

WinMorph Manual

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Introduction

WinMorph is a program that warps and morphs scanned or computer generated images. It brings to your PC one of the most fascinating image processing tool, until now available only on high end workstations. WinMorph can automatically generate sequences for video edit or static frames, for use by professional photographers.

System Requirements

Before installing WinMorph, assure yourself that your system meets these requirements:

- At least a 80386 DX 33Mhz with a math coprocessor

- Microsoft Windows 3.1 in enhanced mode

- 16Mb of memory are needed for sequence generation in a resolution of 512x480 with 24 bits/pixel. It's possible to use the virtual memory offered by Windows, but performance will suffer.

- A VGA adapter with at least 32k colors at 640x480 with color monitor

- Mouse

- Hard disk with enough space to save a sequence. A run of five seconds in resolution of 512x480 true color will need about 106Mb of disk space.

Recommended configuration:

- 80486DX or DX2 of 33Mhz or better

- At least 16Mb of real memory

- 24 bits VGA adapter with windows accelerator with 17" color monitor.

Installation

Put the distribution floppy in the drive, say drive A:, and follow these steps:

1. change to your hard disk: c:
2. create a sub directory: MD \winmorph
3. change to the subdir: CD \winmorph
4. copy files: COPY a:*. * c:\winmorph
5. execute the instalation program, INSTALL.BAT, which will decompress the program files and the examples.

now, you have to install the icon on Windows' Program Manager

1. execute Windows: win
2. select the Program Manager window
3. execute the sequence File-New-Program Item-OK (fig. 1 and 2)
4. fill the empty fields in the Program Item properties as in fig. 3
5. chose OK.

To execute WinMorph, just double click on the installed Icon.

Introduction to the image warp process

WinMorph is a non-linear image process that allows a controlled image deformation, guided by means of a pair of control point meshes. Each displacement of a control point placed on the destination frame, relative to its position on the origin frame, causes a corresponding deformation of the image, in the attempt to follow the displacement.

That way, the displacement of a destination mesh control point to the right, will induce the deformation of the origin image in that way.

Morph is a particular warp process where control points are marked over the origin and destination image in order to drive the transformation process that occurs between both.

Through the sequence of frames, origin image elements acquire the destination element's shape and vice versa. The intermediate images suffer a fusion process (dissolve), that is proportional to the progression of the animation (frames generated between the origin and destination images).

The fusion percentile between two warped frames, can be specified by the user, in the generation of still frames.

Program Operation

Program controls are divided into four classes:

- Read/Write of frames and control meshes
- Control mesh edit
- Morph/warp process controls
- Auxiliary visual controls

Most of the WinMorph menu items are also available to the user by the quick menu window, that can be shown or hidden with the F7 key.

Other dialog windows that can be called by function keys are:

F8: frame sequence generation control

F9: still frame generation control

F10: mesh colors

Reading the origin and destination images



The first step in the generation of warp or morph effects, are the load of origin and destination images. The WinMorph program version 1.0 reads and writes only the Targa image format (files *.tga) at 24 bits/pixel (true color) with any resolution, bound only to available memory. A common resolution is 512x480, used on video tape recording.

Obs.: The demo version is limited to 320x200 resolution.

To read the images, proceed as follows:

1. Click on the Read Frame icon (if the quick menu window is not visible, press F7 or move any window that could be over it)
2. Select the desired frame (origin or destination)
3. Select the file in the File Open dialog box
4. Choose OK

or:

1. Select the File option on the menu bar
2. Select Frames then Read
3. Select the desired frame (origin or destination)
4. Select the file in the File Open dialog box
5. Choose OK

Saving origin, destination or in between images



To save these images, proceed as follows:

1. Click on the Save Frame icon on the quick menu window (if the quick menu window is not visible, press F7 or move any window that could be over it)
2. Select the desired frame (origin, destination or in between)
3. Select the file in the File Open dialog box
4. Choose OK

or:

1. Select the File option on the menu bar
2. Select Frame then Save
3. Select the desired frame (origin, destination or in between)
4. Select the file in the File Open dialog box
5. Choose OK

Creating a control mesh



Before starting the morph/warp process, it's necessary to create control meshes for origin and destination frames.

1. Click on the New Mesh icon
2. Select the desired frame (origin or destination)
3. Fill in the fields indicating the desired horizontal and vertical resolution
4. Choose OK

or:

1. Select the option Edit from the menu bar
2. Select Control Mesh then New Mesh
3. Select the desired frame (origin or destination)
4. Fill in the fields indicating the desired horizontal and vertical resolution
5. Choose OK

Reading control meshes



WinMorph version 1.0 reads and writes mesh files in a proprietary format (extension .msh) in resolutions up to 50x50 lines.

