Hot Shoes in the Room: Authentication of Thermal Imaging for Quantitative Forensic Analysis

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Supplementary Material: Coefficients of Beta distributions describing pixel values at different intensity levels

Table 1: Shape parameters (υ and ω) defining a beta distribution describing the probability of obtaining different pixel values (ρ) at various intensity levels for the Fuji shoe. Mean ρ value for each intensity level was calculated from the corresponding shape parameters [1].

pixel intensity level (ρ)	**Shape parameters**	**Mean**
$\rho = 40$	$\upsilon = 4066.1\,(2832.7, 6363.0)$ $\omega = 19506.2\,(13611.6, 30515.5)$	43.99
$\rho = 45$	$\upsilon = 791.4\,(662.9, 983.3)$ $\omega = 3476.2\,(2904.2, 4331.2)$	47.29
$\rho = 50$	$\upsilon = 1385.8\,(1200.8, 1640.8)$ $\omega = 5269.2\,(4576.0, 6229.6)$	53.10
$\rho = 55$	$\upsilon = 1541.9\,(1389.7, 1728.8)$ $\omega = 5304.8\,(4778.9, 5948.9)$	57.43
$\rho = 60$	$\upsilon = 1547.2\,(1366.0, 1782.3)$ $\omega = 4789.2\,(4225.1, 5520.8)$	62.27
$\rho = 65$	$\upsilon = 1538.0\,(1326.1, 1816.8)$ $\omega = 4287.8\,(3696.4, 5070.7)$	67.32
$\rho = 70$	$\upsilon = 1776.7\,(1485.2, 2196.2)$ $\omega = 4486.8\,(3751.8, 5551.7)$	72.33
$\rho = 75$	$\upsilon = 1964.4\,(1514.2, 2713.1)$ $\omega = 4509.9\,(3468.1, 6233.8)$	77.37
$\rho = 80$	$\upsilon = 2957.4\,(2202.0, 4198.9)$ $\omega = 6211.9\,(4623.7, 8816.6)$	82.25
$\rho = 85$	$\upsilon = 2407.0\,(1885.4, 3269.2)$ $\omega = 4606.4\,(3603.3, 6265.3)$	87.52
$\rho = 90$	$\upsilon = 3839.8\,(2652.6, 7055.0)$ $\omega = 6714.2\,(4650.1, 12261.4)$	92.78
$\rho = 95$	$\upsilon = 3065.3\,(2040.7, 5682.7)$ $\omega = 4955.6\,(3292.9, 9247.6)$	97.45
$\rho = 100$	$\upsilon = 645.5\,(449.0, 1155.6)$ $\omega = 930.8\,(643.5, 1693.8)$	104.42

Table 2: Shape parameters (υ and ω) defining a beta distribution describing the probability of obtaining different pixel values (ρ) at various intensity levels for the leather shoe. Mean ρ value for each intensity level was calculated from the corresponding shape parameters [1].

pixel intensity level (ρ)	**Shape parameters**	**Mean**
$\rho = 40$	$\upsilon = 2812.1\,(1955.0, 4814.3)$ $\omega = 13582.7\,(9461.0, 23105.5)$	43.74
$\rho = 45$	$\upsilon = 875.3\,(748.8, 1059.0)$ $\omega = 3791.7\,(3254.0, 4566.3)$	47.82
$\rho = 50$	$\upsilon = 1110.8\,(1005.7, 1233.8)$ $\omega = 4269.0\,(3867.1, 4739.0)$	52.65
$\rho = 55$	$\upsilon = 1352.6\,(1213.4, 1522.9)$ $\omega = 4657.1\,(4179.6, 5240.6)$	57.39
$\rho = 60$	$\upsilon = 1597.9\,(1403.7, 1849.2)$ $\omega = 4960.0\,(4352.2, 5751.3)$	62.13
$\rho = 65$	$\upsilon = 1587.0\,(1365.8, 1885.2)$ $\omega = 4435.3\,(3816.5, 5278.7)$	67.20
$\rho = 70$	$\upsilon = 1934.4\,(1561.8, 2495.1)$ $\omega = 4869.6\,(3932.5, 6280.7)$	72.50
$\rho = 75$	$\upsilon = 2385.0\,(1760.2, 3506.2)$ $\omega = 5477.5\,(4041.3, 8057.1)$	77.35
$\rho = 80$	$\upsilon = 1893.5\,(1400.1, 2928.1)$ $\omega = 3972.0\,(2927.4, 6167.4)$	82.31
$\rho = 85$	$\upsilon = 3120.0\,(2088.5, 5816.1)$ $\omega = 6015.6\,(4010.7, 11267.3)$	87.09
$\rho = 90$	$\upsilon = 511.6\,(272.1, 2554.5)$ $\omega = 876.9\,(452.8, 4481.2)$	93.95

Table 3: Shape parameters (υ and ω) defining a beta distribution describing the probability of obtaining different pixel values (ρ) at various intensity levels for the Cumulus shoe. Mean ρ value for each intensity level was calculated from the corresponding shape parameters [1].

pixel intensity level (ρ)	**Shape parameters**	**Mean**
$\rho = 40$	$\upsilon = 8536.1\,(5341.3, 33648.6)$ $\omega = 40537.0\,(25409.3, 158498.2)$	44.36
$\rho = 45$	$\upsilon = 836.0\,(726.0, 972.5)$ $\omega = 3657.7\,(3177.8, 4254.6)$	47.44
$\rho = 50$	$\upsilon = 1312.9\,(1184.0, 1473.8)$ $\omega = 5018.3\,(4523.6, 5623.5)$	52.88
$\rho = 55$	$\upsilon = 1261.5\,(1137.4, 1419.1)$ $\omega = 4377.9\,(3942.4, 4931.5)$	57.04
$\rho = 60$	$\upsilon = 1464.3\,(1256.6, 1735.2)$ $\omega = 4519.0\,(3874.7, 5359.7)$	62.41
$\rho = 65$	$\upsilon = 1560.4\,(1298.0, 1946.8)$ $\omega = 4342.6\,(3605.6, 5429.8)$	67.41
$\rho = 70$	$\upsilon = 2100.2\,(1671.7, 2769.2)$ $\omega = 5316.5\,(4232.7, 7029.1)$	72.21
$\rho = 75$	$\upsilon = 1710.4\,(1394.4, 2208.1)$ $\omega = 3935.0\,(3205.9, 5085.2)$	77.26
$\rho = 80$	$\upsilon = 2784.0\,(2088.9, 3937.4)$ $\omega = 5832.2\,(4377.2, 8271.2)$	82.39
$\rho = 85$	$\upsilon = 2740.3\,(1986.5, 4190.9)$ $\omega = 5243.0\,(3801.5, 8023.6)$	87.53
$\rho = 90$	$\upsilon = 3116.1\,(2226.3, 4951.0)$ $\omega = 5473.5\,(3907.9, 8739.4)$	92.51
$\rho = 95$	$\upsilon = 3069.2\,(2245.5, 4856.6)$ $\omega = 4972.6\,(3640.1, 7858.0)$	97.32
$\rho = 100$	$\upsilon = 791.5\,(487.3, 1810.7)$ $\omega = 1153.1\,(703.9, 2683.6)$	103.79

References

1. Gaussorgues, G. *Infrared Thermography*; Chapman & Hall: London, UK, 1994.