

ハンコーディングで行う機械入門

Lesson 1 機械学習概要、ソフトウェアRapidMiner Studio概要と事例デモ・実習

Lesson 2 分類1: 主要なアルゴリズム説明と応用事例デモ・実習

Lesson 3 分類2: データ前処理と後処理、教師データと

テストデータの分割による分類問題の実習

Lesson 4 分類3: 交差検証、最適アルゴリズム探索の実習

Lesson 5 回帰: 主要なアルゴリズム説明と実習

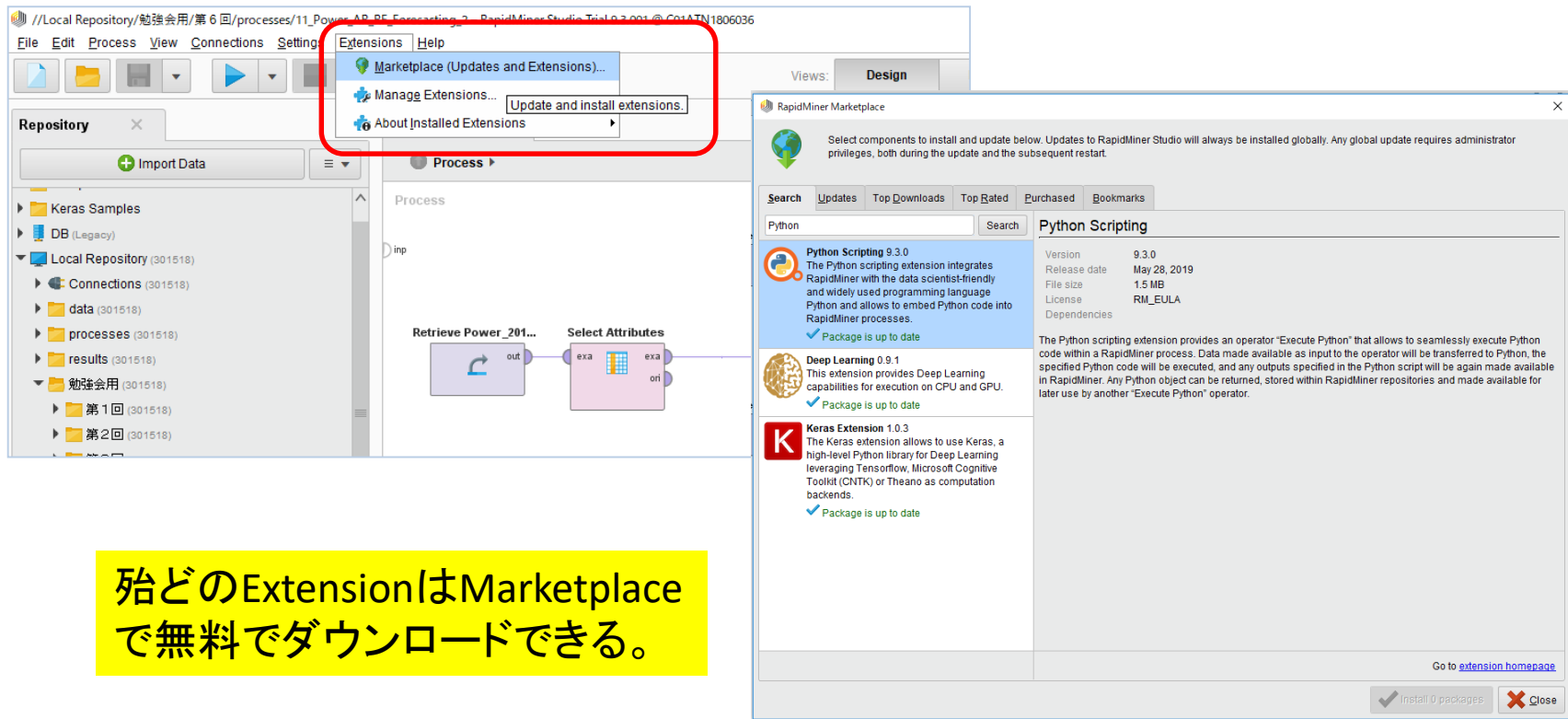
Lesson 6 (応用) 時系列データの機械学習

Lesson 7 (応用) Extensionによる機能拡張と画像の分類

Lesson 8 自ら学ぶ: RapidMiner のウェブサイトの活用

RapidMinerはExtensionをインストールすることで機能拡張できます

(第4回で触れた Python や R のスクリプトを挿入するのもExtensionによる機能拡張です)



