

# **Processing Image Files For**

## **Inspection, Selection and Distribution**

By Peter Wolf

Digital cameras allow the amateur photographer to take more pictures on a weekend than many folks did in a lifetime with film cameras. With so many pictures available after an event, how should one sort and index them for future retrieval?

Sorting pictures became an acute problem when we started our event photography business in 1999. We could generate 5,000 or 20,000 image files during one event within a few hours and needed some way of processing the image files and allowing participants to easily find their particular picture. There may have been several photographers involved during the same event and images could not have duplicate file names.

***Allowing participants of an event to find their pictures quickly is critical in generating sales.*** Our goal was to make pictures of an event available for online inspection, selection and purchase within 24 hours after the event. 95% of our events meet that goal.

If your event photography includes any of the following types then read on:

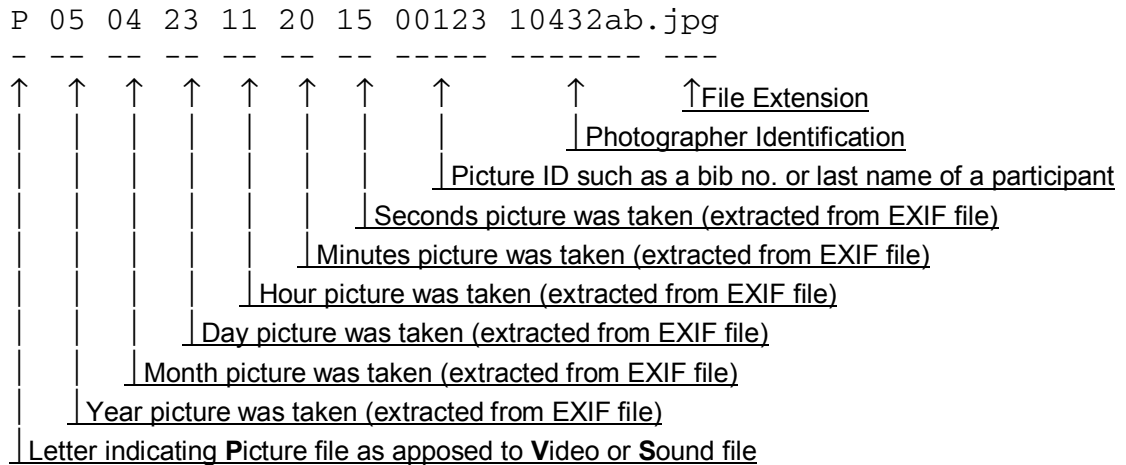
- **5K, 10K & Marathon Running Events**
- **Triathlon Events**
- **Bicycle Events**
- **Soccer, Little League, Swimming, Team & Individual Pictures**

We decided that the file name of each image must be unique and could contain the indexing data. This approach worked so well that even today, after some 3 million images, we can retrieve any picture file within seconds for viewing and order processing.

The following image file name structure should provide unique image descriptors for thousands of event photographers taking pictures at thousands of events.

There are many programs that can easily extract information from the usual EXIF file associated with digital images. We have found one program Picture Information Extractor (PIE) by <http://www.picmeta.com/> to be particularly useful in renaming picture files and rotating images.

The following file name would generally not have any spaces between characters:



A program that utilizes these pictures files can easily parse the various data from the image file name and use the parsed data for searching and indexing of image files.

One of the most desirable ways of sorting and indexing large numbers of image files for quick retrieval and order processing is by the date and time of day the image was taken or some image identifier such as a bib number or person's name.

### **5K, 10K & Marathon Running Events**

There are some unique benefits to indexing pictures by time of day. For example, published race results of a 10K or Marathon run indicate the bib number and finish time of each participant. We utilize these published results and integrate the data to retrieve pictures when the participants enter their name or bib number into a search box.

We simply look up the finish or split times of the participant and then retrieve the pictures from our indexed picture files that match that time. This technique allows the participants to find their images by searching on the bib number even if the bib number is not visible in the image itself. Provisions need to be made to allow a general offset of picture time to perfectly synchronize the picture time with the recorded race time. The offset is easily determined by noting when the first racer crossed the finish line and knowing the recorded finish time. It is also desirable to offer an offset from the point where the finish or split time was measured and the photographer's location since the camera is seldom situated at the same spot as the timing systems. i.e. the camera may be 50 feet before or after the timing station.

To determine the exact time the participant passed the photography station near a timing station the following simple calculations are used:

$$S_{average} = D_{start\ to\ timer} / T_{start\ to\ timer} \quad T_{photog} = T_{timer} - (D_{photog\ to\ timer} / S_{average})$$

Here it is assumed that the Photog was situated before the participant reached the timing station. The average speed ( $S_a$ ) for a particular athlete is calculated first and then the time it takes that participant to traverse the distance from the Photog to the timing station ( $D_{photog\ to\ timer} / S_{average}$ ) is subtracted from the recorded time at the timing station ( $T_{timer}$ ). This method takes into account the difference in speed from one athlete to the next by first evaluating the average speed ( $S_a$ ) for a particular athlete.

