SOURCEFORGE

Flavia (at a glance)

a Leaf Recognition Algorithm for Plant Classification using PNN (Probabilistic Neural Network)

Publication and errata

Please cite our paper if you use our data and program in your publications. We will be very happy if you give us the credit.

This program is based on the paper A Leaf Recognition Algorithm for Plant classification Using Probabilistic Neural Network, by Stephen Gang Wu, Forrest Sheng Bao, Eric You Xu, Yu-Xuan Wang, Yi-Fan Chang and Qiao-Liang Xiang, published at *IEEE 7th International Symposium on Signal Processing and Information Technology*, Dec. 2007.

We also found some errors in the Latin or English names of plants. We listed the up-to-date version in the "Dataset" section. We shared our dataset for other researchers here.

Introduction

The purpose of this MATLAB program is to teach a computer to classify plants via their leaves. You just need to input the leaf image of plant (acquired via digital camera or scanners), then the computer can tell you what kind of plant it is. Presently, our system can classify 32 plants. The average accuracy is 93% for all of them.

We utilize the PNN (Probabilistic Neural Network) to implement this AI process. 12 characters of leaves are taken into account, including geometrical ones and morphological ones. After discriminant analysis (stepwise method), all these characters are reserved. PCA orthogonalizes these 12 characters into 5 principal variables, which are input vectors of the PNN. Details can be found in our paper.

More details can be found from our SourceForge summary page.

Download

The default download is our MATLAB source code. We strongly recommend you read the user manual first. If you need the leaf comparison function of our program, please also download the standard leaf image library and place it in proper path.

If any link is broken, please check all files of this project to determine. If you have further trouble, please ask questions in our mailing list or forum.

If you want a big collection of leaf images, please see the section below to download our 1GB dataset.

Dataset

During our research, we suffered a lot from the lack of a standard plant leaf dataset. Thus, we don't have a benchmark to compare our algorithm with others. A public dataset may help other researchers working on similar projects as ours. So we decide to share our raw data. You can download the complete raw dataset. It is a very large file, around 1 GB. You can check your file integrity by this MD5SUM: 8d3ca661e201f4eac8d0975e7b6b5853.

When citing the source of the dataset, please don't use the web link, which might change. Please cite it as the data used in our paper: *Stephen Gang Wu, Forrest Sheng Bao, Eric You Xu, Yu-Xuan Wang, Yi-Fan Chang and Chiao-Liang Shiang, A Leaf Recognition Algorithm for Plant classification Using Probabilistic Neural Network, IEEE 7th International Symposium on Signal Processing and Information Technology, Dec. 2007, Cario, Egypt*

In our dataset, file names of all images are 4-digit numbers, followed by a ".jpg" suffix. The plants and their corresponding image file names are listed in below table. The classification labels of plants used in our program are listed at the most left column. Classification information from USDA websites, Wikipedia or other websites are listed in the most right column.

label	Scientific Name	Common Name(s)	filename	URL
1	Phyllostachys edulis (Carr.) Houz.	pubescent bamboo	1001-1059	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=506646
2	Aesculus chinensis	Chinese horse chestnut	1060-1122	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?1625
3	Berberis anhweiensis Ahrendt	Anhui Barberry	1552-1616	http://asaweb.huh.harvard.edu:8080/databases/specimens?id=277371
4	Cercis chinensis	Chinese redbud	1123-1194	http://www.ag.auburn.edu/hort/landscape/dbpages/306.html
5	Indigofera tinctoria L.	true indigo	1195-1267	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=26750
6	Acer Palmatum	Japanese maple	1268-1323	http://en.wikipedia.org/wiki/Acer_palmatum
7	Phoebe nanmu (Oliv.) Gamble	Nanmu	1324-1385	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?28039
8	Kalopanax septemlobus (Thunb. ex A.Murr.) Koidz.	castor aralia	1386-1437	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=565257
9	Cinnamomum japonicum Sieb.	Chinese cinnamon	1497-1551	http://en.wikipedia.org/wiki/Cinnamomum_japonicum
10	Koelreuteria paniculata Laxm.	goldenrain tree	1438-1496	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=503286
11	Ilex macrocarpa Oliv.	Big-fruited Holly	2001-2050	http://asaweb.huh.harvard.edu:8080/databases/specimens?id=159529
12	Pittosporum tobira (Thunb.) Ait. f.	Japanese cheesewood	2051-2113	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=24067
14	Chimonanthus praecox L.	wintersweet	2114-2165	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?10204
15	Cinnamomum camphora (L.) J. Presl	camphortree	2166-2230	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=18175
16	Viburnum awabuki K.Koch	Japan Arrowwood	2231-2290	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?80375