The image shows the RapidMiner Studio interface. The 'Extensions' menu is highlighted with a red box, showing options: 'Marketplace (Updates and Extensions)...', 'Manage Extensions...', 'Update and install extensions...', and 'About Installed Extensions'. The 'Marketplace (Updates and Extensions)...' option is selected. The 'RapidMiner Marketplace' window is open, displaying a list of extensions. The 'Python Scripting' extension is highlighted, showing details: Version 9.3.0, Release date May 28, 2019, File size 1.5 MB, License RM_EULA, and Dependencies. The 'Deep Learning' and 'Keras Extension' extensions are also visible. The 'Python Scripting' extension is marked as 'Package is up to date'. The 'Deep Learning' extension is also marked as 'Package is up to date'. The 'Keras Extension' is marked as 'Package is up to date'. The 'Python Scripting' extension is selected, and its details are shown on the right. The 'Python Scripting' extension provides an operator 'Execute Python' that allows to seamlessly execute Python code within a RapidMiner process. Data made available as input to the operator will be transferred to Python, the specified Python code will be executed, and any outputs specified in the Python script will be again made available in RapidMiner. Any Python object can be returned, stored within RapidMiner repositories and made available for later use by another 'Execute Python' operator.

殆どのExtensionはMarketplace
で無料でダウンロードできる。

画像処理Extension IMMI

<http://splab.cz/en/research/data-mining/articles>



Signal Processing
LABORATORY

"There is nothing quite as practical as a good theory" Kurt Lewin

[Home](#) [Research](#) [Study](#) [Cooperation](#) [Download](#) [Contacts](#) [OPVK project](#)

► [Data-mining](#)

- [News](#)
- [IMMI](#)
 - [Trainable segmentation](#)
 - [3D image segmentation](#)
 - [Interest point detection](#)
 - [Trainable segment selection](#)
 - [Image object detection](#)
 - [Grammar Driven Genetic Programming](#)
- [About group](#)
- [Members](#)
- [Laboratories](#)
- [Projects](#)

► [Human-machine interaction](#)

► [Non-orthogonal signal representation](#)

IMMI



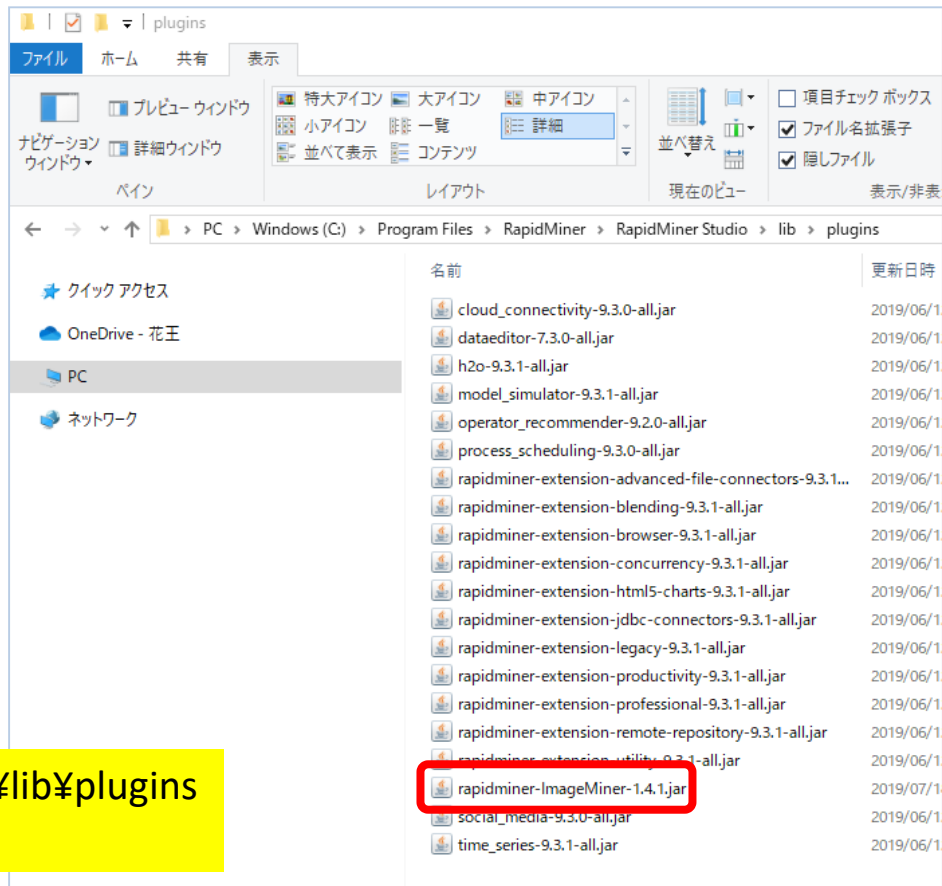
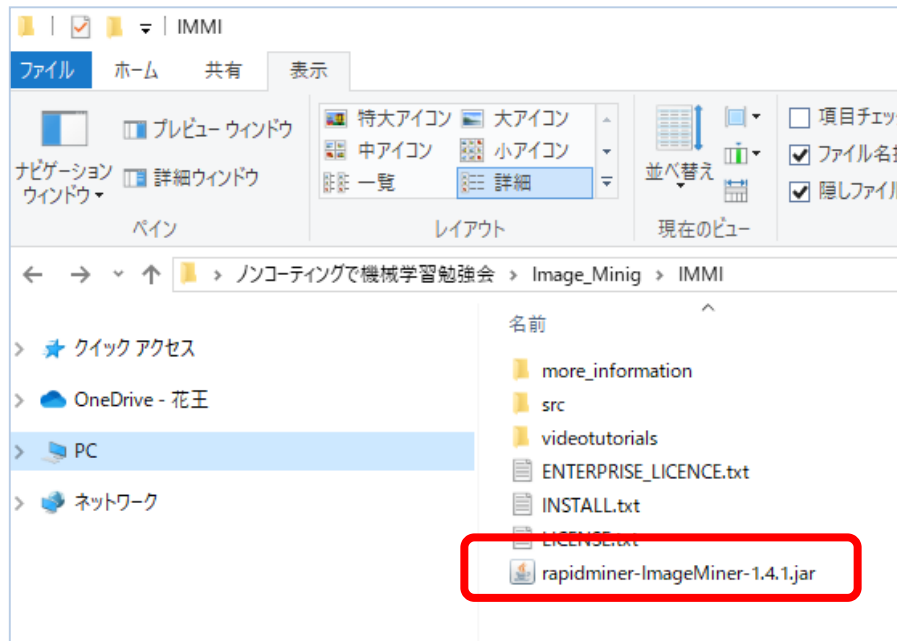
Call for participation: Challenge & Conference – Brain Tissue Analysis,
registration: December 31, 2012; deadline: *February 11, 2013*
Indexed by: ISI Web of knowledge, IEEExplore, Google scholar

