Variable Frame Delays (VFD)
Software Release Version 1.2
Release Notes
July, 2011

This file contains information about the above product in the following sections:

1) Release Contents

The VFD software was developed by the Institute for Telecommunication Sciences (ITS). VFD is a full reference (FR) measurement that estimates the variable frame delays in one processed video clip. The program has a number of command line options that can be used to adjust the algorithm behavior and its outputs (see section 10 Input and Output Arguments).

2) Package Contents

The VFD software Version 1.2 package contains the following:

Installation related files:
  MCRInstaller.exe

Software related files:
  vfd.exe

Video Sequences:
  vfd_calmob_original.yuv
  vfd_calmob_hrc2.yuv
  vfd_flogar_original.yuv
  vfd_flogar_hrc1.yuv

Technical documentation:
  vfd_pc_readme.pdf
  ntia_tm_10_463.pdf

If any of these files are missing, you have not received an official distribution of the VFD software.

3) System Requirements

VFD software version 1.2 requires the following software and hardware:

Minimum Configuration:

Processor	2.0 GHz Pentium
RAM	2.0 GB (for SD video), >4.0 GB (for HD video)
Software	XP 32-bit (for 32-bit executable), Windows 7 64-bit (for 64-bit executable). The software may run under Vista but this has not been tested.
Disk	>4 GB free disk space

4) Technical Support Information

Please send any problems or requests for future improvements to vqm@its.bldrdoc.gov

For information on other video quality NTIA/ITS publications, visit <http://www.its.bldrdoc.gov/pub/n3/video/index.php >. For information on other NTIA/ITS publications, visit the NTIA/ITS web site at <www.its.bldrdoc.gov>. Other video quality measurement software tools may be obtained at <http://www.its.bldrdoc.gov/vqm/>.

5) Install/Uninstall Instructions

*****Install Instructions

The VFD software was developed using MATLAB and its associated toolboxes. It is therefore necessary to install the MATLAB Component Runtime (MCR) library before running VFD. If a prior version of VFD was installed, you must first uninstall the old version of the MATLAB Component Runtime Library before proceeding (see Uninstall Instructions below). Follow this installation procedure for VFD:

1. Copy the distribution files to a directory on your computer. This directory will be denoted as c:\VFD for the rest of the installation instructions given below.

2. Double click MCRInstaller.exe in c:\VFD and follow the instructions to install the MCR library on your computer.

3. After completing installation, check to make sure that the MATLAB Component Runtime library installed properly. From the "Start" menu, select "Control Panel", and in the window that appears, double-click "Add or Remove Programs" and see if the MATLAB Component Runtime library appears in the list of installed programs. If not, repeat step 2.

*****Uninstall Instructions

1. Select "Start", "Control Panel", "Add/Remove Programs". From the list of programs, select "MATLAB Component Runtime", and press "Remove".

2. Delete your installation directory and all files in it.

6) Operating Instructions

Open a command prompt window by selecting "Start", "Program", "Accessories", "Command Prompt". Change to the c:\VFD installation directory in step 1 of the Installation Instructions by typing "cd c:\VFD" at the command prompt.

To start the VFD software, type "vfd" at the command prompt.

Execute VFD with no arguments for syntax and brief operating instructions. See also #10 below for details.

Since VFD loads the entire original and processed video clips into memory in double precision format, you may encounter out of memory problems for long video sequences and/or high resolution video sequences (e.g., HDTV). The solution to this problem is to utilize the 64-bit executable version and to install 4 GB or more of RAM.

7) Product Release Notes

Version 1.0 is the first released version of the software.

The following changes have been made in version 1.2 (when compared with version 1.1):

1. Bug fix for interlaced video to properly set the starting alignment point for the VFD search.

2. Code added to detect when the VFD algorithm fails.

3. Improvements and bug fixes have been made to the read_avi function, including support for the ‘YV12’ format.

The following changes have been made in version 1.1 (when compared with version 1.0):

1. Improved read_avi function to read more uncompressed formats and files larger than 2 GB. Support has been added for 10-bit uncompressed UYVY files in the ‘V210’ format (but the read times are very slow).

