the program (by clicking **main.exe**), you will have to choose the recording of the game you want to analyze (**mp4 file**). You can record your game using **OBS** (open broadcasting software). You can record your own games or record youtube videos of other peoples games (up to you).
2. There are several important requirements to video needs to fulfill!



-The recording should ideally be **1080p** (720p is less reliable).

-The recorded game must have a **16:9** format.

-Gameplay footage using the **classic HUD** or the **default HUD** of the game can be used (Definitive HUD can NOT be used).

-The in-game **HUD size** must either be **100%** (standard) or **80%** (not inbetween). 100% will give more reliable results due to bigger and more readable writing.

-Footage of early **game versions** of AOE 3 DE can **not** be used.

-Game footage must be in **full screen** (windowed does not work)

-This replay viewer is aimed at 1v1 games
-Footage should be from one players perspective (no player switching)

How do I use it?

- This setting works
  (Classic HUD – 100%)

How do I use it?

- This setting works
  (Default HUD – 80%)

How do I use it?

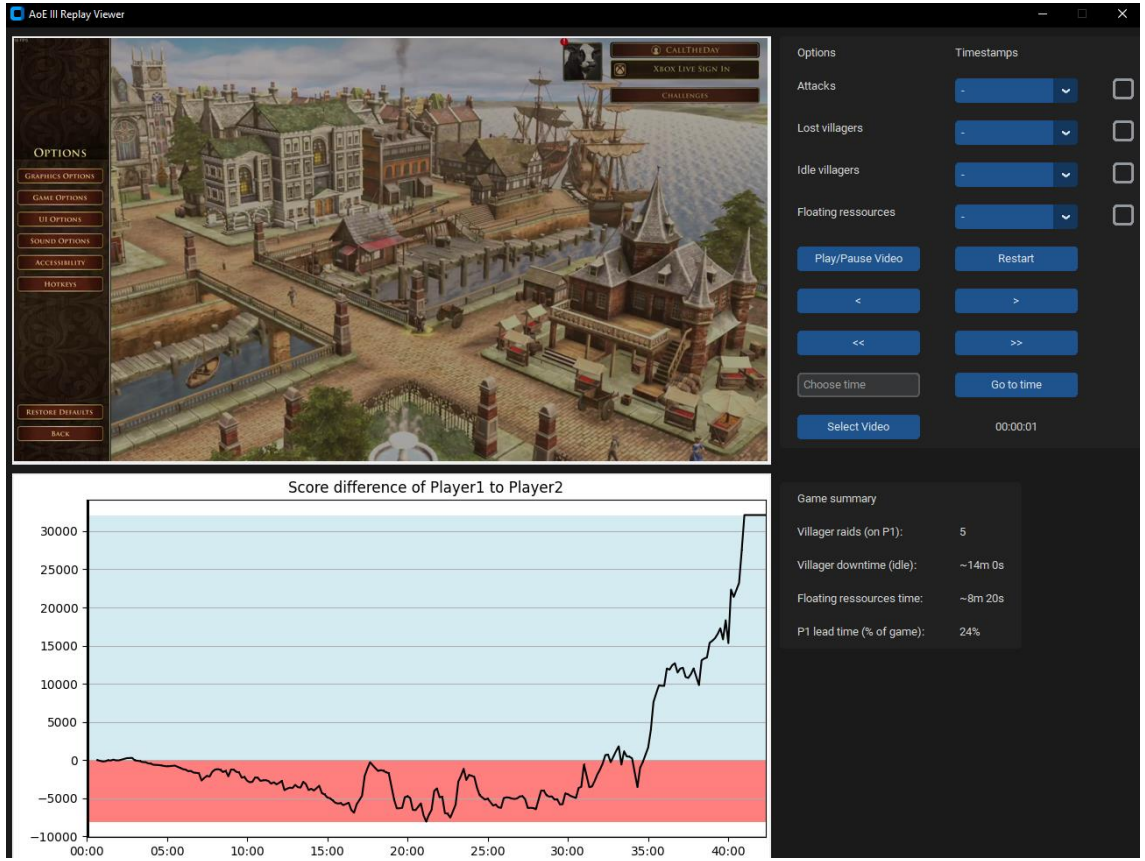
- This setting does NOT work!
  (old version of the game)
  (scores are at a different position)

How do I use it?

