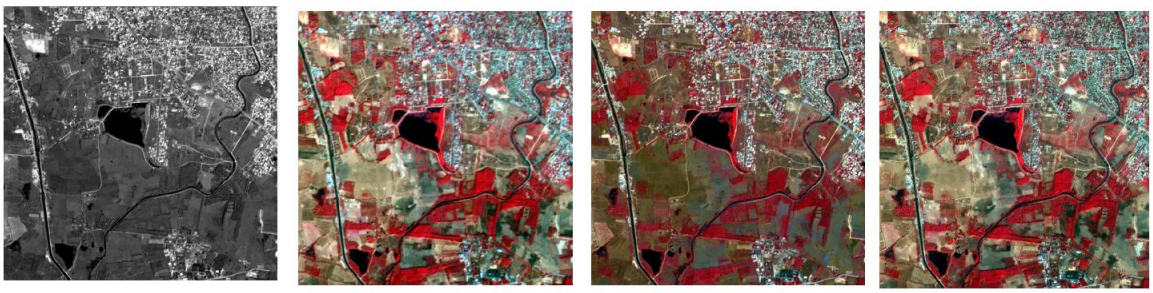
User Manual

Image Fusion Tool for IRS Data



Input PAN | Input Mx | Brovey | SVR

National Remote Sensing Centre

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Contents

Cover Page: Merged product generated from Resourcesat-2 L4Mx

Introduction

Image fusion is the process of combining High spatial resolution panchromatic data with Low spatial resolution multispectral data to get High spatial and spectral resolution fused output.

For improving the spatial resolution with improved spectral resolution several fusion methods are being used based on the requirements from the user. The widely used Fusion methods like Brovey, IHS and Synthetic Variable Ratio (SVR), High pass Filtering (HPF), YIQ fusion methods are provided as fusion techniques in this utility.

The tool is platform independent and implemented using JAVA and GDAL libraries to support various file formats.

2. Downloading the program

The program and the user manual can be downloaded from the location: **http://www.nrsc.gov.in/Satellite_Data_Products_Overview?q=Download_Softwares_1**

3. Hardware and software requirements:

Desktop computer system with minimum 4 GB RAM and any operating system with 5GB Hard disk space, preinstalled Java SE JRE 8 (Build 1.8.0_65 or higher) with *GDAL libraries (Ver 2.0 or above)*

Update Environment Variable Settings:

Add Java Installation directory at the end of 'path' variable inside Environment Variable settings of your system. Also add gdal installation, gdal-data and gdalplugins folder paths to path variable.

Input and Output requirement:

Input file should be in GeoTiff format and Mx data set should be layer stacked. Software utility can take stacked files with more than 3 band, but while using user should be aware of position of individual band as the utility uses first three bands for fusion. Output file format will always be in GeoTiff file with same projection parameter as that of input. Input files should contain Infra Red, Red and Green. These individual PAN and Mx data sets should be co-registered.

Select appropriate files for generating the fused output product by selecting the suitable method. The utility will prompt if the data sets given are not valid data sets.

Cartosat-1/2
PAN: 10 Bit

Resourcesat-2
LISS-IV: 10 Bit

This software utility may also work with any other sensor data provided they meet the above requirement. However its functionality is tested only with NRSC supplied Cartosat-1/2 and Resourcesat-2 L4Mx data sets.

4. Salient Features of software

1. Platform independent JAVA program and require GDAL library (Ver 2.0 or above).
2. Software can take input PAN as individual band Mx data as stacked layer.
3. It does not require any installation as program can run by invoking it through double click or through command mode.
4. Software provides option for the user to use a suitable fusion method for his application from the drop down box.