Obs.: A control mesh is a bidimensional structure, not related to the frame resolution.

In order to read a control mesh follow these steps:

1. Click on the Read Mesh icon (if the quick menu window is not visible, press F7 or move any window that could be over it)
2. Select the desired mesh (origin or destination)
3. Select the file in the File Open dialog box
4. Choose OK

or:

1. Select the File option on the menu bar
2. Select Control Mesh then Read
3. Select the desired frame (origin or destination)
4. Select the mesh in the File Open dialog box
5. Choose OK

Saving control meshes



In order to save a control mesh follow these steps:

1. Click on the Write Mesh icon (if the quick menu window is not visible, press F7 or move any window that could be over it)
2. Select the desired mesh (origin or destination)
3. Select the file in the File Open dialog box
4. Choose OK

or:

1. Select the File option on the menu bar
2. Select Control Mesh then Save
3. Select the desired frame (origin or destination)
4. Select the mesh in the File Open dialog box
5. Choose OK

Control Mesh Editing

In order to achieve the desired effect, it is necessary to place control points over each one of the image key spots. Areas full of detail, most of the time needs more control points, so, it is necessary to use options to move, insert and delete lines and points, in order to better follow image details.

Simultaneous editing of origin and destination control meshes are possible since they have the same vertical and horizontal resolution.

Even so the placements of control points are over the responsibility and skill of the user, it's recommended that:

- Avoid crossing vertical or horizontal lines

- Avoid editing control points placed on frame borders

- Avoid deep displacements of control points without moving together neighbor points.

If the displacement of a control point group has caused undesirable warping in its neighborhood, it is necessary to add more vertical and/or horizontal lines around it, to minimize its influence. See example in sub-directory

EXAMPLE2.

- Avoid excessive lines (most of the time a mesh of 400 points -- 20x20 -- will work with a great number of animation's where people or objects are warped).

Moving a control point



1. Click on the Move Point icon
2. Select the desired point, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
3. Move the mouse cursor to the new position
4. Click on the left mouse button. If this is not the desired position, repeat this step
5. Do the same to every other point that has to be moved

or:

1. Select Edit on the menu bar
2. Select Control Mesh then Move Point
3. Select the desired point, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
4. Move the mouse cursor to the new position
5. Click on the left mouse button. If this is not the desired position, repeat this step
6. Do the same to every other point that has to be moved

Obs.: the procedure of moving control points, can be made on either origin or destination frames. For example, if a point on the origin mesh is selected, the corresponding destination mesh point will be highlighted, and so, can be moved. It is also possible to edit control points even if different levels of zoom are applied

to origin and destination frames.

Moving a vertical mesh line



1. Click on the Move Vertical Line icon
 2. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 3. Move the mouse cursor to the new position
 4. Click on the left mouse button. If this is not the desired position, repeat this step
 5. Do the same to every other vertical line that has to be moved
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Move Vertical Line
 3. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 4. Move the mouse cursor to the new position
 5. Click on the left mouse button. If this is not the desired position, repeat this step
 6. Do the same to every other vertical line that has to be moved

Moving a horizontal mesh line



1. Click on the Move Horizontal Line icon
 2. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 3. Move the mouse cursor to the new position
 4. Click on the left mouse button. If this is not the desired position, repeat this step
 5. Do the same to every other horizontal line that has to be moved
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Move Horizontal Line
 3. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 4. Move the mouse cursor to the new position
 5. Click on the left mouse button. If this is not the desired position, repeat this step
 6. Do the same to every other horizontal line that has to be moved

Deleting a vertical mesh line



1. Click on the Delete Vertical Line icon
 2. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 3. Click on the left mouse button.
 4. Do the same to every other vertical line that has to be deleted
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Delete Vertical Line
 3. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 4. Click on the left mouse button.
 5. Do the same to every other vertical line that has to be deleted

Deleting a horizontal mesh line



1. Click on the Delete Horizontal Line icon
 2. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 3. Click on the left mouse button.
 4. Do the same to every other horizontal line that has to be deleted
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Delete Horizontal Line
 3. Select the desired line, by moving the mouse cursor over it and clicking the right mouse button. Repeat this operation if the select point is not the desired one.
 4. Click on the left mouse button.
 5. Do the same to every other horizontal line that has to be deleted