- This setting does NOT work!
  (definitive HUD)

How do I use it?

3. After selecting a **suitable video** you will arrive at a **loading screen**.
   Depending on the computer hardware this may take as long as the recording itself. You can leave it running in the background. Once the loading is done, a new window will pop up.
   To reduce loading times, the standard sampling frequency is 10s. Which means that every 10 seconds of the video, a „screenshot“ is taken and analyzed within the program.
   To reduce the loading times further or increase it but get more precise results, you can determine your own sampling frequency (see last page)
4. If everything went right, you will arrive at the **replay viewer GUI** and can now navigate the recorded game.
   More details on the next slides…



Using the GUI

Replay of selected video

Graph visualizing point difference between both players
(gives an idea who is in the lead)
The blue area means that Player 1 (Dutch) is in the lead and the red area means that Player 2 (Sweden) is in the lead.

Black line marks current video time

Option menu allowing to jump to keypoints as well as marking them on the score-graph.

Navigation buttons (fast forward etc.)

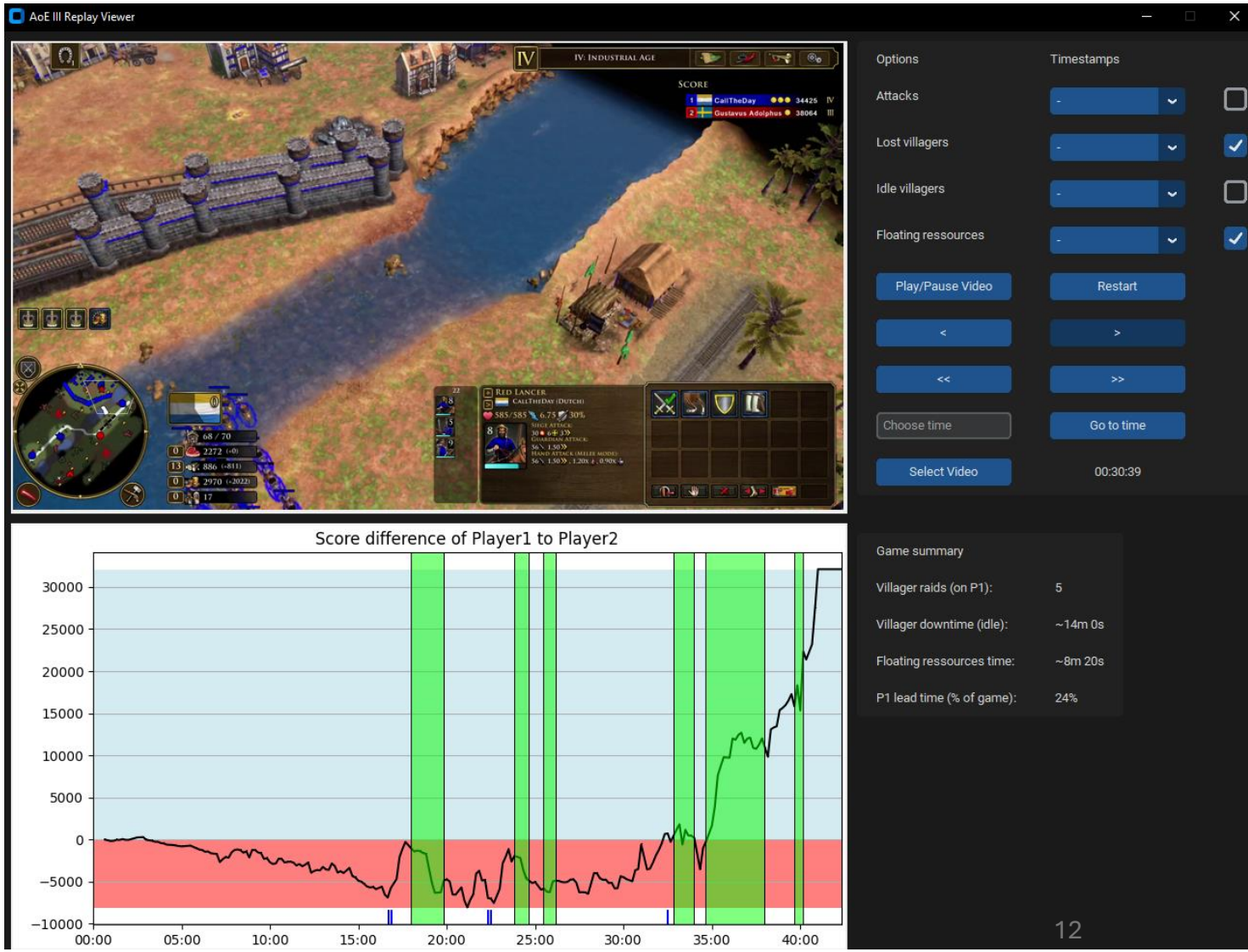
„Select video“ is button for selecting another video file as well as current video time. *(Due to the sampling frequency there can be a small deviation between this and the time at the bottom of the graph but this is the actual video time)*