5. Steps in Running the Program : Invoke program by double clicking on "***fusion.bat***" in windows system or type the following command in the terminal window of your operating system ***"java –Xms4096m –jar fusion.jar"*** the GUI appears

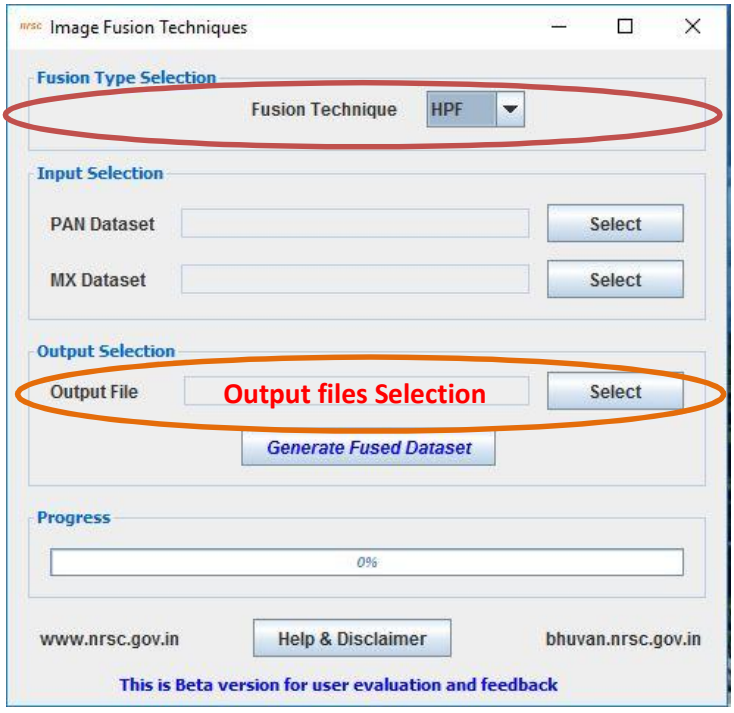
(Give full path of Java command and full path of irsncc.jar incase if above command does not work)

If your system is having more memory try allocating more memory to JVM using –Xmx argument in command mode.

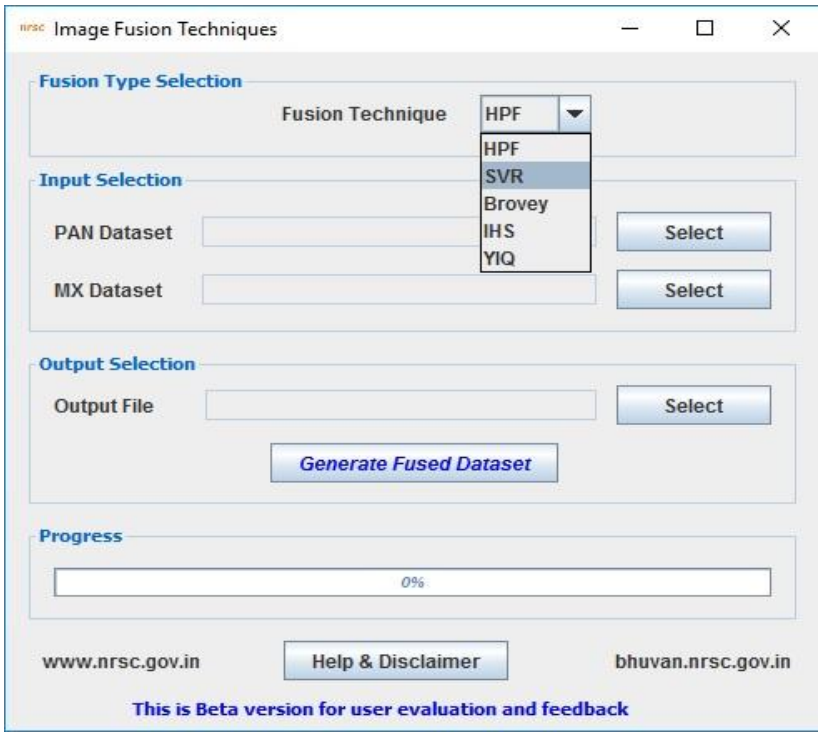
(Example: to allocate 4GB of memory:***" java –Xmsx4096m –jar fusion.jar"***)

Download JRE: Java SE JRE can be downloaded and installed from Oracle website (www.oracle.com).