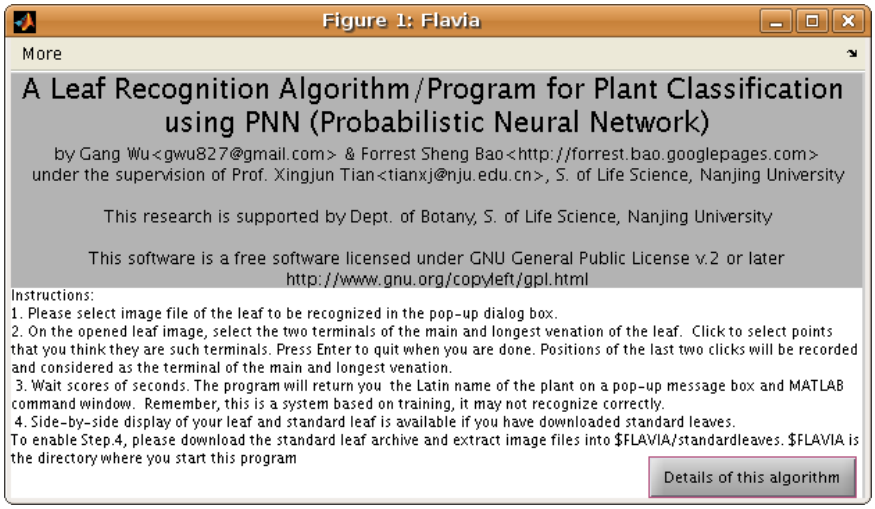
17	Osmanthus fragrans Lour.	sweet osmanthus	2291-2346	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=505977
18	Cedrus deodara (Roxb.) G. Don	deodar	2347-2423	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=183408
19	Ginkgo biloba L.	ginkgo, maidenhair tree	2424-2485	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=183269
20	Lagerstroemia indica (L.) Pers.	Crape myrtle, Crepe myrtle	2486-2546	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=27110
21	Nerium oleander L.	oleander	2547-2612	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=30184
22	Podocarpus macrophyllus (Thunb.) Sweet	yew plum pine	2616-2675	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=183490
23	Prunus serrulata Lindl. var. lannesiana auct.	Japanese Flowering Cherry	3001-3055	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?104754
24	Ligustrum lucidum Ait. f.	Glossy Privet	3056-3110	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=503450
25	Tonna sinensis M. Roem.	Chinese Toon	3111-3175	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?36754
26	Prunus persica (L.) Batsch	peach	3176-3229	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=508766
27	Manglietia fordiana Oliv.	Ford Woodlotus	3230-3281	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?23361
28	Acer buergerianum Miq.	trident maple	3282-3334	http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?1088
29	Mahonia bealei (Fortune) Carr.	Beale's barberry	3335-3389	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=18846
30	Magnolia grandiflora L.	southern magnolia	3390-3446	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=18074
31	Populus ×canadensis Moench	Canadian poplar	3447-3510	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=22457
32	Liriodendron chinense (Hemsl.) Sarg.	Chinese tulip tree	3511-3563	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=18086
33	Citrus reticulata Blanco	tangerine	3566-3621	http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=28888