IMMI extension is an opensource software plugin for the Rapidminer platform which extends this data mining platform for image mining. Below are some screenshots, video tutorials and selected set of features, which use the extension.



Marketplace経由ではなく、直接「rapidminer-ImageMiner-1.4.1.jar」を所定のフォルダにコピー

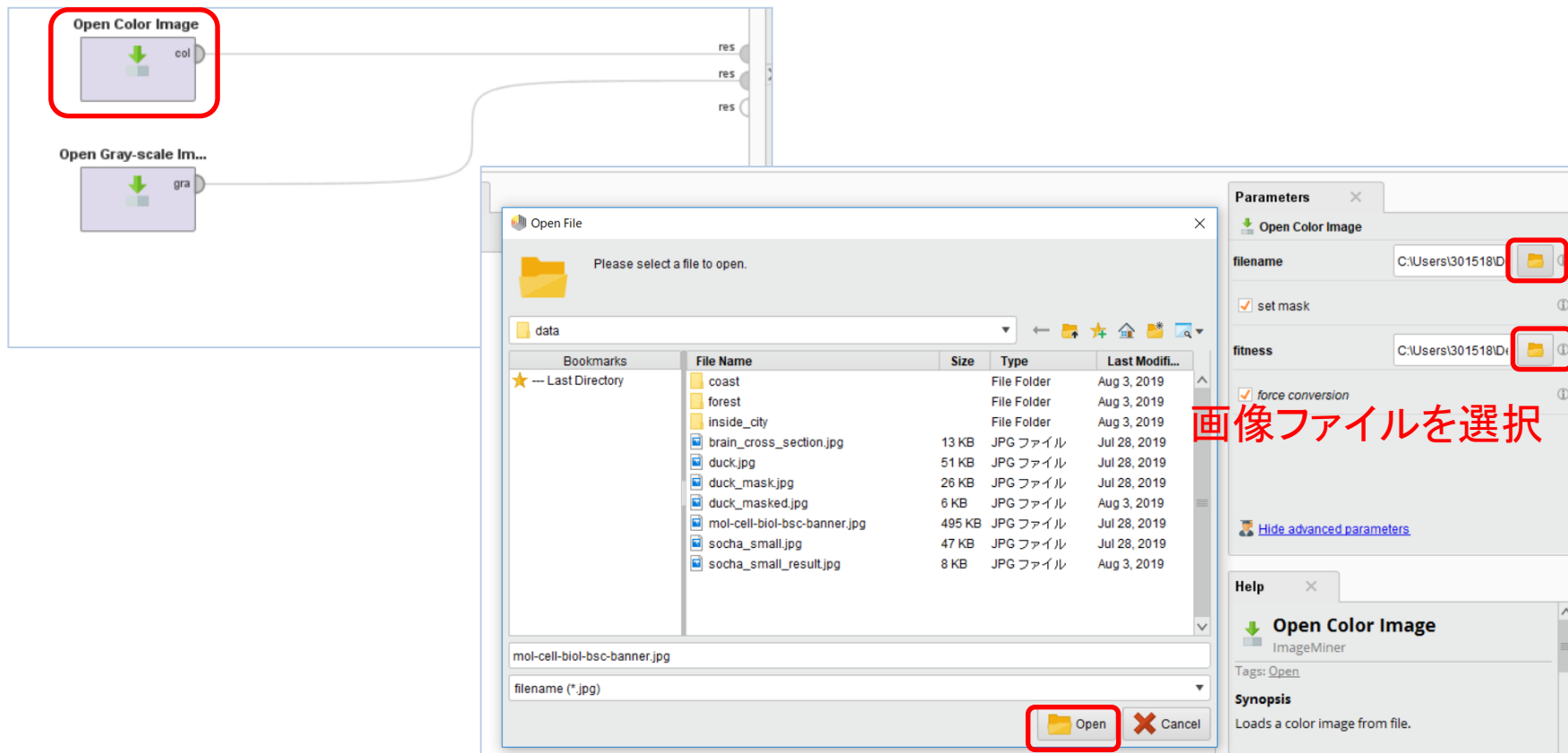
RapidMinerのExtensionをマニュアルでインストールする方法



C:\Program Files\RapidMiner\RapidMinerStudio\lib\plugins
