AI-FLARES

WP5100-D2: Technological service for data analysis of solar flares observations

The technological service offered by AI-FLARES is made of two kinds of pipelines: pipelines already included within the paths related to NASA and ESA missions; stand-alone pipelines included in the AI-FLARES gihthub repository. We now list these pipelines together with the corresponding links.

Pipelines included in missions' trees:

- SE-DESAT (desaturation pipeline release 1.0):
  https://hesperia.gsfc.nasa.gov/ssw/packages/desat/idl/desat_gen__define.pro
  https://hesperia.gsfc.nasa.gov/ssw/packages/desat/idl/desat_pril__define.pro
  https://hesperia.gsfc.nasa.gov/ssw/packages/desat/idl/dst_fit__define.pro
  https://hesperia.gsfc.nasa.gov/ssw/packages/desat/idl/dst_strpril__define.pro
  https://hesperia.gsfc.nasa.gov/ssw/packages/desat/idl/main_desat_pril_test.pro
- MEM_GE (maximum entropy for RHESSI and STIX):
  - https://hesperia.gsfc.nasa.gov/ssw/gen/idl/image/vis/mem_ge.pro
  - https://hesperia.gsfc.nasa.gov/ssw/gen/idl/image/vis/mem_ge_fb.pro
  - https://hesperia.gsfc.nasa.gov/ssw/gen/idl/image/vis/mem_ge_mean_visib.pro
- STIX ground software (imaging pipeline):
  - Pixel data construction routines:
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/pixel_data/stx_construct_pixel_data.pro
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/pixel_data/stx_construct_pixel_data_summed.pro
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/pixel_data/stx_sum_pixel_data.pro
  - Visibility construction and calibration routines:
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/vis/stx_calibrate_visibility.pro
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/vis/stx_construct_calibrated_visibility.pro
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/vis/stx_construct_visibility.pro
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/vis/stx_pixel_data_summed2visibility.pro
  - Routines for reading auxiliary fits files containing aspect information:
    - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/aux_data/stx_create_auxiliary_data.pro

- Routines for performing coordinate transformation (for precisely locating the STIX reconstructed maps):
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/coordinates/stx_hpc2rtn_coord.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/coordinates/stx_hpc2stx_coord.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/coordinates/stx_rtn2solo_coord.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/coordinates/stx_rtn2stx_coord.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/coordinates/stx_solo2stx_coord.pro
- Routines for calibrating the sub-collimator transmission:
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/subcollimator/stx_grid_transmission.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/subcollimator/stx_subc_transmission.pro
- Routines for determining the location of the flare:
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/stx_estimate_flare_location.pro
- VIS_FWDFIT_PSO routines:
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_func_pso.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_circle_struct_define.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_func_makealoop.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_loop_struct_define.pro
  - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_multiple_src_create.pro

        - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_source2map.pro
        - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_src_bifurcate.pro
        - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_src_nfurcate.pro
        - https://github.com/i4Ds/STIX-GSW/blob/master/stix/idl/processing/imaging/vis_fwdfit_pso_src_structure__define.pro

Stand-alone pipelines:

- Adaptive SE-DESAT (desaturation pipeline release 2.0): https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP2100-D1/SE_DESAT_adaptive
- Flare forecasting pipelines:
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP4100-D2/flare_forecasting_ensemble_learning
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP4100-D2/forecasting_solar_storm_september_2017
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP4100-D2/topological_descriptor_flare_forecasting
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP4100-D2/video_based_DL_flare_forecasting
- Imaging spectroscopy pipeline for RHESSI
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP3100-D1/RHESSI_VisibilityInversionSoftware
- Imaging spectroscopy pipeline for STIX:
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/WP3100-D1/STIX_VisibilityInversionSoftware
- Imaging pipelines
    - https://github.com/theMIDAgroup/AI-FLARES/tree/main/stx_uv_smooth
    - https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/stx_uv_smooth.pro
    - https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/stx_make_map_uv_smooth.pro
    - https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/uv_smooth.pro
        - https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/uv_smooth_vsk.pro
        - https://github.com/theMIDAgroup/AIFLARES/blob/main/stx_uv_smooth/uv_smooth_codes/uv_smooth_augmented_feature.pro

- https://github.com/theMIDAgroup/AIFLARES/blob/main/stx_uv_smooth/uv_smooth_codes/uv_smooth_vsk.pro
- https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/matern_kernel_interp.pro
- https://github.com/theMIDAgroup/AI-FLARES/blob/main/stx_uv_smooth/uv_smooth_codes/distance_matrix.pro