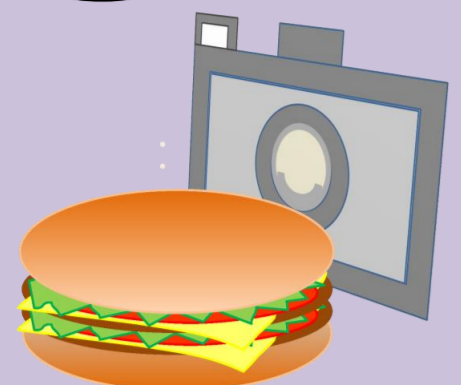


FoodCam256:

A Large-scale Real-time Mobile Food Recognition System employing High-Dimensional Features and Compression of Classifier Weights

The University of Electro-Communications, Tokyo, JAPAN

Yoshiyuki Kawano and Keiji Yanai



Objective

- standalone (4 cores)
(no communication to a server)
- 256 kinds of food recognition
- processing time 0.19 second
- top5: about 74.4%
- high dimension and compression
 - higher recognition accuracy
 - the memory of app is limited

FoodCam Overview

download: <http://foodcam.mobi>

The flow of FoodCam256



Method

Local descriptors

- RootHOG - gradient
- Color - moment

local patch: 16x16 and 24x24
Dense sampling every 6 pixel

Feature vector Fisher Vector

GMM: K=64, SPM: SP=1

Color-FV(15360dim), HOG-FV(20480dim)

Classifier

AROW (combined by late fusion)

New Food Dataset: UEC-Food256

New 256 large-scale food dataset

American



loco moco adobo lumpia brownie popcorn

Japanese



釜飯 (kamameshi) 串カツ (kushikatsu) 沖縄そば (okinawa soba) 雑煮 (zoni) お吸い物 (clear soup)

World food

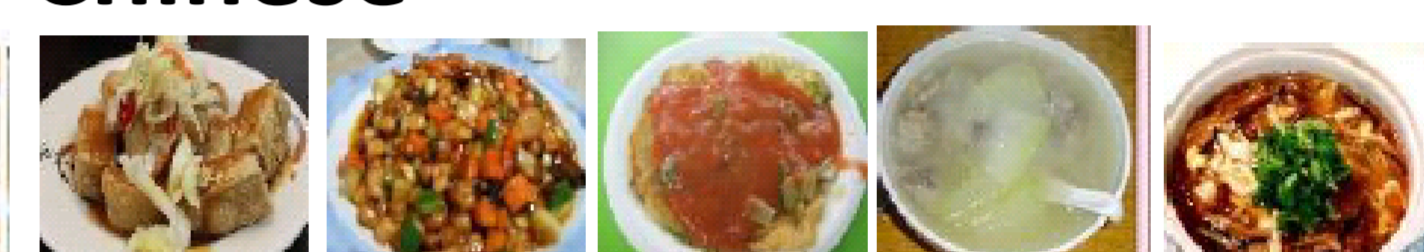


Thai



ส้มตำ (Thai papaya salad) หมกเหนียว (Pork Sticky Noodles) ผัดเผ็ด (hot and sour, fish and vegetable ragout) ไข่จืด (egg noodle in chicken yellow curry) ซุปกะทิ (coconut milk soup)

Chinese



臭豆腐 (stinky tofu) 宫保鸡丁 (kung pao chicken) 蚵仔煎 (oyster Omelette) 冬瓜汤 (winter melon soup) 酸辣汤 (hot & sour soup)

Vietnamese



Phở bún bò Huế bánh cuốn (steamed rice roll) Bánh xèo (coconut milk-flavored crepes with shrimp and beef) Chè trôi nước (glutinous rice balls)