にExtensionをコピーペーストする。

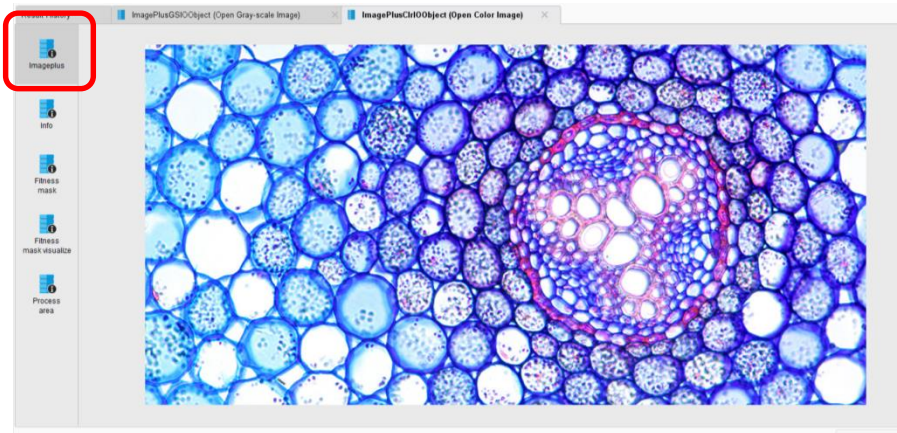
画像処理Extension IMMI

1. 画像の読み込み

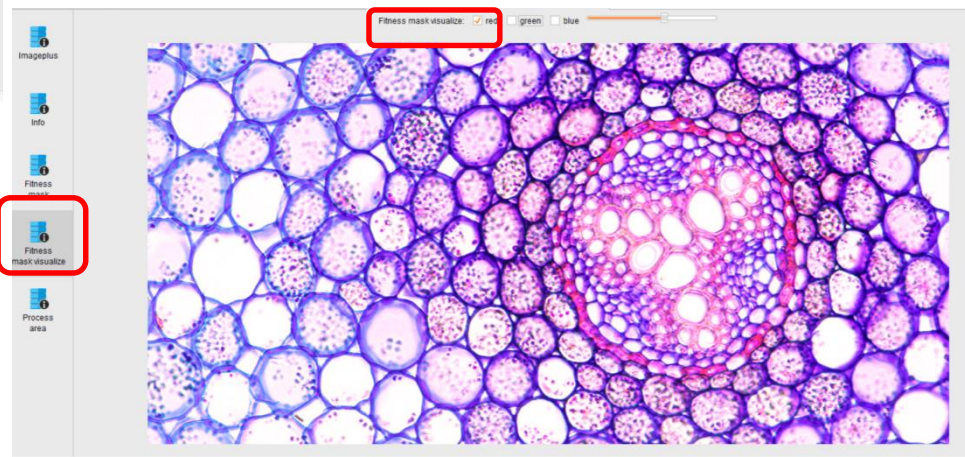


画像処理Extension IMMI

1. 画像の読み込み(結果)

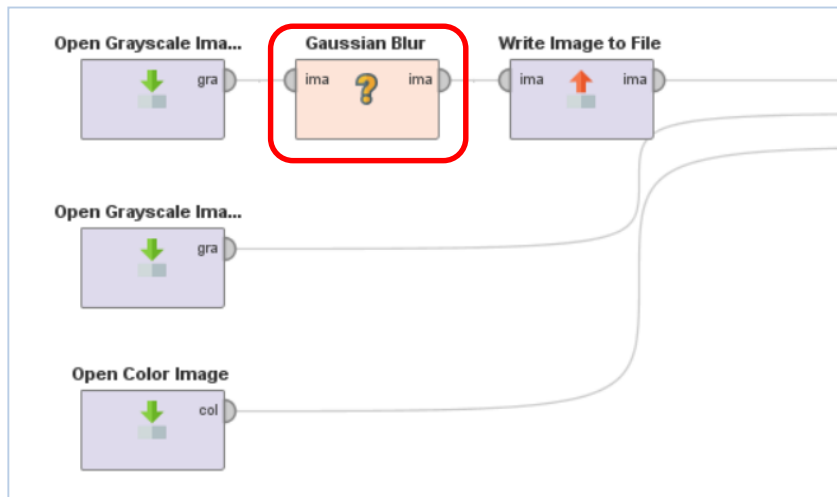


Name	Value
Name	C:\Users\301518\Desktop\レンコーティングで組織学資料保存会第7回\data\mol-cell-bio-soc-banner.jpg
Dimensions WxH	1200x600
Number of channels	1
Bit depth	24
Bytes per pixel	4
ImageProcessor	ColorProcessor
Label	



