一般社団法人　電子情報通信学会
THE INSTITUTE OF ELECTRONICS,
INFORMATION AND COMMUNICATION ENGINEERS

信学技報
IEICE Technical Report
PRMU2013-87(2013-12)

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あらまし　への　の設　が　めら　像　用　あ
像　ら対象の　物　が　と　し　し　手　よ　らの　と
め　画像　よ　物　が　めら　物画像　ら手荷物所持の
判定　と　よ　物　の　と　とし　きと　考　し　手荷物の
所持判定手法　手荷物の　き　考　手荷物の　よ　特徴量が　と
用し　判定　の　実　し　ま　実　の　像の　用　定し　実画像とし　iLIDS
bofifiSwUlh

キーワード　手荷物　所持判定

A study on detection of belongings from a human image using their category and direction

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Abstract　Recently, surveillance camera in public space is increasing. We need to search a target person in an enormous amount of data. However, manual search consumes a lot of time and labor. Thus, image processing technology which supports manual search is required. Therefore, we aim at the detection of belongings from a human image so that human operators can filter specific persons. In this report, we propose a method for the detection of belongings from a human image using image features effective for their category and the position of the belongings. In addition, we applied the proposed method to actual surveillance camera images to evaluate its effectiveness.

Key words　Surveillance camera, belongings, detection of belongings

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1. ま え が き

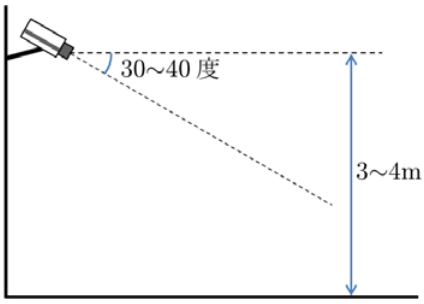
識の ま ら への の設
が めら の 件 の
とし お 実 の特定 のき
と 件 の 手が と
し 量の 像の ら 対象の 物
が が 手 よ と
め 画像 よ 物 が めら

別 とと 手荷物の
よ 物 の 手が と考え
ら とえ 像 の 物の
キ ー 特定の の手荷物
所持 物の とが き 物 の
とが き 実 2013

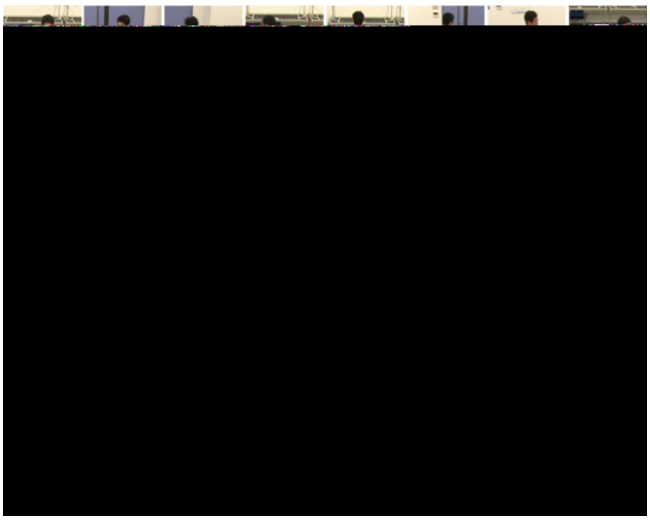
0p—
8rTtsloM [1]
tpVhML
bht—tbos
hMtSMo—2013 5 D 6 11:30 T
11:45 p 15 — 198 tmMoh
t— 1 OsLhT
TOt—vbip
Gsn84pV
H o— t b s oM
[2] [3] [4]Dima [3] carring objects oN
20tM Temporal template Mo
ThooM
h—tpVsMMO:
h—TtTmmh
bVtb]p [5] [6] [7]
Smith [7] VthTsM—
hMMlhboMfh—
MhtpVsM
0h:Ob—
thp— bMO
sMfp—fht
tpM 2 tp— 2(a)(b) Ot—
tloGVbfhf
toSlh [8]t—
2(b)(c) Ot—MtloGV
bT—pM

1　fiOqzOwM

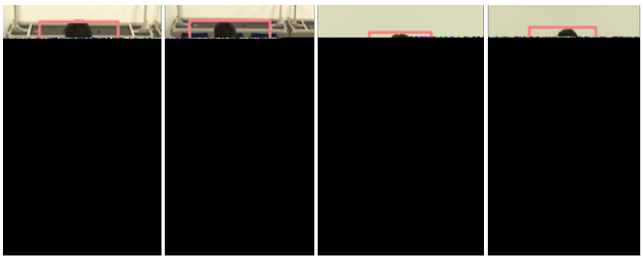
O	Yww	qMw	fiw
zO 1	– p	–	–
zO 2	–	–	–
zO 3	y p y p	p p	– p
fiO			



$ 5　wE



6　whw



7　Qfi0w

fi UbMqQwpfib;b
qtmMoxmY
wGVwMtwymVUGVMqQ
f“pcu)bhttfiqofi
pK　HOGHistograms of Oriented Gradients　[10] M
h BoFBag of Features　[11] ob　BoF
htMpht
Bopp
7M
h—.,jbymtct
Mgt　HOG b
t—t　2 t0oM
m　SVM Support Vector MachineM