Summary of the game.
Precision of summary is also depending on the sampling frequency.

Using the GUI

- Attacks and Villager deaths are <u>timepoints</u> and are marked at the bottom of the graph in blue. Attacks ecompasses all timepoints where units where lost (including lost villagers). Lost villagers only includes villager deaths.
  (in this case the 5 occurences of villager deaths are shown)

- Idle villagers and floating ressources are <u>time durations</u> and are shown in transparent green.
  (in this case the times with bad ressource management are shown)



How does it work?

- Once you start the program it will look at the selected mp4 file. After every set sampling frequency (for example every 10 seconds) the current frame in the video is analyzed.

- In the beginning, a part of the top right menu is searched within the frame. If the menu picture is found, the program knows, that the game has started.

- Once the game has started, the score of both players is collected after every x seconds. This will then be used to create the graph within GUI.

How does it work?

- For the ressources, population and villagers, the food icon is searched within the frame. Depending on the found position, the spaces for the ressource values are then determined.

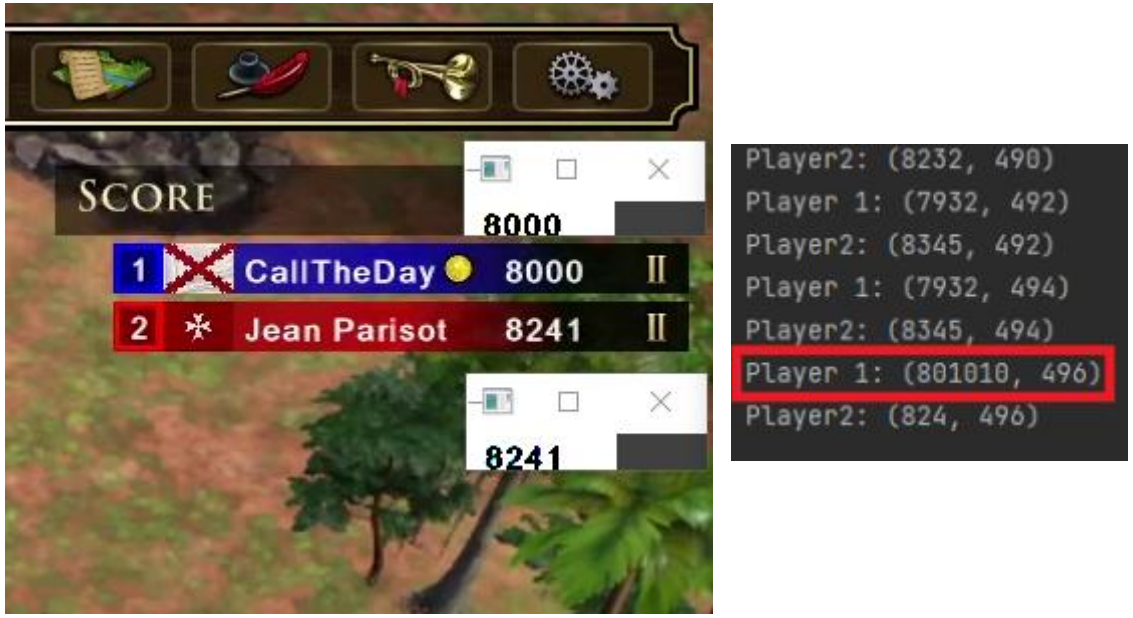
  This is because the ressources have different positions depending on the civilization and HUD style.