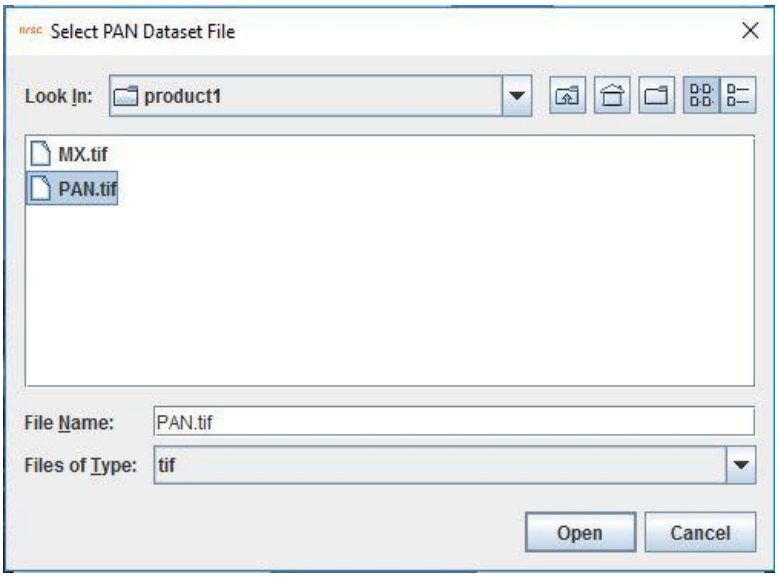
Download GDAL Libraries: Download GDAL libraries from the http://trac.osgeo.org/gdal/wiki/DownloadingGdalBinaries. Web site.

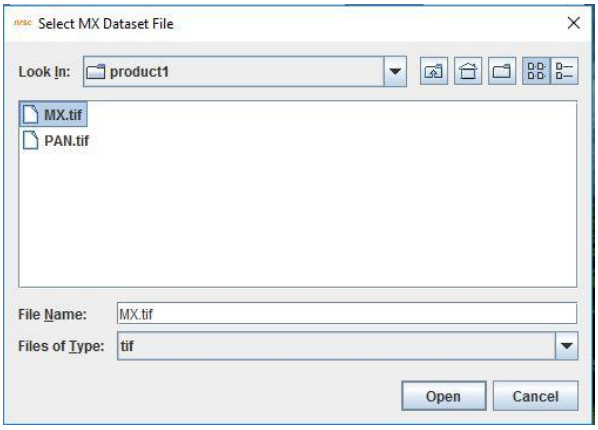


From "***Fusion Type Selection"*** panel, user can select the required Fusion Technique from the given Combo Box as shown in the figure below:

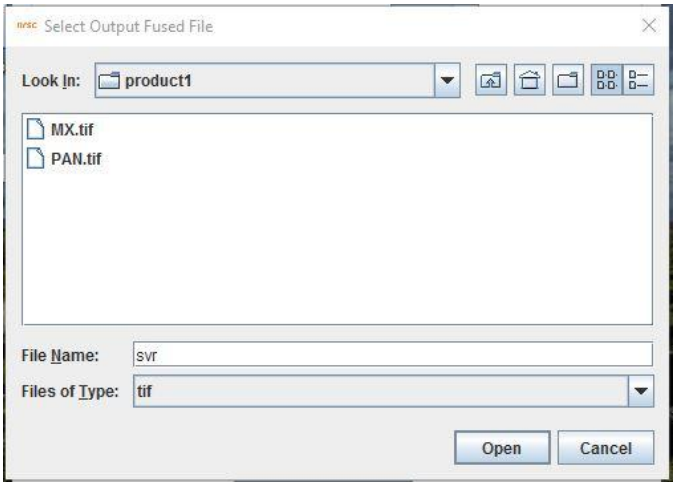


From "***Input Selection"*** panel, using respective "Select" button one can enter the required input files to the module. Each button opens a file selection dialogue for entering the locations of the input files as shown in the figure below:

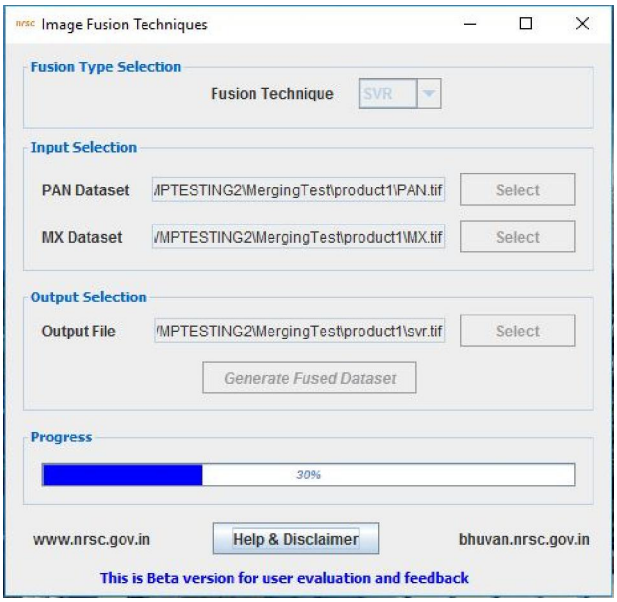




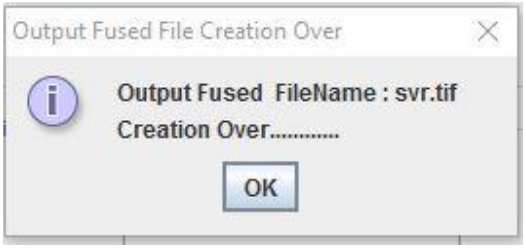
After selecting the PAN & MX Datasets, select the name of the output file to be created as shown in the figure below:



Then press “Generate Fused Dataset” button to create a fused image from the given set of input image files. Progress of the module is displayed in a progress bar as shown in figure



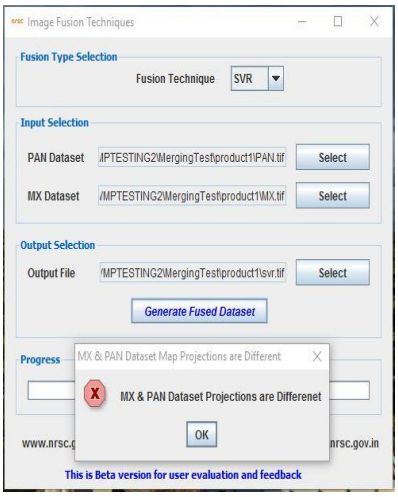
After completion of the conversion the completion status is reported as shown in the figure below:



6. Error conditions and messages

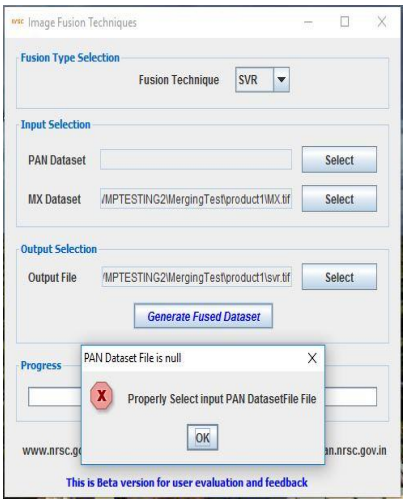
1. ***Input files belongs to different Projection:*** If input files PAN & MX Datasets does not corresponds to same Projection, an error message will be shown as in the figure