画像処理Extension IMMI

2. Gaussian Blur 処理



オリジナル
(カラー)



Grayscale

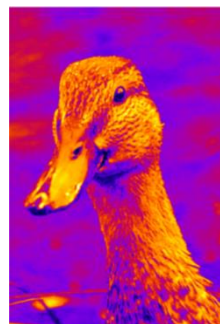
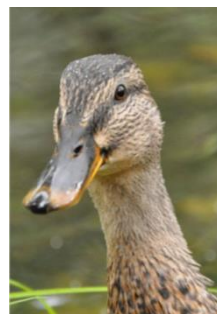
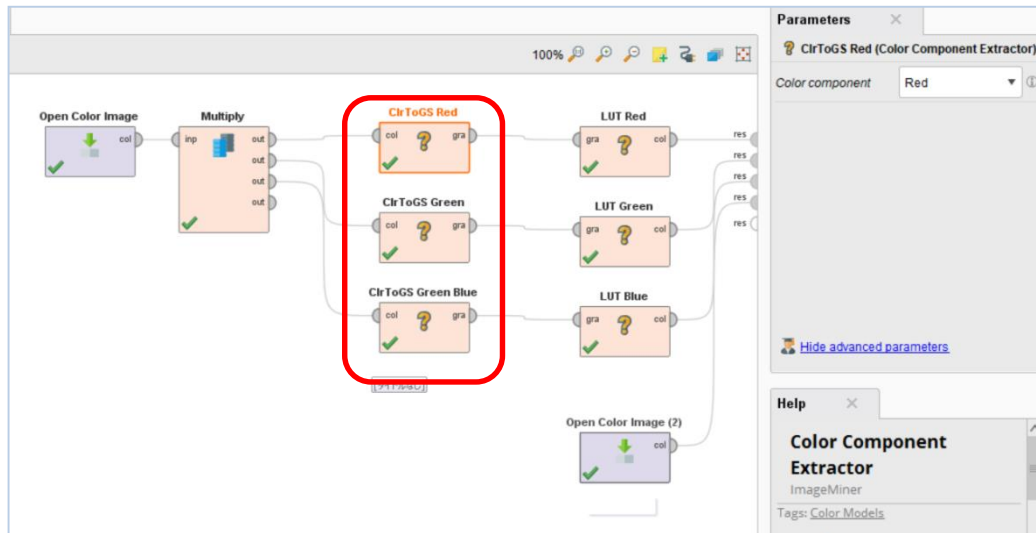


Gaussian
Blur 処理



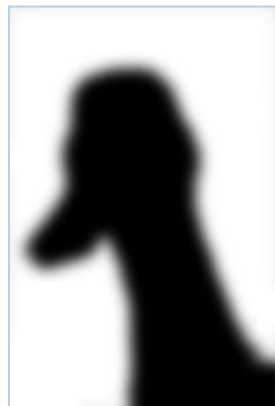
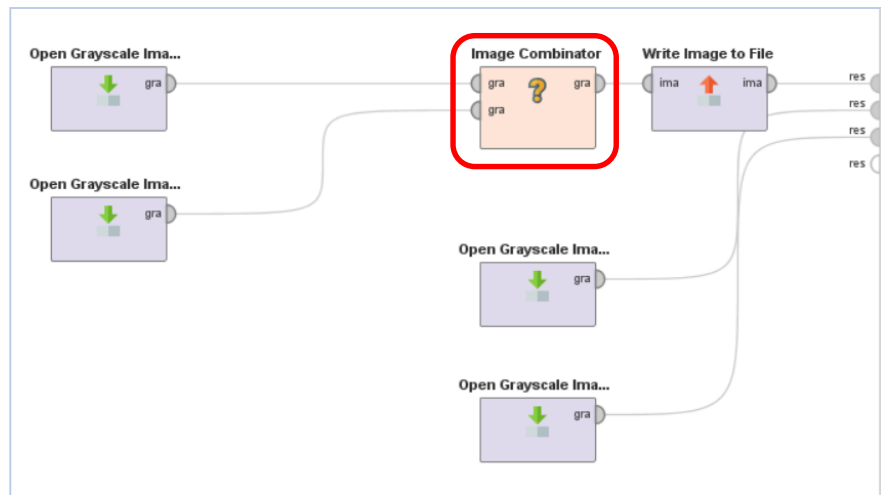
图像处理Extension **IMMI**

