GAIA Catalog

Catalog Specifications

- Keep consistent units from file to database.
- RA and DEC in both sexagesimal, radians, and degrees (6 sig figures)
    - this is to avoid the need for translation later.
- Check for values to be replaced with null.
    - Set null floats for values like magnitude and proper motion.
- Four tables: gaia, gaia_errors_flags, gaia_not_visible and gaia_errorsnot_visible
    - _not_visible: Not visible from Keck Observatory (Declination < -70°)

Tables

gaia			
ColumnName	**Datatype**	**Units**	**NullValues**
GAIA_ID	VARCHAR(30)	id	-
RA	VARCHAR(13)	sexag	-
Decl	VARCHAR(13)	sexag	-
RA_deg	DOUBLE	deg	-
Decl_deg	DOUBLE	deg	-
RA_rad	DOUBLE	rad	-
Decl_rad	DOUBLE	rad	-
Epoch	FLOAT	year	Blank
pmra	DOUBLE	mas/yr	-
pmdec	DOUBLE	mas/yr	-
Gmag	DOUBLE	mag	999.9
BpMag	DOUBLE	mag	999.9
RpMag	DOUBLE	mag	999.9
radial_velocity	FLOAT	-	Blank
parallax	DOUBLE	parsecs	-

gaia_errors_flags			
ColumnName	Datatype	Units	NullValues
GAIA_ID	VARCHAR(30)	id	-
source_id	BIGINT	id	-
solution_id	BIGINT	id	-
random_index	BIGINT	-	Blank
ra_error	FLOAT	-	Blank
dec_error	FLOAT	-	Blank
parallax_error	FLOAT	-	Blank
parallax_over_error	FLOAT	-	Blank
pmra_error	FLOAT	-	Blank
pmdec_error	FLOAT	-	Blank
ra_dec_corr	FLOAT	-	Blank
ra_parallax_corr	FLOAT	-	Blank
ra_pmra_corr	FLOAT	-	Blank
ra_pmdec_corr	FLOAT	-	Blank
dec_parallax_corr	FLOAT	-	Blank
dec_pmra_corr	FLOAT	-	Blank
dec_pmdec_corr	FLOAT	-	Blank
parallax_pmra_corr	FLOAT	-	Blank
parallax_pmdec_corr	FLOAT	-	Blank
pmra_pmdec_corr	FLOAT	-	Blank
astrometric_n_obs_al	INT	-	Blank
astrometric_n_obs_ac	INT	-	Blank
astrometric_n_good_obs_al	INT	-	Blank
astrometric_n_bad_obs_al	INT	-	Blank
astrometric_gof_al	FLOAT	-	Blank
astrometric_chi2_al	FLOAT	-	Blank
astrometric_excess_noise	FLOAT	-	Blank
astrometric_excess_noise_sig	FLOAT	-	Blank
astrometric_params_solved	INT	-	Blank
astrometric_primary_flag	BOOLEAN	-	Blank
astrometric_weight_al	FLOAT	-	Blank
astrometric_pseudo_colour	FLOAT	-	Blank
astrometric_pseudo_colour_error	FLOAT	-	Blank
mean_varpi_factor_al	FLOAT	-	Blank
astrometric_matched_observations	INT	-	Blank
visibility_periods_used	INT	-	Blank
astrometric_sigma5d_max	FLOAT	-	Blank
frame_rotator_object_type	INT	-	Blank
matched_observations	INT	-	Blank
duplicated_source	BOOLEAN	-	Blank
phot_g_n_obs	INT	-	Blank
phot_g_mean_flux	FLOAT	-	Blank

gaia_errors_flags (cont.)			
ColumnName	Datatype	Units	NullValues
phot_g_mean_flux_error	FLOAT	-	Blank
phot_g_mean_flux_over_error	FLOAT	-	Blank
phot_bp_n_obs	INT	-	Blank
phot_bp_mean_flux	FLOAT	-	Blank
phot_bp_mean_flux_error	FLOAT	-	Blank
phot_bp_mean_flux_over_error	FLOAT	-	Blank
phot_rp_n_obs	INT	-	Blank
phot_rp_mean_flux	FLOAT	-	Blank
phot_rp_mean_flux_error	FLOAT	-	Blank
phot_rp_mean_flux_over_error	FLOAT	-	Blank
phot_bp_rp_excess_factor	FLOAT	-	Blank
phot_proc_mode	VARCHAR(10)	-	Blank
bp_rp	FLOAT	-	Blank
bp_g	FLOAT	-	Blank
g_rp	FLOAT	-	Blank
radial_velocity_error	FLOAT	-	Blank
rv_nb_transits	INT	-	Blank
rv_template_teff	INT	-	Blank
rv_template_logg	INT	-	Blank
rv_template_fe_h	INT	-	Blank
phot_variable_flag	VARCHAR(8)	-	Blank
l	FLOAT	-	Blank
b	FLOAT	-	Blank
ecl_lon	FLOAT	-	Blank
ecl_lat	FLOAT	-	Blank
priam_flags	INT	-	Blank
teff_val	FLOAT	-	Blank
teff_percentile_lower	FLOAT	-	Blank
teff_percentile_upper	FLOAT	-	Blank
a_g_val	FLOAT	-	Blank
a_g_percentile_lower	FLOAT	-	Blank
a_g_percentile_upper	FLOAT	-	Blank
e_bp_min_rp_val	FLOAT	-	Blank
e_bp_min_rp_percentile_lower	FLOAT	-	Blank
e_bp_min_rp_percentile_upper	FLOAT	-	Blank
flame_flags	INT	-	Blank
radius_val	FLOAT	-	Blank
radius_percentile_lower	FLOAT	-	Blank
radius_percentile_upper	FLOAT	-	Blank
lum_val	FLOAT	-	Blank
lum_percentile_lower	FLOAT	-	Blank
lum_percentile_upper	FLOAT	-	Blank

Figures 4.1, 4.2 & 4.3: Name, SQL Datatype, Units and Values to be replaced with NULL for the gaia and gaia_errors_flags tables.

Database Implementation

- The GAIA catalog was constructed from 307 folders from “aa” through “lu” in the order aa, ab, ac, etc.
- Each folder contains additional files listing the GAIA_ID values they contain.
    - Ex: GaiaExtracted_100424601954531200_100677322125743488.csv

Data Cleaning

- RA (sexagesimal) was constructed from the RA_deg column.
- RA_rad (radians) was constructed from the RA_deg column.
- Decl (sexagesimal) was constructed from the Decl_deg column.
- Decl_rad (radians) was constructed from the Decl_deg column.
- Error and flag names were kept the same
- All error and flag values were updated from blank to NULL
- All magnitudes were updated (999.9 changed to NULL).
    - gmag
    - bpmag
    - rpmag