Solution: *Select input files that belongs to same Projection*



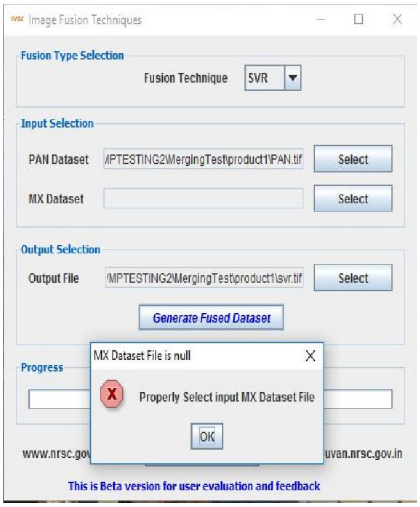
2. ***Forgot to enter PAN file :*** After selecting Input MX Dataset file, if one forgets to enter PAN Dataset file it will given an error message

Solution: *Select input PAN Dataset file*



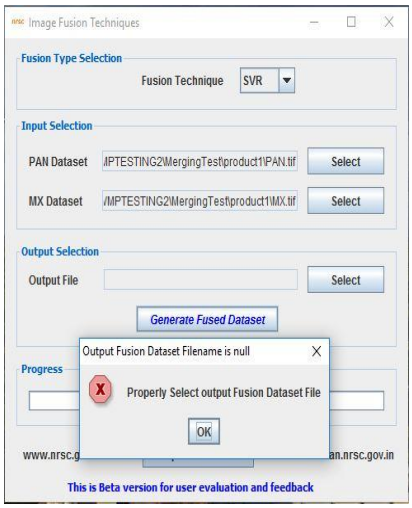
3. ***Forgot to enter MX file :*** After selecting Input PAN Dataset file, if one forgets to enter MX Dataset file it will given an error message

Solution: *Select input MX Dataset file*



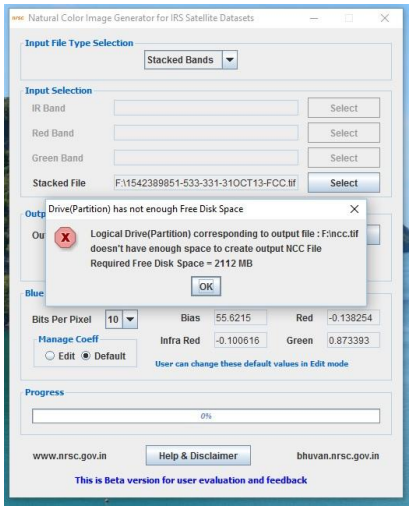
4. ***Forgot to enter output Fusion file :*** After selecting Input PAN & MX Dataset files, if one forgets to enter output Fusion Dataset file it will given an error message

Solution: *Select output Fusion Dataset file*



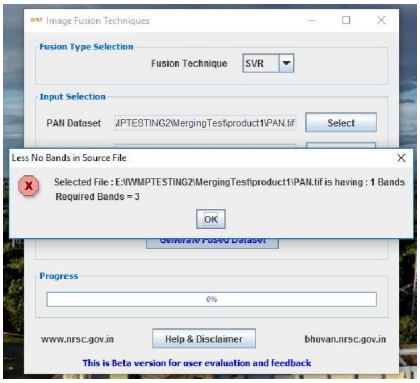
5. ***If the available disk space is not sufficient for writing the output file*** *the program gives an error message*

Solution*: Clear disk space in the output drive or create output files in a disk where sufficient space is available*



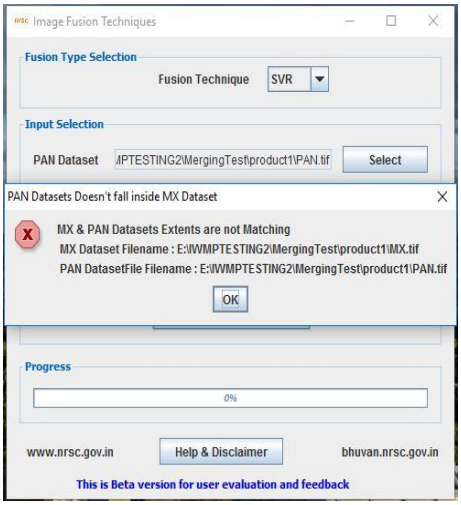
6. If selected input file is having less no of bands than required, program will give an error message