## Triathlon Events

An example of this can be found at a [Triathlon event on September 24, 2006](#). Enter as the participant bib number 279 (Phil Suttner). The program displays the following results:

<b>Start Time:</b>	07:38:15	<a href="#">View photos</a>
<b>Swim Finish Photo:</b>	08:11:04	<a href="#">View photos</a>
<b>Swim Split Time:</b>	00:33:33	
<b>Swim Finish Time:</b>	08:11:48	
<b>Swim Speed:</b>	1.67 mph	
<b>Bike Transition:</b>	00:02:35	
<b>Bike Start Photo:</b>	08:14:23	
<b>Bike Finish Photo:</b>	09:36:27	<a href="#">View photos</a>
<b>Bike Split Time:</b>	01:22:26	
<b>Bike Finish Time:</b>	09:36:49	
<b>Bike Speed:</b>	18.12 mph	
<b>Run Transition:</b>	00:02:12	
<b>Run Start Photo:</b>	09:39:01	
<b>Run Finish Photo:</b>	10:35:13	<a href="#">View photos</a>
<b>Run Finish Time:</b>	10:35:19	
<b>Run Split Time:</b>	00:56:18	
<b>Run Speed:</b>	6.61 mph	
<b>Finish Line Photo:</b>	10:35:19	

Click on any of the “view photos” to see several images displayed on the screen. Bib number 279 (Phil Suttner) could easily identify himself in each set of images. Phil is the one with dark hair and a blue and yellow jersey. In some instances you can make out his bib number on his arm or the paper bib number he is wearing. The resolution of the thumbnail images is of sufficient resolution where Phil can identify himself but others may not and that is to assure some personal privacy



*Swim Exit Pictures*

Notice the offset between his actual swim finish (8:11:48) and when the picture was taken according to the calculations (8:11:04). The actual time the picture was taken was at 8:11:13. By the way the swim offset time calculation does not use the average swim time but instead uses the average running time of the athlete since the athlete is running on the beach and not swimming on the beach.

Differences can also be noted in the bike and run finish times and their respective calculated and actual photo time.



*Bike Finish Pictures*



*Run Finish Pictures*

Frequently the exact time offset for the swim, bike and run portions are tested by trial and error methods and only approximating the distance from the timing station to the photo station. Different offset distances are substituted in the program until the pictures closely match the search process.

The method just described avoids the need of "Bib Screening" which is a cumbersome and error prone process where someone has to view each picture and associate a visible bib number with an image file. "Lost image folders" that contain pictures with no visible bib numbers are avoided since these methods do not depend on visible bib numbers in the picture. It is not uncommon that 50% or fewer images contain visible bib numbers. Swim exit pictures with wetsuits are almost useless if their identity depended on visible bib numbers. Indexing pictures by the time of day allows each participant to find their pictures quickly.

There are some events that are not timed or the timing data is not available to the photographer. Then the only option is to do the bib screening and provisions are made in the picture file name to associate a bib number with a photo. Alternate methods of using lookup tables can also be used. However, having the pictures organized by time of day is still useful since many athletes know approximately what their start, split and finish times are and can generally find their pictures with a little search. Posting pictures randomly would be the worst scenario.

## **Bicycle Events**

There are many events that professional event photographers photograph that do not involve bib numbers or any kind of time keeping. Organized bicycle rides (bibs are usually not visible even if used) fall into this category. These types of events can be very lucrative for an event photographer. When timing methods are not used, we simply place a sign with a big clock near the event photographer. The sign reminds participants to remember the time they pass the photographer. People surprisingly do remember the time they passed the photographer! Retrieving their pictures from thousands of images online becomes a snap if the images are sorted and indexed by the time of day they were taken.

Participants may not remember the time they passed the photographer but they often remember the time they started the event and when they finished. We have worked out a convenient way for a participant to find their photo by simply knowing their start and finish time. This is accomplished by calculating the approximate time the participant passed the photo station based on the average speed the participant took to travel the entire route.

A good example of this is found with an event that was photographed some years ago: [Marin Century & Double - August 6, 2005](#). This event involved several routes of varying distances:

Metric Double	(134 miles)
Marin Metric	(60 miles)
Marin Century	(105 miles)
Double Century	(198 miles)

The photography station was situated at one location and three [automatic cameras](#) were used to capture the participants. The mileage to the photography station was different depending on which route was taken. However simple algebra can quickly approximate the time when a participant passed the photography station:

$$S_{\text{average}} = D_{\text{Total Route Distance}} / T_{\text{Time from Start to Finish}}$$

$$T_{\text{At Photog}} = T_{\text{Start Time}} + (D_{\text{Start to Photo Location}} / S_{\text{average}})$$

The participant can select the route, start and finish times and the system will automatically display images from the time when the participant should have passed the photo location.

Indexing and/or grouping images by time of day and allowing time synchronization of multiple cameras allows participant to quickly find and order their pictures.

## **Soccer, Little League, Swimming, Team & Individual Pictures**

Endless efforts and dollars are spent on youth sports. Event photographers have a unique opportunity to provide professional services and “cash” in with youth sports. Many parents

are not proficient on computers and may give up too soon if they can't find "Johnny's" picture conveniently of an event only hours ago. On the other hand, **parents are willing to spend outrageous money** if they find "Johnny's" picture quickly.

Organizing event pictures by the time of day they were taken and informing the parents where to look for them is a simple way to insure that the pictures are found. We utilize business cards with instructions printed on one side where to look for the event pictures. On the other side we imprint the date and time with a [portable time stamp machine](#) (strapped on the photographer's belt). Frequently, a simple flyer informing parents that all the pictures are organized by the time of day suffices to find the desired pictures. Parents simply jot down the time their son or daughter was in the game or at bat.

These techniques have been instrumental in helping event participants find pictures quickly on computer networks such as the Internet. PhotoCrazy, Inc. has utilized these and other processes successfully since 1999. Anyone using these techniques and/or other processes should carefully review U.S. Patent Numbers [6,985,875](#) and [7,047,214](#). PhotoCrazy, Inc. has made both of these patents available for licensing. For more information, please contact me at [info@photocrazy.com](mailto:info@photocrazy.com).

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