Copyleft

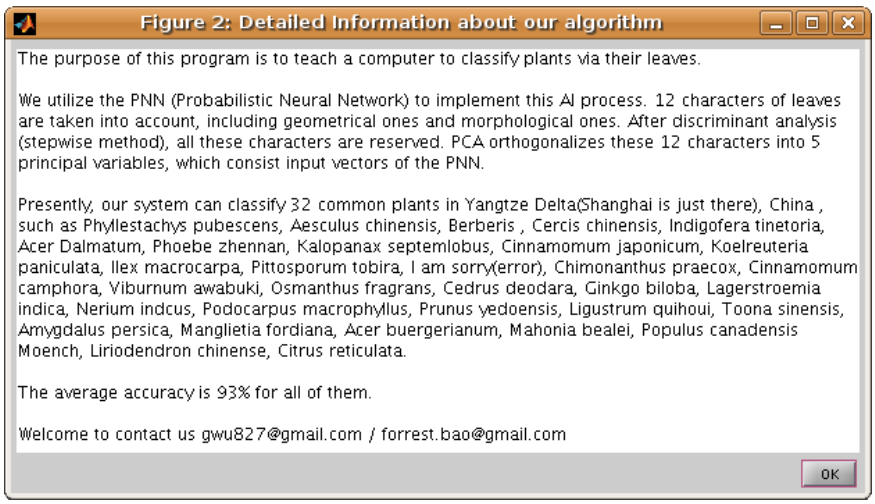
Support or contact

Please use the forum of this project or join our mailing system to ask for help.