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10) Input and Output Arguments

Document ntia_tm_10_463.pdf, provided with this release, give a preliminary description of the VFD algorithms and MATLAB reference code. The following four command line arguments are required by VFD:

'proc_file' Specifies the processed video file for which to estimate the variable frame delays.

'orig_file' Specifies the corresponding original video file.

'scan_type' Specifies the scan type of the video files as either 'progressive', 'interlaced_uff' (interlaced upper field first), or 'interlaced_lff' (interlaced lower field first).

'results_file' The full path name of the file to save VFD results, in Comma-Separated Values (CSV) format.

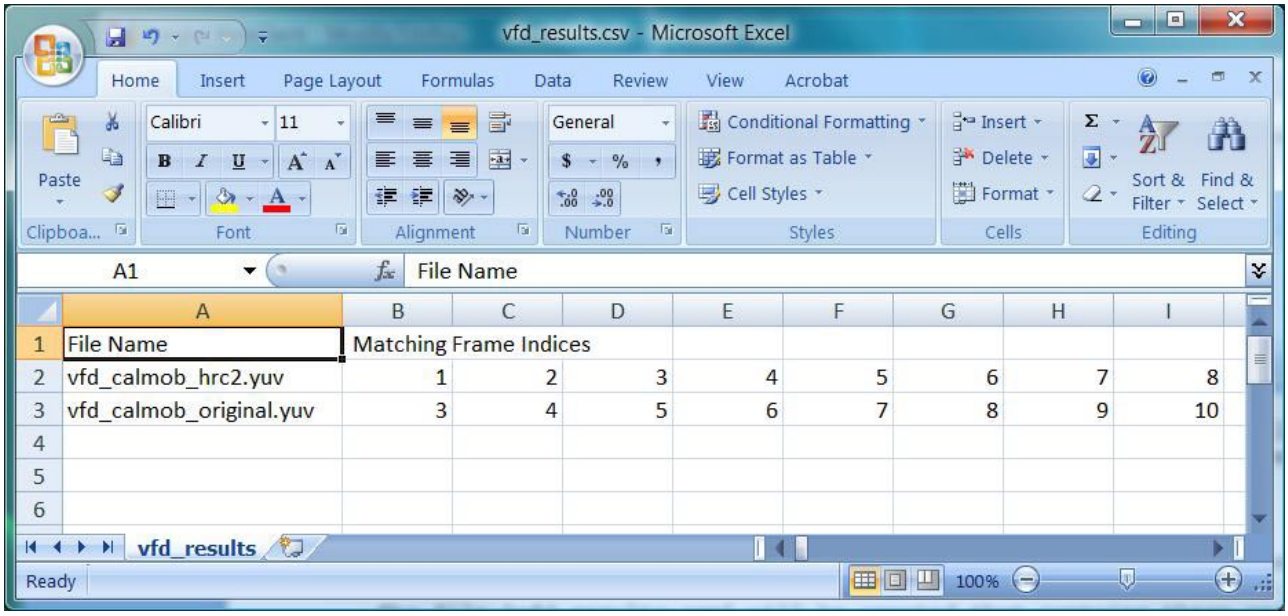
Run VFD with no command line options to obtain further help information and documentation and to obtain a complete list of the optional command line arguments accepted by the software.

11) Validation

To validate VFD, run on the provided video sequences with the following command line in the installation directory (this assumes that the software was installed as given in item 5):

```
vfd 'vfd_calmob_hrc2.yuv' 'vfd_calmob_original.yuv' 'progressive'
'vfd_results.csv' 'yuv' 144 176 'sroi' 5 5 140 172 'causal' 'verbose'
```

The file 'vfd_results.csv' will be created that contains these results when loaded into a spreadsheet program. The last 2 lines in the spreadsheet (lines 2 and 3) continue past column I. As a side note, if an older version of Microsoft Excel (e.g., 2003) is used to read the results CSV file, the number of columns are limited to 256. This column limit has been greatly extended in newer versions of Excel to be 16k (2^14).


vfd_results.csv - Microsoft Excel
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