

Image & Video Detection Technology Assessment

Profil Technology

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Revision History

Rev	Revision History	Date
Edition 1	Initial version of this report.	11 November 2015
Edition 2	Added Optimal Threshold Analysis.	12 November 2015
Edition 3	Added version information.	12 November 2015
Edition 4	Revised name, thresholds used in results, added company logo.	13 November 2015

Executive Summary

PassMark Software® conducted an objective accuracy evaluation on Profil Technology®’s detection technology: VISIA Technology®. For the purpose of this test, we will use the term “explicit” to define content containing male and/or female genitals and/or female breasts, and the term “normal” content to define content not containing these. VISIA technology is used to scan a folder’s contents for explicit images and/or videos. When a file is scanned, it is determined to be either explicit (logged as “EXPLICIT”) or normal (logged as “OK”) at different levels of sensitivity.

PassMark compiled the following four data sets, and a separate scan was performed on each:

- Normal (no nudity) Videos (1019 files)
- Explicit (contains nudity) Videos (1018 files)
- Normal (no nudity) Images (3059 files)
- Explicit (contains nudity) Images (3060 files)

Each file set contains data from various sources of various file types and sizes. Images were of a minimum resolution of 320x240 pixels and videos were of a minimum length of 3 minutes.

The results for each scan were collected and analyzed in order to calculate the accuracy of detection. The technology tests for explicit content, meaning that a “Positive” result is given when a file is identified as “Explicit”. Conversely, a “Negative” result is given when a file is identified as normal. Each result is further described as either “True” or “False” depending on whether the identification was accurate or not.

The chart below illustrates this terminology:

		File Status	
		Explicit	Normal
Test Result	Explicit	True Positive – An explicit file that has been correctly identified as explicit	False Positive – A normal file that has been incorrectly identified as explicit
	Normal	False Negative – An explicit file that has been incorrectly identified as normal	True Negative – A normal file that has been correctly identified as normal

A small proportion of files were not scanned by the software and logged with the result “ERROR”. Since this report deals with the tool’s detection capabilities, these skipped files have been omitted from the following values.

Images - Results

The following tables contain results for the images at three different sensitivity levels (low, medium, and high):