3. Color Component Extractor



图像处理Extension **IMMI**

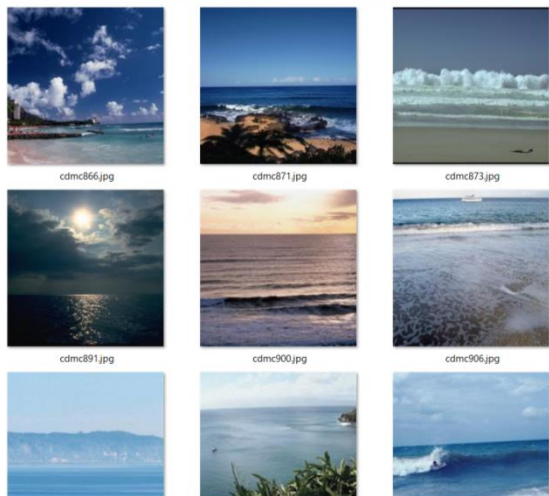
4. Image Combinator



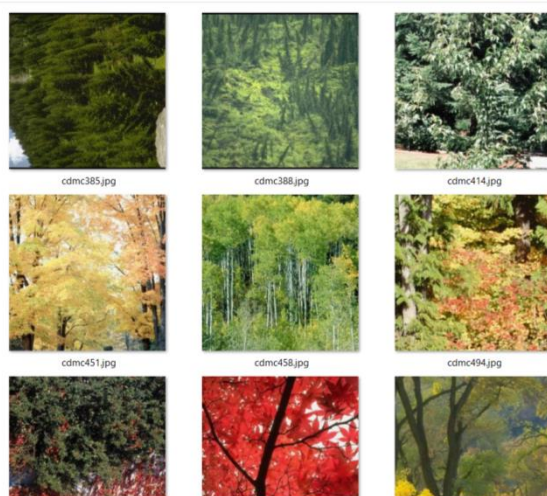
設問: 分類済みの画像データセットを機械学習(分離)する

<http://cvcl.mit.edu/database.htm>

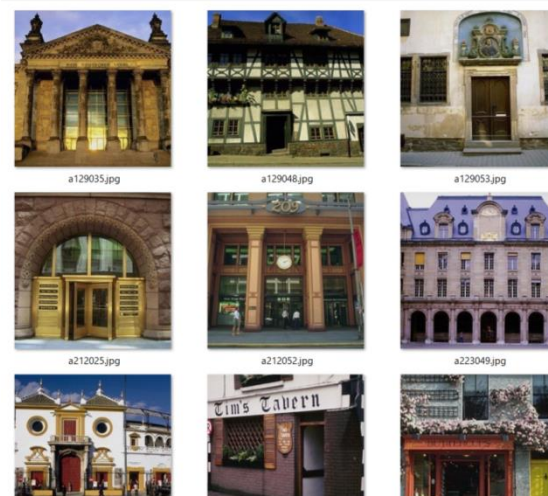
coast 361画像



forest 329画像



inner_city 309画像



画像処理Extension IMMI

5. MCIO (Multiple Color Image Opener)

時間がかかるので各自自習

MCIO

Store

Parameters

MCIO (Multiple Color Image Opener)

datamanagement double_array

images Edit List (3)...

auto adjust contrast

set mask

extension ALL IMAGES

assign label

Hide advanced parameters

Help

Multiple Color Image Opener

ImageMiner

Tags: Open

Synopsis

Loads all images from folder.

Edit Parameter List: images

Edit Parameter List: images

In this list arbitrary directories can be specified. All image files matching the given file ending will be loaded and assigned to the class value provided with the directory.