Indonesian



gulai mie goreng nasi campur ayam bakar nasi uduk

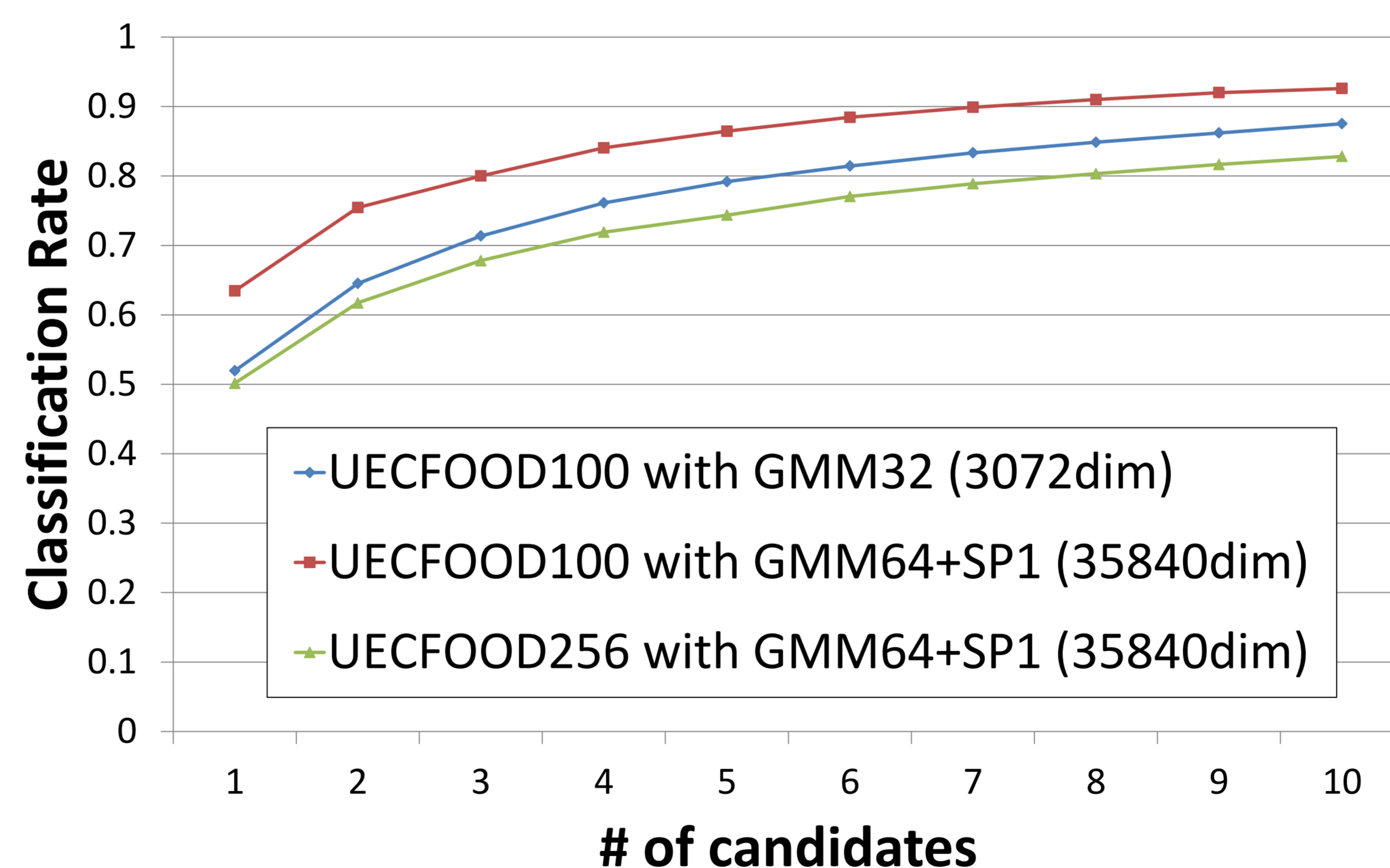
Constructed by using crowd sourcing



Experiments

Recognition accuracy

by the proposed method and our previous work



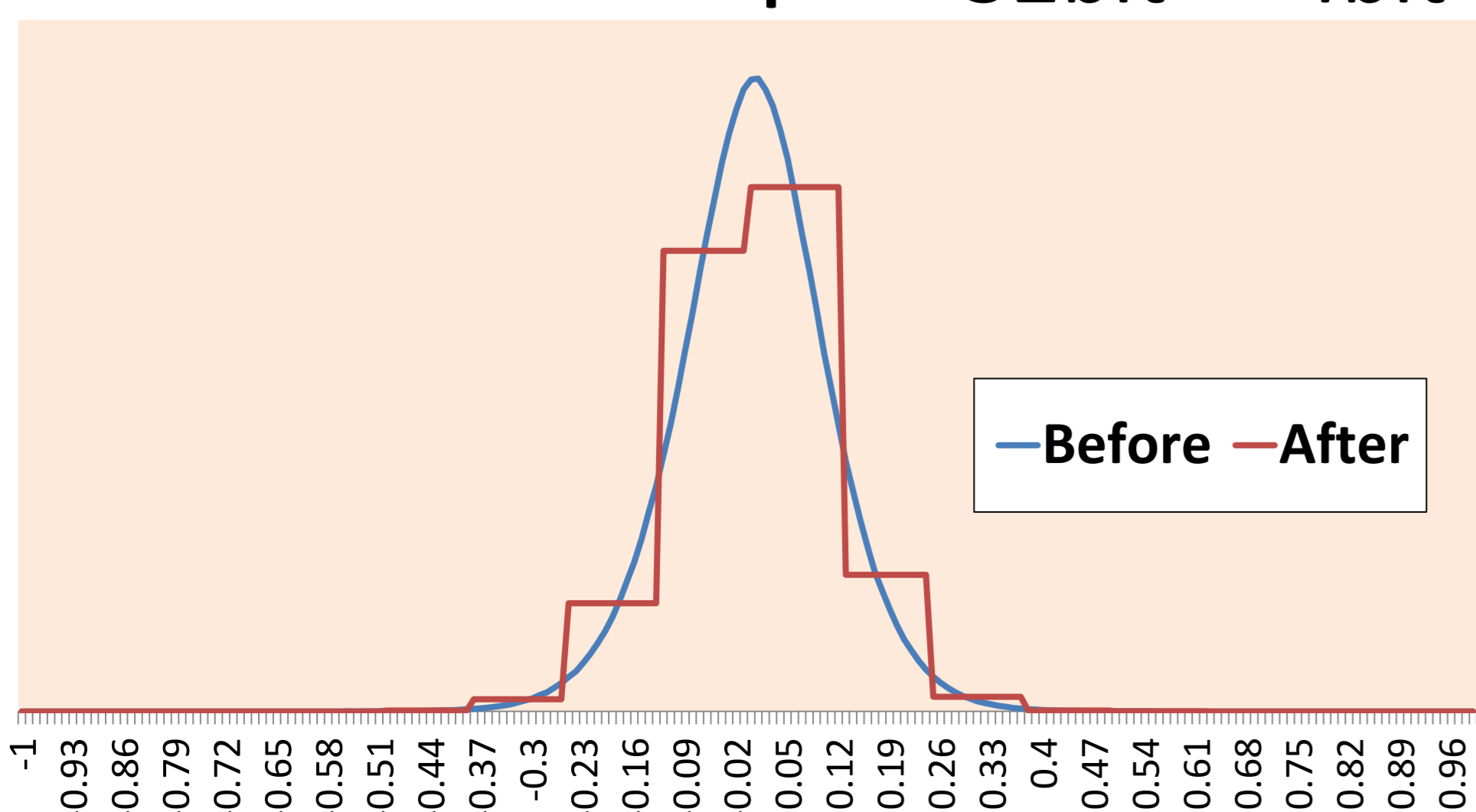
Memory size
37MB -> 4.5MB
(32bit -> 4bit)

Processing time
device: galaxy note2
0.19 second

Compression of Classifier Weight

Compress each element of the weight vectors

example 32bit -> 4bit



Food recognition system (Android, Twitter)

Food Rec Android App

Project page
<http://foodcam.mobi>



Food Rec bot twitter

- @foodimg_bot (food recognition on twitter)
- try to send food images to @foodimg_bot

食事画像認識 foodimg_bot
@foodimg_bot

ハンバーガー (500kcal) サンドウィッチ (550kcal) 目玉焼き (110kcal) 春巻き (369kcal) エビフライ (299kcal)
pic.twitter.com/22VpkgcK

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