Normal Images

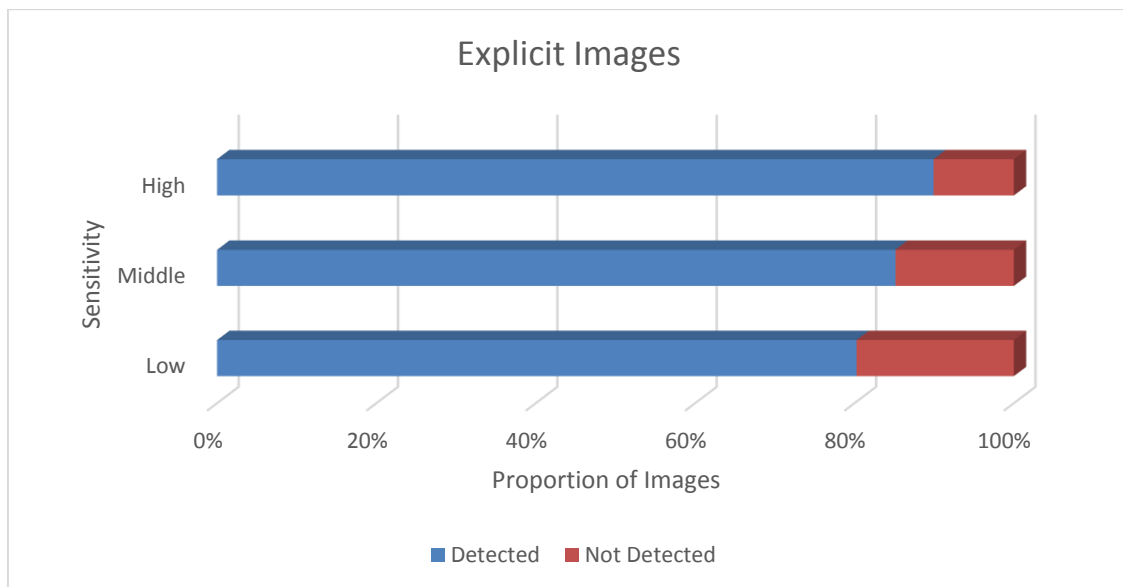
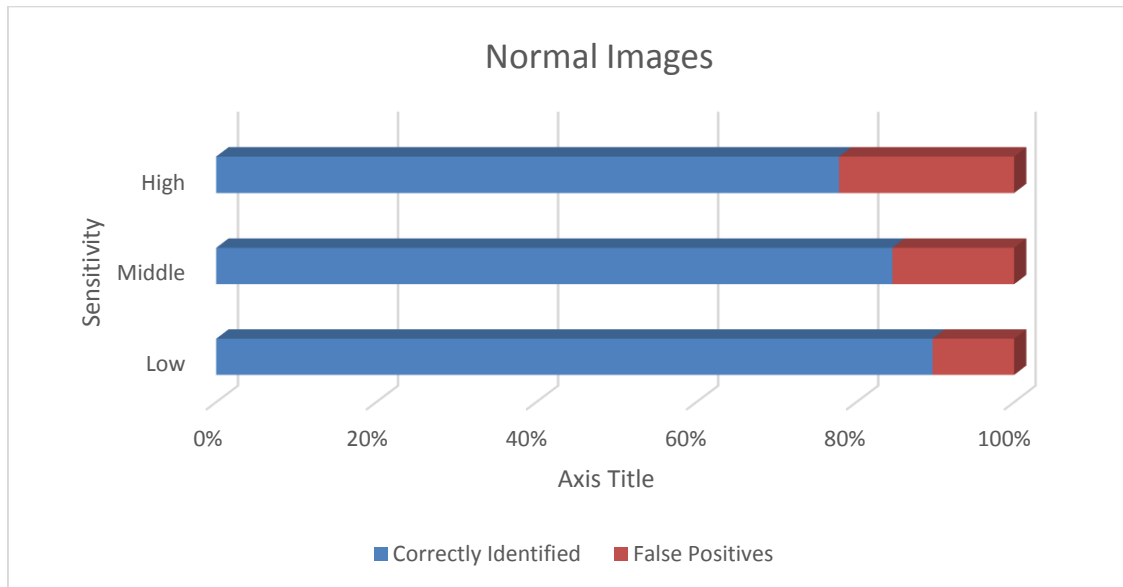
Sensitivity (Threshold)	Low (0.8)	Middle (0.73)	High (0.65)
# Correctly Identified (True Negatives)	2680	2527	2327
# False Positives	310	463	663
Total	2990	2990	2990

Explicit Images

Sensitivity (Threshold)	Low (0.8)	Middle (0.73)	High (0.65)
# Not Detected (False Negatives)	595	448	304
# Detected (True Positives)	2420	2567	2771
Total	3015	3015	3015

Images - Charts

The following charts are a graphical interpretation of the above data, showing the proportions of normal and explicit images that have been correctly identified at three sensitivity levels:



Videos - Results

The following tables contain results for the videos at three different sensitivity levels (low, medium, and high):