Inserting a vertical mesh line



1. Click on the Insert Vertical Line icon
 2. Select where to place the new line by moving the mouse cursor between two other vertical lines and clicking the right mouse button. Repeat this operation if the select region is not the desired one.
 3. Click on the left mouse button. Will be created then a vertical line in the middle of the other two neighbours
 4. Do the same to every other vertical line that has to be inserted
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Insert Vertical Line
 3. Select where to place the new line by moving the mouse cursor between two other vertical lines and clicking the right mouse button. Repeat this operation if the select region is not the desired one.
 4. Click on the left mouse button. Will be created then a vertical line in the middle of the other two neighbours
 5. Do the same to every other vertical line that has to be inserted

Inserting a horizontal mesh line



1. Click on the Insert Horizontal Line icon
 2. Select where to place the new line by moving the mouse cursor between two other horizontal lines and clicking the right mouse button. Repeat this operation if the select region is not the desired one.
 3. Click on the left mouse button. Will be created then a horizontal line in the middle of the other two neighbours
 4. Do the same to every other horizontal line that has to be inserted
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Insert Horizontal Line
 3. Select where to place the new line by moving the mouse cursor between two other horizontal lines and clicking the right mouse button. Repeat this operation if the select region is not the desired one.
 4. Click on the left mouse button. Will be created then a horizontal line in the middle of the other two neighbours
 5. Do the same to every other horizontal line that has to be inserted

Moving control mesh points



1. Click on the Move Mesh icon
 2. Select the guide control point for the mesh displacement. Repeat this operation if the select point is not the desired one.
 3. Place the mouse cursor over the new position
 4. Click on the left mouse button. Repeat this operation until the control mesh is in the desired place. Please, note that the border lines are not displaced
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Move Mesh
 3. Select the guide control point for the mesh displacement. Repeat this operation if the select point is not the desired one.
 4. Place the mouse cursor over the new desired position for the guide point
 5. Click on the left mouse button. Repeat this operation until the control mesh is in the desired place. Please, note that the border lines are not displaced

Moving a control point group



1. Click on the Move Group icon
 2. Select the control point group by placing the mouse cursor over each point and clicking the right button, one by one. If any point had been select by mistake, the hole operation has to be repeated. It is important to note that the last select point will be the guide point for the displacement of the group.
 3. Place the mouse cursor over the new desired position to the guide point
 4. Click on the left mouse button. Repeat this operation until the guide point is in the desired place.
- or:
1. Select Edit on the menu bar
 2. Select Control Mesh then Move Group
 3. Select the control point group by placing the mouse cursor over each point and clicking the right button, one by one. If any point had been select by mistake, the hole operation has to be repeated. It is important to note that the last select point will be the guide point for the displacement of the group.
 4. Place the mouse cursor over the new desired position to the guide point
 5. Click on the left mouse button. Repeat this operation until the guide point is in the desired place.

Changing control mesh colors



To achieve a better contrast while editing a control mesh, the user can alter each one of the colors for the vertical or horizontal mesh lines and for the highlighted control points. For this, select the icon Edit Mesh Colors or just press the F10 key. Now, just use the slide controls to change the colors and observe the mesh to get the desired contrast.

Making a Still Frame



First, select the Still Frame Control icon or select option Control from the menu bar then choose Single Frame Control or press the F9 key. After this, the still frame production dialog box will appear on the screen.

Obs.: To close this dialog box, press F9 again or the Cancel button.

This dialog contains the following control groups:

Warp group: contain two slides that controls the image deformation intensity. One for the origin frame and other to the deformation of the destination one. The user can drag the slide or key in the desired value. Valid ranges are among 0 and 100.

Dissolve group: controls the fusion percentile between origin and destination frames, if morph is the desired process. *Obs.:* If the slide is totally moved to the left, the origin frame, deformed by following the directions of the Warp group, will be shown without fusion with the destination frame. In the same way, if the slide is totally moved to the right, the destination frame will be shown without fusion with the origin frame.

Quality group: controls the quality of the produced image. It can be with a anti-aliasing process or unfiltered (lower quality but more speed. Better for preview).

Process Type group: Select the process to be used:

Morph: Deformation of the origin and destination frames, followed by fusion, using the direction in the Warp and Dissolve groups.

Warp: Deformation of the frame following the percentile defined in the Warp group.

Running Mode group: if the Background option is selected, other software can be run at the same time. Exclusive mode does not allow other program to run, but is faster.

After choosing the desired options, click on the Set button to make then active.

Now, to begin creating the warped frame using the above options, the user should now click on the Make Still Frame button, or select the Processing option on the menu bar and then select Make Still Frame.

Obs.: The in-between frame produced, can be saved on disk using the procedure to save frames, described in a former section.