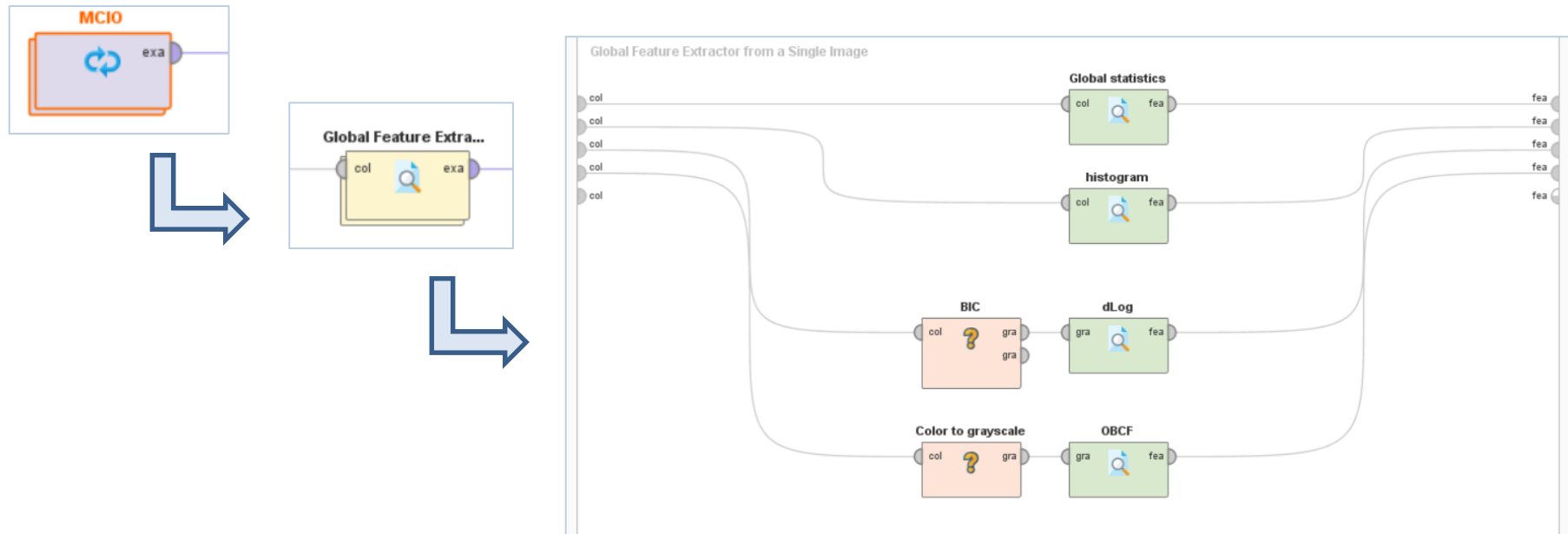
class name	directory
forest	C:\Users\301518\Desktop\レンコーティングで機械学習
inside_city	C:\Users\301518\Desktop\レンコーティングで機械学習
coast	C:\Users\301518\Desktop\レンコーティングで機械学習