- Like with the points, the ressources, population and villager numbers are also saved after every set sampling frequency.

How does it work?

- Values are read using easyOCR. Mistakes (as seen on the picture) are possible but uncommon when using 100% HUD size.

  Using only 80% HUD size within the game will lead to more errors, since the numbers are smaller and harder to make out.

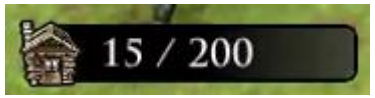


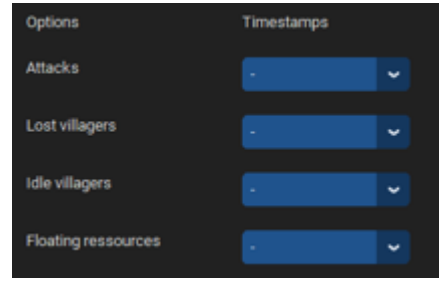
Early prototype demonstrating wrongly read values.

How does it work?

- **Attacks**: Timepoints are chosen by checking the population count. If the current population is less than the previous population, it means that an attack occured.
  (In rare cases a timepoint can be detected if a unit is canceled and thus the population goes down without an attack occuring).

  After a attack time point is found, the population for the next 30 seconds will not be analyzed *(battles can take several minutes and this would lead to a high amount of timepoints. The first timepoint of a battle is sufficient)*.





- **Lost villagers**: Timepoints are detected by checking the villager amount. If the current number is less than the previous measurement, it means that a villager was lost. *(This means that revolts will also be detected as villager lost)*

How does it work?