Making a frame sequence (animation)



Sequence is a collection of frames in the Targa format (.tga), with 24 bits/pixel, without alpha channel, whose name is construct by connecting up to four alphanumeric characters and four numbers. Example: SEQ0010.TGA, SEQ0011.TGA, SEQ0012.TGA, etc.

This file name format is used by the majority of the video edit MS-DOS softwares, so, the user will not have any trouble in using a sequence produced by WinMorph.

Operation Control

Click on the Production Control button or select the option Control from the menu bar, then select Sequence Control Panel or press the F8 key. Then, the dialog box that includes all sequence generation control groups is displayed.

Obs.: Pressing again F8 or clicking on Cancel closes this window.

Control groups

Frame Control

Frames: define the number of frames the hole sequence will have.

Starting at: define the first frame number that will be saved to disk.

Finishing at: set the last frame of the sequence.

Ex.: To make a sequence of the frames 20, 21, 22, 23 and 24 of a 30 frames sequence (1 second on NTSC video), the above parameter should be: #

Frames = 30; Starting at = 20; Finishing at = 24. Naturally, if the hole sequence is desired, the parameters should be 30, 0 and 29 respectively.

Running Mode

When the Background option is selected, you can minimize the WinMorph window and then, call other Windows programs. Please note that WinMorph allocates memory as it is needed along a sequence generation, so, once running it in the background, if another program that uses a lot of memory is started, WinMorph can interrupt its execution and display an error message like NOT ENOUGH MEMORY.

When set to Exclusive, WinMorph will not allow any other Windows application to run. Of course, this is the fastest mode to produce a sequence.

Dir Selection

Allow the user to change to the desired sub directory where the sequence will be saved.

Output File Type

This version of WinMorph allows only the Targa format for frame output.

Dissolve Control

This control is used only for morph process. The Start and End sliders, controls the starting and ending points for fusion of the deformed origin and destination frames.

Ex.: If you will generate a sequence of 30 frames, that will morph an origin frame into the destination one, a good choice for the above parameters are start = 15% (frame 4) and end = 85% (frame 24). This way, the first frame is allowed to warp itself until frame 4 and then, it is fused with the deformed destination frame, up to frame 24. From this frame till the end, it will only warp to the shape of the destination one.

Obs.: When the start and end points are too close, says 45% and 55 %, there is a very abruptly change between images, causing often an unpleasant effect.

Warp Control

Control the start and end points of the origin and destination deformation for the sequence. Their values are most of the time kept on 0 and 100, so the deformation will start on the first frame and be finished at the last frame.

Production

This group is build by the following controls:

Name: Up to four alphanumeric characters defining the production name. It is the first part of the file names for the sequence frames.

First File #: From 0000 to 9999. Define the file sequence number for the frames that will be generated. This value, added to the values defined on the Frame Control, will give the file names for the sequence.

Ex.: if a production called PROD, first file # = 0010, # frames = 30, starting at = 0, finishing at = 29. The produced files written on the output directory will be PROD0010.TGA, PROD0011.TGA,...,PROD0039.TGA.

Quality:

Anti-aliased: Better results

Unfiltered: More speed

Process Type:

Warp: Simple deformation of the origin frame, leaded by the control meshes, placed over the origin and destination frames (that in this case, is always a copy of the origin frame, just to act as a reference for the user).

Morph: Origin and destination frames deformation followed by fusion of the in-between images, as defined by the Warp and Dissolve controls listed above.

To start the sequence click on the Set button, then on the Run Now button.

Important Tips

- 1.Each point on the origin should have a corresponding one on the destination, following a aesthetic and logic criteria
- 2.Both images must have some resemblance (there is no sense on morphing a tiger on a white wall)

3. The background should be neutral (to get another kind of background the chroma key effect can be used)
4. The light of both scenes should be similar. By not following this rule some kind of flash could appear on the produced sequence.
5. Points should not be excessively displaced from their original positions.
6. Start with a simple mesh (4x4) and progressively insert horizontal and vertical lines. Remember that each point will move to the corresponding one on the destination image.
7. Use the zoom tool to better position the mesh points.
8. Generate a still frame with all parameters as 50%. If the results are good, there is a good chance that the sequence will be too.
9. Go moving the points very smoothly and generating still frames until there is total removal of the fading effect on some image regions.
10. Never leave important points without a good correspondence between frames.
11. Never cross vertical or horizontal lines.
12. Do not collapse areas by joining many points.
13. Try to keep the polygonal shape of the areas on both images.
14. On 99% of the morphs set warp start = 0 and warp end = 100
15. The dissolve should begin on 15%/25% and finish on 75%/85%.
16. High quality images are very important to get good results.