3. 手荷物の所持判定実験

手法の　め キ ー

の所持判定実験

3.1 実 験 条 件

実験　あ　ー　し　あ
5 tbOt—3　～4m
tt—30　～40 SFpoMgp
htSMo—b
o—7tsOth
o—
—　4 —
t——Ms—　2,112
hh　6 thb
T t——
—pht0o—
pt——
ID—M)hsS—　2
tOsbtmMo
.tc7M

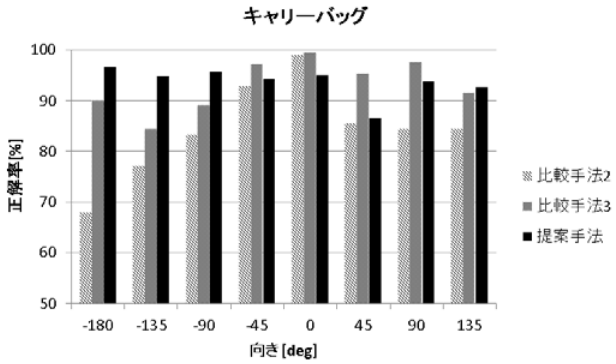
UbMqQhww0qh
hT
wtwQfibg
slhMwQfi0wx　7:th
Spp　3 mOh　1 tO
MO　1 pM
Mdc—boa0bhp
0—Tysrsb
OshtmMot
s　1 m6—thO　2
—]t0
h [8] O　3 MM
oMtmMo]toMsM　[9]s
S—O　1～3 po　HOG h

3.2 実験結果および考察

2 tOtrpb
O　3 S—OtSrp　8 M
rphOtrp
7—fihh—
p 84.4%—p　83.9% rpslh
t—MMhOb
ht—tbt
mMo—MtItb　8—　9 tfg

2 QfiYrp [%] wz

Yw	zO 1	zO 2	zO 3	fiO
	70.1	79.2	93.0	93.7
	68.9	71.8	82.7	88.0
	–	–	–	84.4
	–	–	–	83.9



8 qMwQfiYrpwz

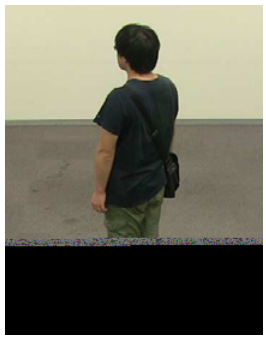
9 qMwQfiYrpwz

wqMwQfiYrpb“wTqM
tSMofiOwQfiYrpUzO 2 slo
S—MMbh
MMt—rptGVs)
Mtlo.t
—fGVbhp
10 lhhp.t
oOtoOTlh
—oTpMp—:
Opth—S[
pVh—
pto
M—h

3.3 実画像への適用

実 の 像 お 手荷物の所持判定
像 の よ ー
が 実
像の 用 定し iLIDSImagery Library for Intelligent Detection Systems [12] b—

(a) (b)



(c) (d)

10 Qfiw

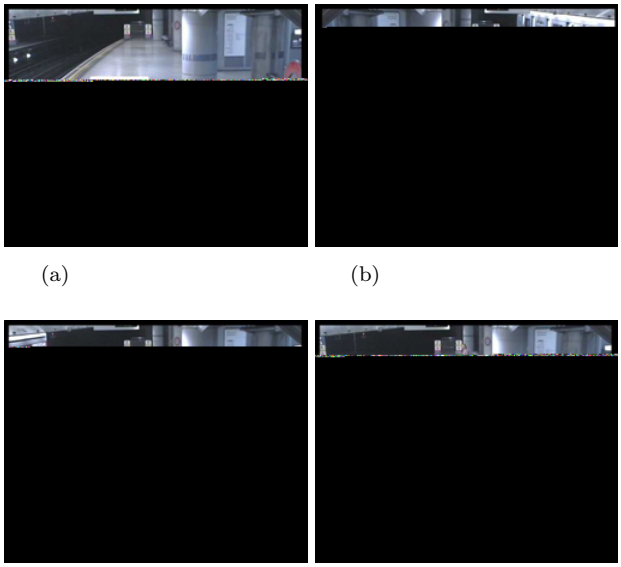
3 Y]qwYr:

Yw	yYr: / : y
	10 / 10
	8 / 10
	6 / 10
	8 / 10

“w t0ofiOfi;h
TtQfi0qbtfih
;hhxfgwY]qt 10 cm 40 p
3 tOhL
bh— 11 th[p 80% r
pplhptrpsloM
—.toS—
bMhpFGV
o—7sOt—
0npVD

4. ま と め

像 の 物 と
とし 画像 よ 物画像 ら特定の手荷物の所持の
判定 手法 し の ー 用
物画像 らキ ー
の所持の 判定 実験
の結果 ら 手法の し
手荷物の と 方 の 考 と よ 物の
方 が の 判定 が と し
ま 実 の 像の 用 定し iLIDS



(a) (b)

(c) (d)

11 Qfiw

tfiOfi;hgtht0o

p 80% rpbpVh

]o—MbO—

srtIstg—p

S—sr[

謝辞 の 文

および よ

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