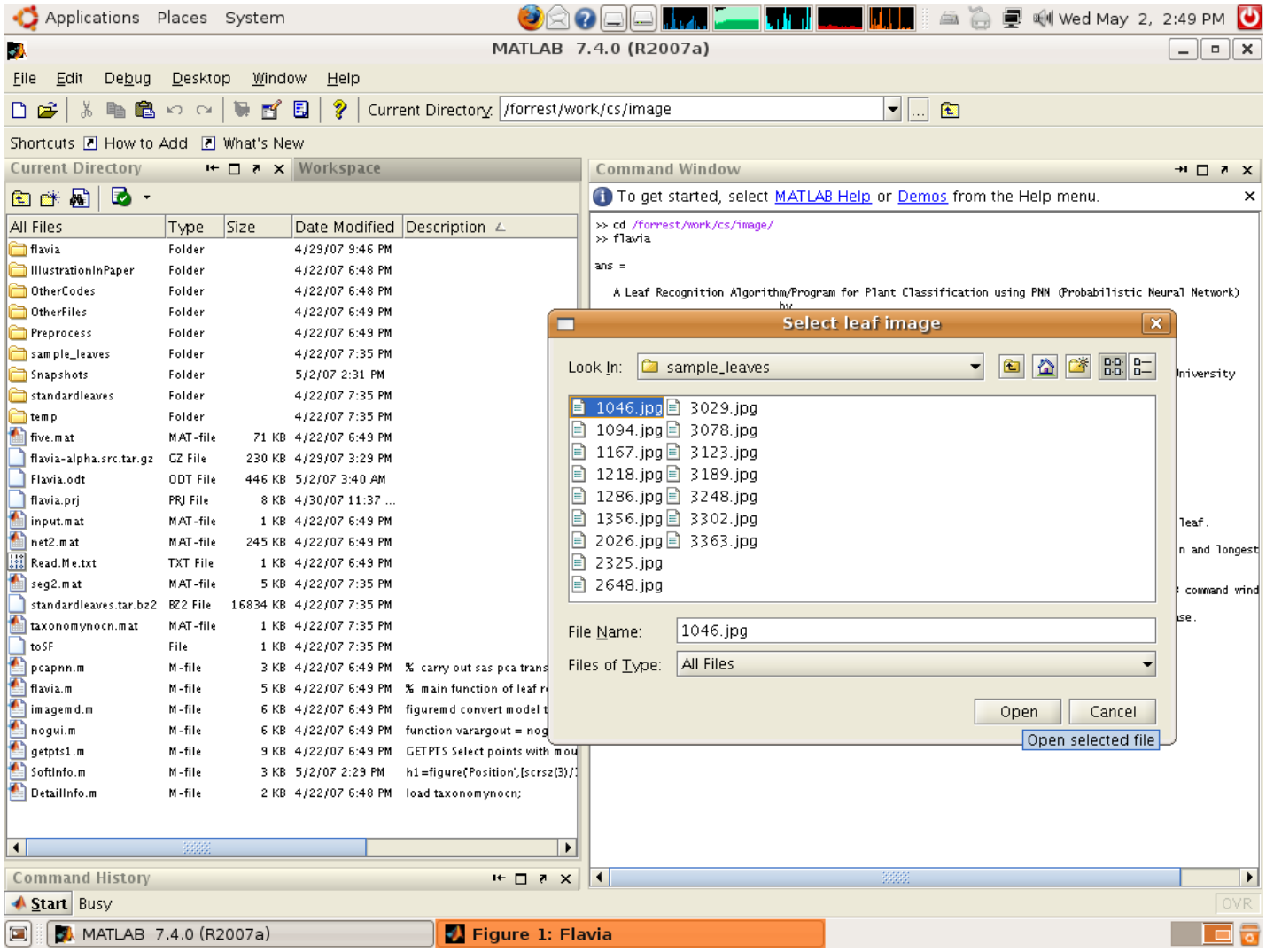
Snapshots



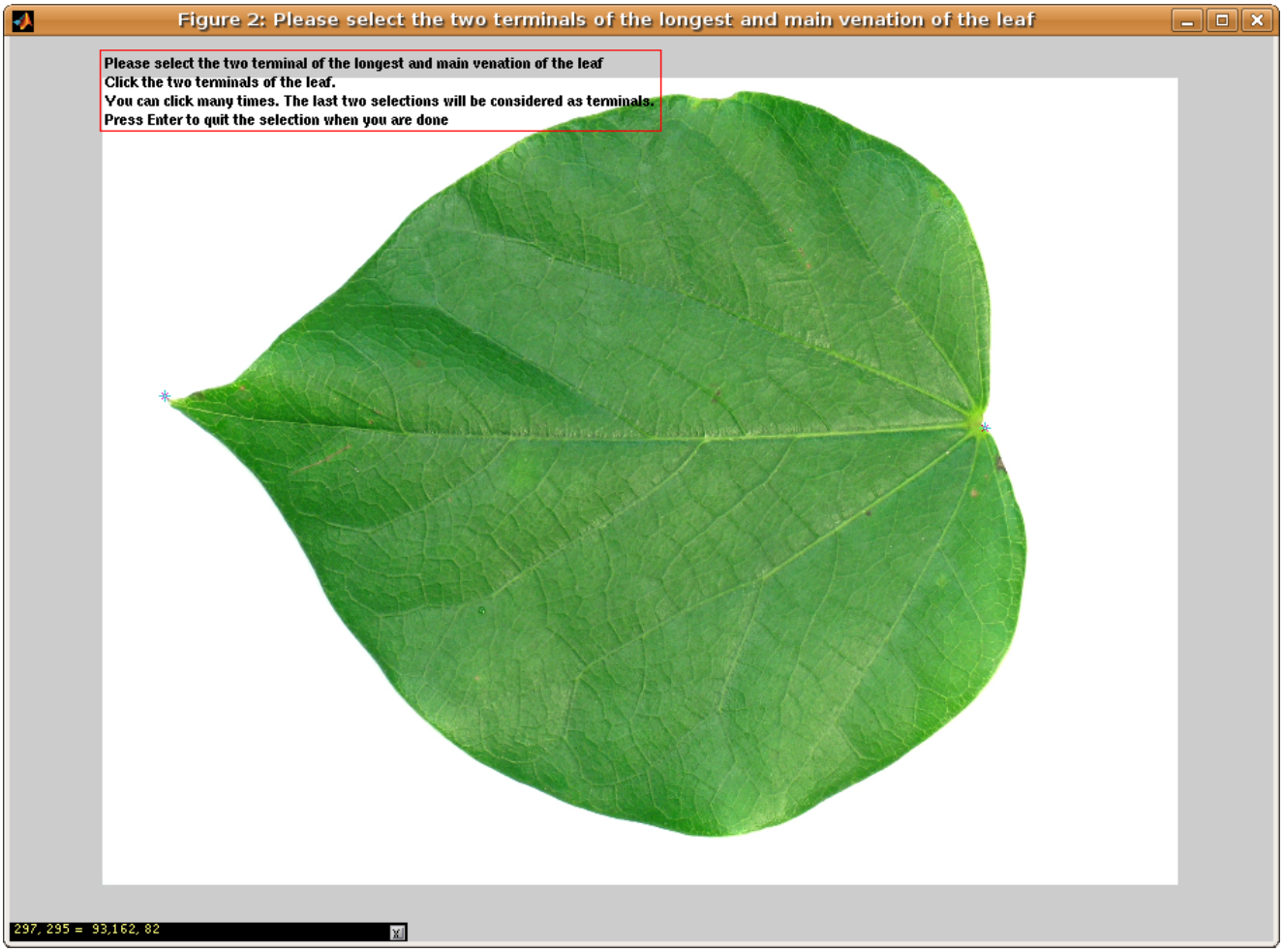
Program information



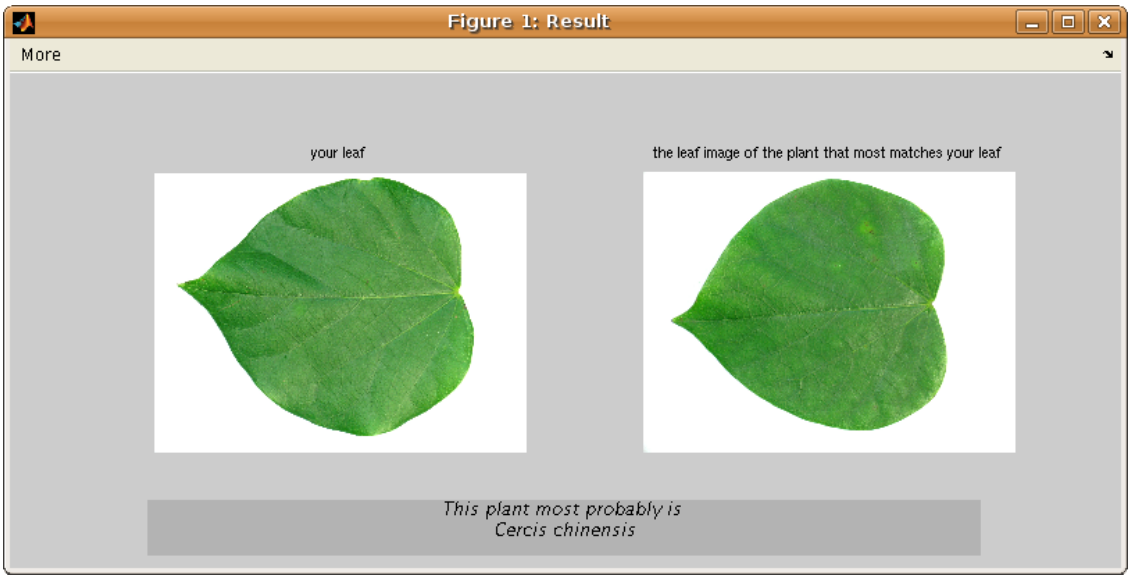
Detailed information of our algorithm



Start the program from command window