Add Entry Remove Entry Apply Cancel

選択したフォルダの中の全ての画像にlabelをつける

画像処理Extension **IMMI**

5. MCIO (Multiple Color Image Opener)



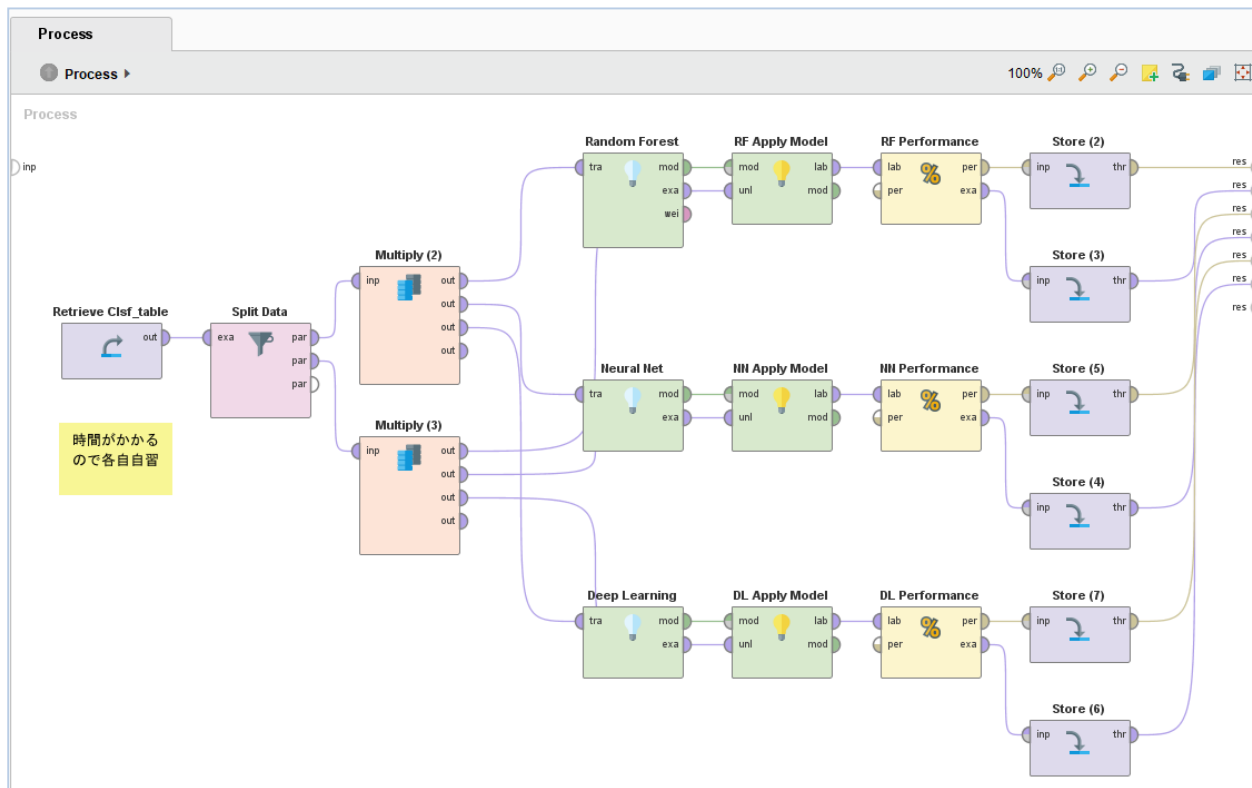
各画像から特徴量をパラメーターとして抽出する

5. MCIO (Multiple Color Image Opener)

	Open in		Filter (996 / 996 examples):															
	Turbo Prep		Auto Model															
	Row No.	label	FileName	Area Fractio...	Eginess_Glo...	KURTOSIS_...	Max Gray Va...	Mean_Globa...	Median_Glo...	Minimum Gr...	Normalized ...	Normalized ...	Peak Relativ...	Peak_Global...	Skewness_...	Standard De...	Histogram0	Histogram
	1	forest	art114.jpg	0	0.248	-0.175	249	102.131	92	0	0.489	0.497	0.011	86	0.533	49.873	0.008	0.002
	2	forest	bost100.jpg	0	0.072	-0.540	250	109.118	106	8	0.514	0.542	0.011	108	0.341	44.372	0.000	0.000
	3	forest	bost101.jpg	0	0.096	-0.287	255	102.346	92	2	0.514	0.423	0.011	74	0.681	47.462	0.000	0.000
	4	forest	bost102.jpg	0	0.126	0.302	254	111.478	108	8	0.507	0.504	0.014	106	0.551	36.779	0.000	0.000
	5	forest	bost103.jpg	0	0.113	0.339	255	111.023	104	6	0.519	0.482	0.012	91	0.717	44.349	0.001	0.001
	6	forest	bost190.jpg	0	0.063	-0.324	244	123.674	125	7	0.483	0.470	0.012	137	-0.057	35.848	0.000	0.000
	7	forest	bost196.jpg	0	0.077	-0.988	251	110.893	111	3	0.491	0.563	0.011	158	-0.037	44.486	0.000	0.000
	8	forest	cdmc101.jpg	0	0.132	-0.751	254	91.372	86	0	0.567	0.540	0.013	21	0.442	57.281	0.003	0.001
	9	forest	cdmc12.jpg	0														
	10	forest	cdmc271.jpg	0														
	11	forest	cdmc277.jpg	0														
	12	forest	cdmc278.jpg	0														
	13	forest	cdmc280.jpg	0	0.043	7.578	253	39.776	31	0	0.573	0.456	0.024	22	2.407	32.420	0.000	0.000
	14	forest	cdmc281.jpg	0	0.265	1.272	253	54.249	33	0	0.491	0.522	0.034	5	1.395	54.388	0	0
	15	forest	cdmc282.jpg	0	0.063	2.339	246	64.385	54	0	0.467	0.559	0.014	30	1.503	44.060	0.000	0.000
	16	forest	cdmc283.jpg	0	0.133	2.430	255	44.847	17	0	0.528	0.267	0.129	2	1.908	66.007	0.000	0.000
	17	forest	cdmc284.jpg	0	0.079	5.333	254	45.534	29	0	0.480	0.382	0.032	6	2.316	51.359	0.003	0.001
	18	forest	cdmc290.jpg	0	0.085	0.136	248	73.280	75	0	0.492	0.497	0.014	19	0.319	35.936	0	0
	19	forest	cdmc291.jpg	0	0.101	4.054	253	47.091	35	0	0.564	0.446	0.053	15	1.945	37.787	0	0.000
	20	forest	cdmc292.jpg	0	0.079	-0.255	253	77.992	50	0	0.506	0.328	0.012	33	1.055	69.595	0.002	0.001
	21	forest	cdmc293.jpg	0	0.159	1.510	252	68.582	52	1	0.519	0.497	0.021	29	1.440	47.235	0.000	0.000
	22	forest	cdmc306.jpg	0	0.043	7.015	252	58.794	51	0	0.486	0.442	0.016	44	2.270	38.488	0.000	0.000
	23	forest	cdmc313.jpg	0	0.027	12.438	255	40.299	35	0	0.443	0.493	0.075	14	2.628	29.352	0.000	0.000
	24	forest	cdmc315.jpg	0	0.102	1.327	255	87.217	75	0	0.450	0.434	0.011	65	1.279	53.632	0.001	0.001
	25	forest	cdmc317.jpg	0	0.015	1.653	235	64.655	65	0	0.563	0.468	0.014	73	0.591	30.345	0	0

全ての画像に label がついて、特徴量が数値データとして抽出されている
→ このデータセットを基に機械学習ができる

6. Classification



これまで学んだのと同じ方法で、分類の機械学習を実行

6. Classification 結果

Neural Network

accuracy: 85.23%

	true forest	true inside_city	true coast	class precision
pred. forest	83	24	1	76.85%
pred. inside_city	11	66	2	83.54%
pred. coast	4	2	105	94.59%
class recall	84.69%	71.74%	97.22%	