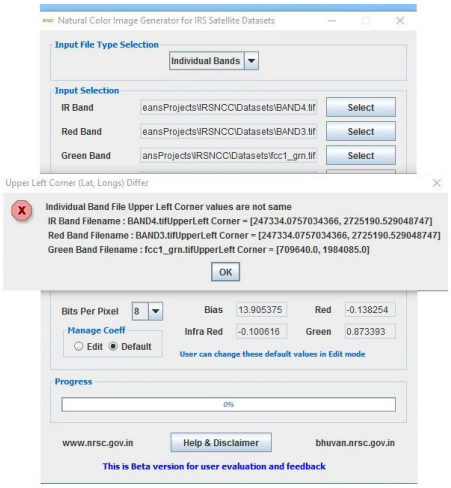
Solution: *Select correct file with specified no of band*



7. If selected input files extents are not matching, program will give an error message

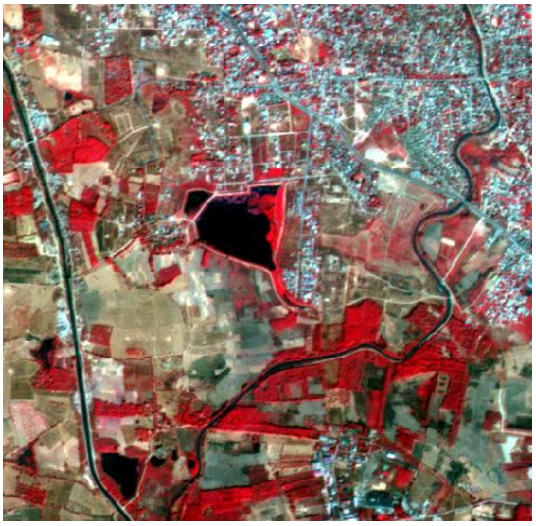
Solution: *Select correct file with specified no of band*



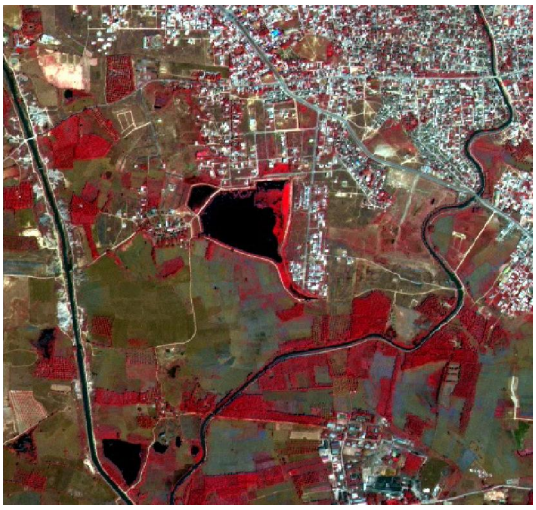


Sample Fused product

Cartosat-1 PAN Input



RS2 L4Mx Input



Brovey Output Image

Synthetic Variable Ratio (SVR) Fusion

7. Disclaimer

1. This software product is provided by NRSC "as is" and conveys no license or title under any patent, copyright, or mask work right to the product. NRSC reserves the right to make changes in the software without notification. NRSC also make no representation or warranty that such application will be suitable for the specified use without further testing or modification. There are inherent risks in the use of any software, and you are solely responsible for determining whether this software product is compatible with your computer and other software installed on your computer. You are also solely responsible for the protection of your system and backup of your data, and NRSC will not be liable for any damages you may suffer in connection with using, modifying, or distributing this software.
2. This software utility is implementation of the standard fusion algorithms available in the literature. Apart from this, many other techniques are also available in the literature. User on his sole discretion may adopt this utility for generating fused product.
3. This software generates fused output product, and is not a replacement of originally acquired high resolution data.