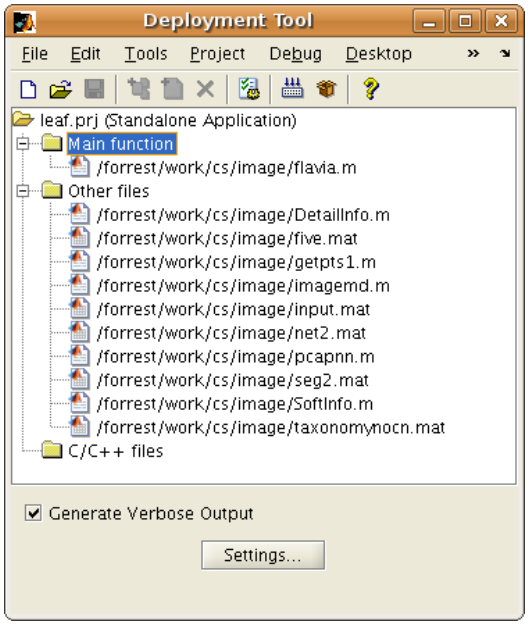


Click to mark the two terminals of the longest and main vein of the leaf.



Side-by-side display of the image you inputed and the standard leaf image.

Result message box



Project file structure

Last update: Dec. 24, 2009