Normal Videos

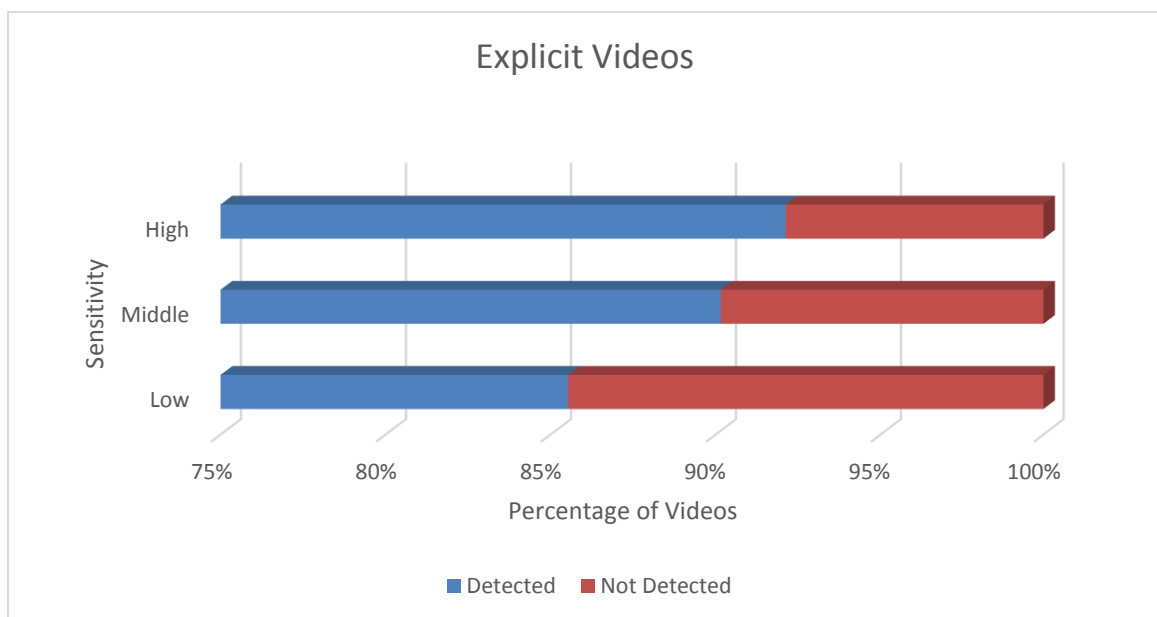
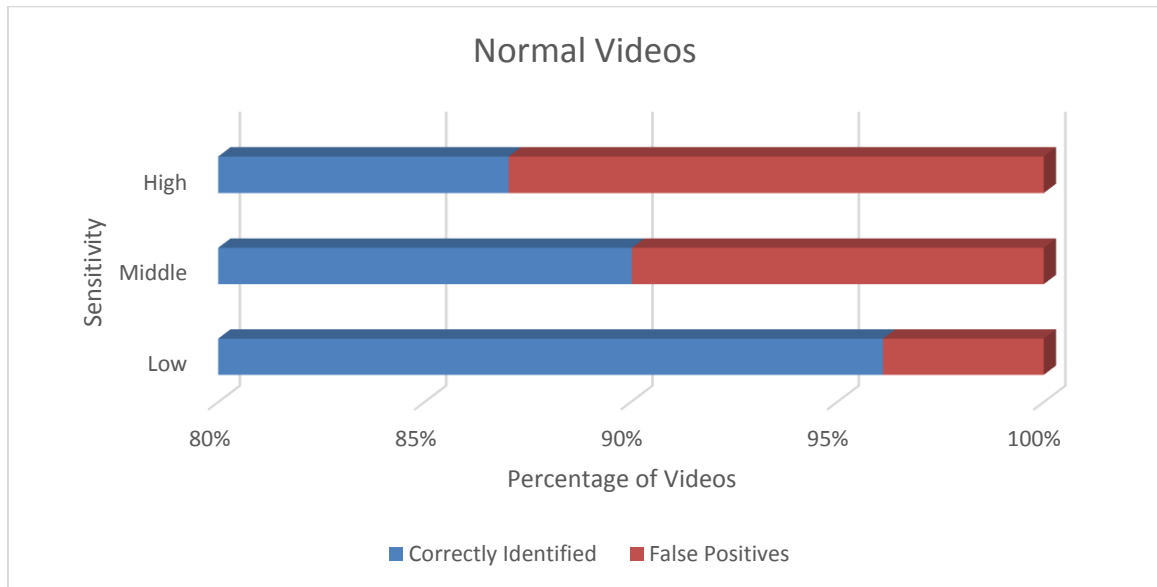
Sensitivity (Threshold)	Low (0.74)	Middle (0.46)	High (0.38)
# Correctly Identified (True Negatives)	964	903	873
# False Positives	39	100	130
Total	1003	1003	1003

Explicit Videos

Sensitivity (Threshold)	Low (0.74)	Middle (0.46)	High (0.38)
# Not Detected (False Negatives)	147	100	80
# Detected (True Positives)	869	916	936
Total	1016	1016	1016