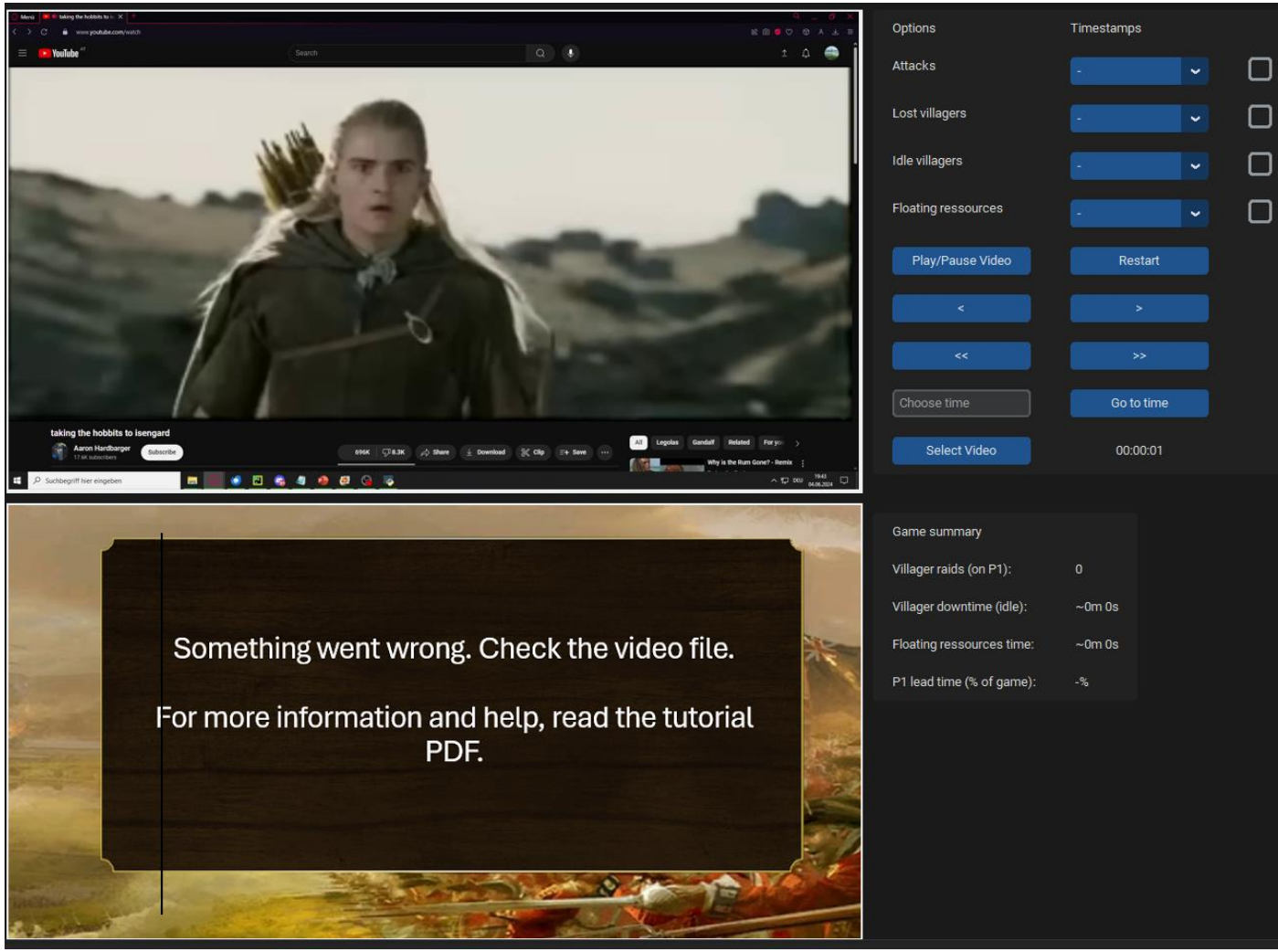
- **Idle villagers:** A timepoint is saved once the idle villager field is greater 0. If the number drops back to 0, a second timepoint is saved and the duration of the two points is noted. (*Accuracy is also depending on sampling frequency)*

- **Floating ressources:** If one ressource is **more than 75%** of the total ressources, a timepoint will be saved. Once that ressource drops back below 75%, a second timepoint is saved and the duration between the two timepoints is noted.
*(Measurements are only taken if total ressources are **greater than 1500**. Having 700 Food, 100 Wood and 100 coin does not count as bad ressource management even though it is above 75% food)*

HELP (It doesnt work)

- If the GUI is showing up after loading but you can not see the graph or any values, it means that **no game** was found or the **score list is empty**. This could either be because the chosen video file does not actually contain a game or that the score values could not be read.
- Make sure that the video file contains footage as explained in the „How do I use it“ section (page 5-12).
  On page 8 you can see an example of a game which would result in the same error, since it is an old version of the game and the scores are at a slightly different position.