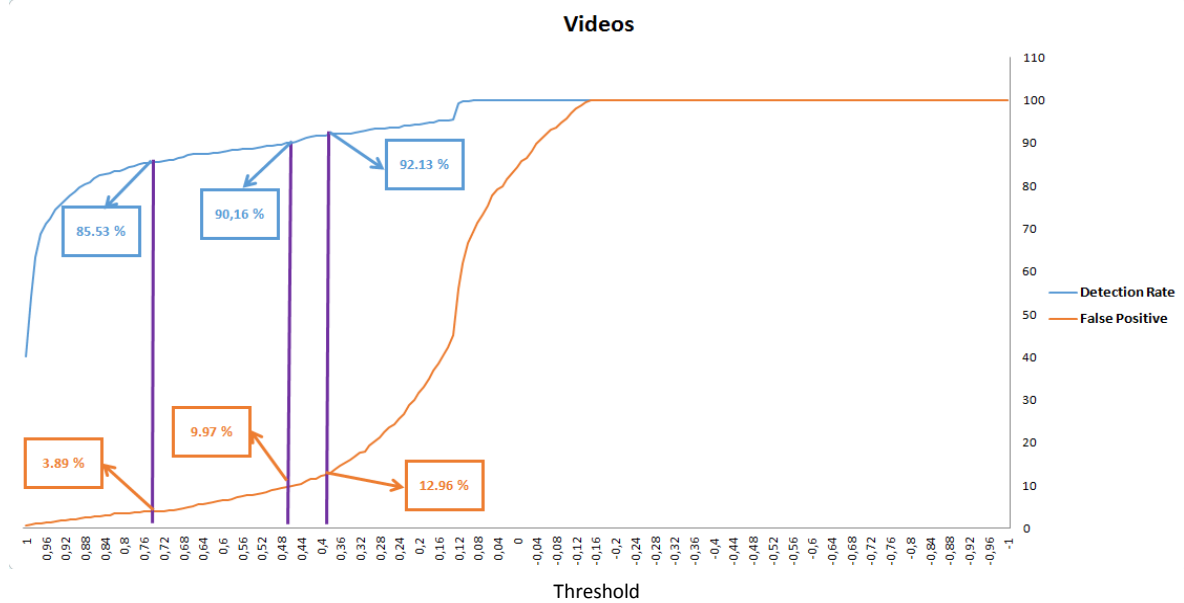
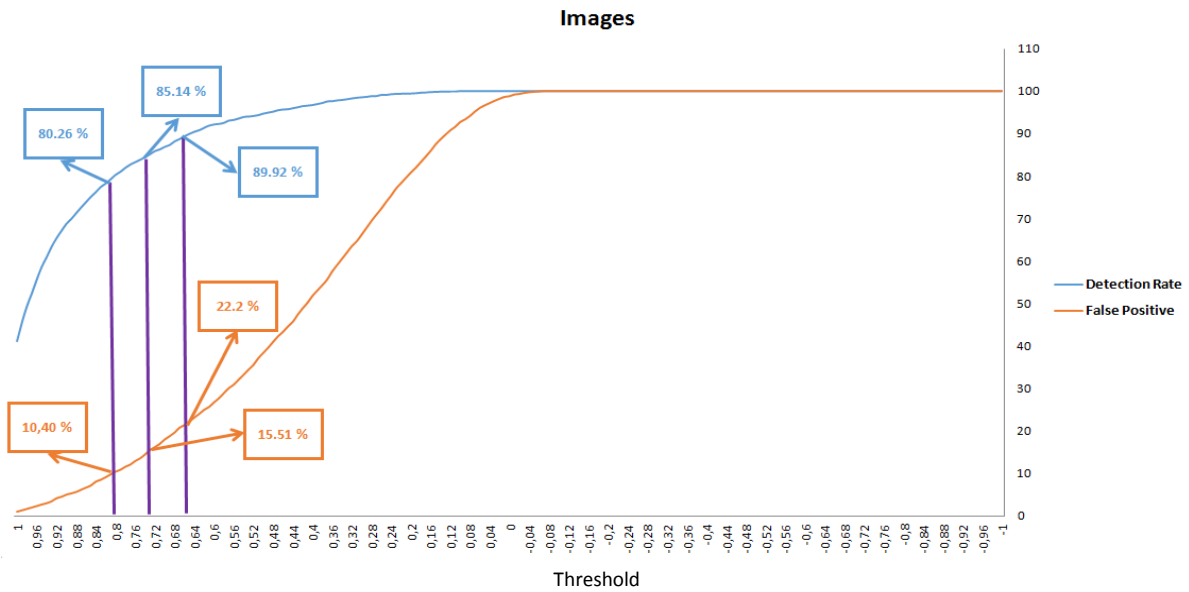
Videos – Charts

The following charts are a graphical interpretation of the above data, showing the proportions of normal and explicit videos that have been correctly identified at three sensitivity levels:



Results Summary

The following analysis was conducted in order to determine the optimal sensitivity thresholds for the data. The Detection rate and False Positive rate was logged for a range of 200 threshold levels between -1.0 to 1.0 with increments of 0.01. The least sensitive, or “lowest” threshold corresponds to 1.0 and the most sensitive (“highest”) threshold corresponds to -1.0. The higher the sensitivity, the more the software is likely to determine that a file is explicit. The following charts illustrate our findings for each file set:



We can thus synthesize the above information to give us appropriate thresholds (see the marked values above) for low, medium, and high sensitivity levels. This gives the following detection rate and false positive rate for images and videos:

Images			
Threshold	Low (0.8)	Medium (0.73)	High (0.65)
Detection Rate	80.3%	85.1%	89.9%
False Positive Rate	10.4%	15.5%	22.2%

Videos			
Threshold	Low (0.74)	Medium (0.46)	High (0.38)
Detection Rate	85.5%	90.2%	92.1%
False Positive Rate	3.9%	10.0%	13.0%

Disclaimer and Disclosure

Disclaimer of Liability

While every effort has been made to ensure that the information presented in this report is accurate, PassMark Software Pty Ltd assumes no responsibility for errors, omissions, or out-of-date information and shall not be liable in any manner whatsoever for direct, indirect, incidental, consequential, or punitive damages resulting from the availability of, use of, access of, or inability to use this information. Additionally, the results obtained in this report are unique to the methodologies and data sets described and are not necessarily representative of consistent behavior on other data sets and other builds of the software.

Disclosure

Profil Technology funded the production of this report, defined the test criteria and provided the software builds for the tests.

Trademarks

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Appendix 1 – Test Environment

For our testing, PassMark Software used a test environment with the following hardware specifications:

O/S:	Windows 7 Professional Edition Service Pack 1 build 7601 (64-bit)
CPU:	Intel Core i5-4570 CPU @ 3.20 GHz
Video Card:	Intel HD Graphics 4600
Motherboard:	ASUSTeK H87M-PRO
RAM:	16GB RAM
Boot Drive:	Intel SSDSC2CW180A3 ATA Device 167.68GB
Data Drive:	WDC WD20EZRX-00D8PB0 ATA Device 186.01GB (This drive contains the software application)
Network:	Gigabit (1GB/s)
Video:	Intel HD Graphics 4600

Appendix 2 – Methodology Description

Test Method

Profil Technology provided a build of their VISIA Technology software for this test. The build details are as follows:

Filename: IVEvalTool
File version: 1.0.0.0
Date: 3 November 2015

A scan was run on each of the below file sets and the results were exported to a .csv file. These files were then analyzed to give false/true positive/negative rates.

Test Data Sets

The files used in this test were obtained from a variety of sources online, including (but not limited to) open source and creative commons libraries. Images were of a minimum resolution of 320x240 px and videos were of a minimum length of 3 minutes. Extra-long (>30 minutes) videos as well as high resolution images were also included.

“Explicit” videos and images contained male and/or female genitals and/or female breasts, whereas “normal” content did not containing these. Explicit data contained a balanced amount of male and female genitals, female breasts, varied skin tones, as well as varied themes. Normal data contained a mix of both humans, animals, and objects across a variety of themes.

Below is a breakdown of the data sets used in this test.

Data Set #1 – Normal Images (Does not contain nudity)

File Type	Number of files	Total File Size
.jpg	2938	1.6 GB
.png	105	69.6 MB
.gif	15	6.7 MB
.bmp	1	2.2 MB
Total	3059	1.68 GB

Data Set #2 – Explicit Images (contains nudity)

File Type	Number of files	Total File Size
.jpg	2971	610.9 MB
.png	45	29.2 MB
.gif	44	47.6 MB
Total	3060	687.7 MB

Data Set #3 – Normal Videos (does not contain nudity)

File Type	Number of files	Total File Size
.avi	258	176.0 GB
.mp4	527	78.7 GB
.mkv	148	22.7 GB
.webm	28	7.7 GB
.m4v	34	2.5 GB
.ogv	6	988.5 MB
.wmv	3	101.4 MB
.swf	12	55.3 MB
.mov	3	30.4 MB
Total	1019	288 GB

Data Set #4 – Explicit Videos (contains nudity)

File Type	Number of files	Total File Size
.avi	281	73.3 GB
.flv	328	37.5 GB
.mkv	1	6.6 GB
.mov	25	12.3 GB
.mp4	260	99.9 GB
.ogv	1	291.5 MB
.rmvb	4	1.2 GB
.wmv	118	61.9 GB
Total	1018	293 GB