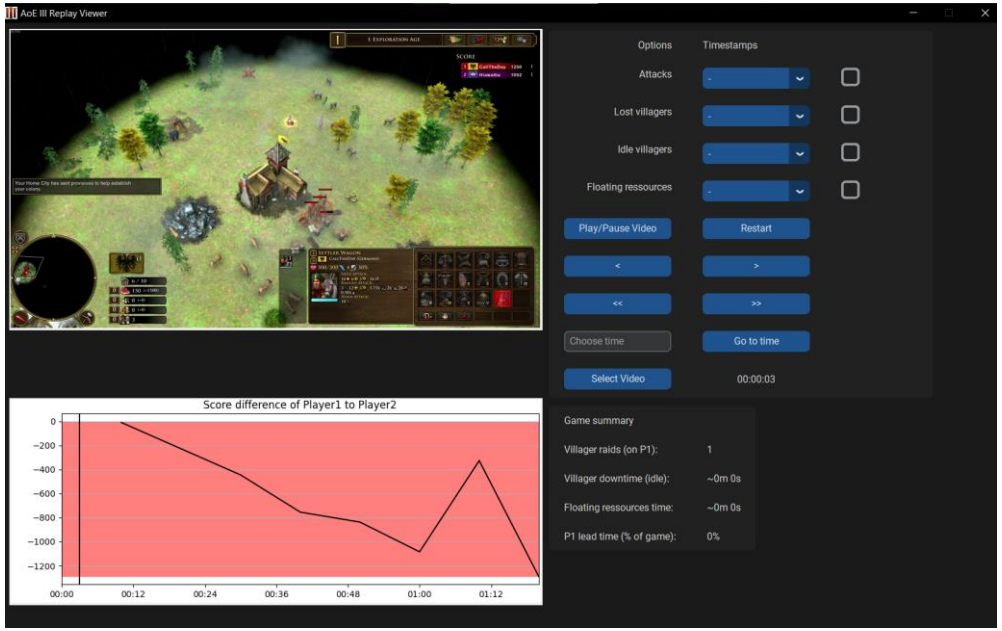
- If the loading screen does not show up or there is no progress (progress percentage does not move), then some other unknown error occured. Make sure to carefully look at the requirements for the input video.

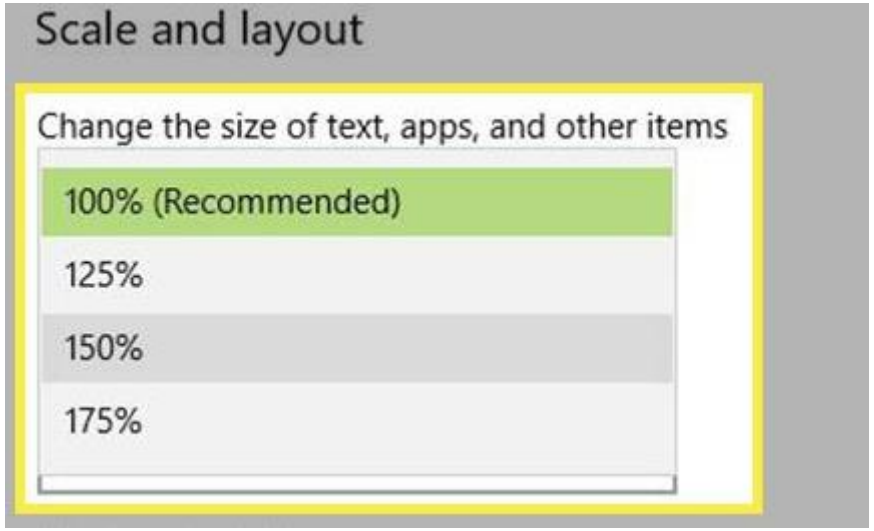


HELP

- Why is my GUI shifted (gaps between widgets)?
  This happens due to display scaling options.
  On Laptops, the display is often scaled to 125%.
  This also affects the GUI, leading to undesired results.

- *If you want to fix this issue, you can set the display scaling on your pc to 100%. (Right click on desktop -> display settings -> scalng=100%)*





Custom settings

- If you want to set your own parameters or want to improve the loading times, you can open the „Custom_settings.txt“ file.
- You can turn off analyzing some values by setting them to „False“. This will make loading faster.
- You can increase the sampling frequency (in seconds) in order to shorten loading times.
- You can decrease the sampling frequency in order to get more detailed results but longer loading times (standard sampling frequency is 10 seconds).
- **Tip**: *Floating ressources needs to analyze 3 areas (food, wood, coin). So disabling it, saves about as much time as disabling attacks, idle vils and dead vils at the same time.*
- Just change the lines within the .txt file and save it. But dont change variable names or delete lines.