Result Class Variables

Variables and their definitions for the 3 results classes are presented here. Detailed mathematical explanations and associated equations are available in the Methods Manuscript.

VCG Morphology Class (VCG_Morphology.m)

Variable	Description	Units
TCRT	Total Cosine R to T (range 0 - 1)	_
TCRT_angle	${\rm Angle\ from\ TCRT} = {\rm acos}({\rm TCRT})$	\deg
qrsloop_residual	SVD variance from fitting QRS loop to a plane (0 = perfect fit) = qrs_s^2	=
qrsloop_rmse	RMSE for fit of QRS loop to best fit plane $(0 = perfect fit)$	mV
qrsloop_roundness	$\label{eq:qrs_loop} \mbox{QRS loop roundness. 1 = perfect circle, larger values are increasingly elliptical = qrs_S1/qrs_S2}$	_
qrsloop_area	Area of QRS loop	mV
qrsloop_perimeter	Length of QRS loop projected into best fit plane	mV^2
$tloop_residual$	SVD variance from fitting T loop to a plane $(0 = perfect fit) = t_s^2$	-
tloop_rmse	RMSE for fit of T loop to best fit plane $(0 = perfect fit)$	mV
$tloop_roundness$	T loop roundness. $1 = perfect circle$, larger values are increasingly elliptical = t_S1/t_S2	=
tloop_area	Area of T loop	mV
tloop_perimeter	Length of T loop projected into best fit plane	mV^2
qrs_loop_normal	Unit vector normal to best fit QRS loop plane	_
$t_{-}loop_{-}normal$	Unit vector normal to best fit T loop plane	_
qrst_dihedral_ang	Dihedral angle between best fit QRS loop and T loop planes	\deg
qrs_S1	1st singular value of QRS loop	_
qrs_S2	2nd singular value of QRS loop	_
qrs_S3	3rd singular value of QRS loop	_
t_S1	1st singular value of T loop	=
t_S2	2nd singular value of T loop	=
t_S3	3rd singular value of T loop	_
von al total	W of total variance made up by 1st ODC singular value	%
qrs_var_s1_total	% of total variance made up by 1st QRS singular value % of total variance made up by 2nd QRS singular value	%
qrs_var_s2_total		%
qrs_var_s3_total	% of total variance made up by 3rd QRS singular value	70
t_var_s1_total	% of total variance made up by 1st T singular value	%
t_var_s2_total	% of total variance made up by 2nd T singular value	%
t_var_s3_total	% of total variance made up by 3rd T singular value % of total variance made up by 3rd T singular value	%
vai _ 33_ to ta t	70 of coour rationed induce up of ord 1 singular value	70

${\rm VCG\ Calculation\ Class\ (\ VCG_Calc.m\)}$

Variable	Description	\mathbf{Units}
qrs_int	QRS duration	ms
$qt_{-}int$	QT interval	${ m ms}$
svg_x	${ m X~component~of~SVG} = { m XQ_area} + { m XT_area}$	$\mathrm{mV}\!\cdot\!\mathrm{ms}$
svg_y	${ m Y~component~of~SVG} = { m YQ_area} + { m YT_area}$	$\text{mV}{\cdot}\text{ms}$
svg_z	$Z \ component \ of \ SVG = \textbf{ZQ_area} + \textbf{ZT_area}$	$mV \cdot ms$
sai_x	Area under the absolute value of the median X QRST complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
sai_y	Area under the absolute value of the median Y QRST complex	$\text{mV}{\cdot}\text{ms}$
sai_z	Area under the absolute value of the median Z QRST complex	$\text{mV}{\cdot}\text{ms}$
sai_qrst	$\mathrm{SAI}\ \mathrm{QRST} = \mathtt{sai}_{\mathtt{x}} + \mathtt{sai}_{\mathtt{y}} + \mathtt{sai}_{\mathtt{z}}$	$\text{mV}{\cdot}\text{ms}$
sai_vm	Area under the absolute value of the median VM QRST complex	$mV \cdot ms$
q_peak_mag	Magnitude of peak QRS vector	mV
q_peak_az	Azimuth of peak QRS vector	\deg
q_peak_el	Elevation of peak QRS vector	\deg
$t_{-}peak_{-}mag$	Magnitude of peak T wave vector	mV
t_peak_az	Azimuth of peak T wave vector	\deg
t_peak_el	Elevation of peak T wave vector	\deg
svg_peak_mag	Magnitude of the sum of peak QRS and peak T vectors ("peak SVG")	mV
svg_peak_az	Azimuth of the "peak SVG" vector	\deg
svg_peak_el	Elevation of the "peak SVG" vector	\deg
q_area_mag	Magnitude of QRS area vector ([XQ_area, YQ_area, ZQ_area])	$\mathrm{mV}{\cdot}\mathrm{ms}$
q_area_az	Azimuth of QRS area vector	\deg
q_area_el	Elevation of QRS area vector	\deg
t_area_mag	Magnitude of T-wave area vector [XT_area, YT_area, ZT_area]	$\mathrm{mV}{\cdot}\mathrm{ms}$
t_area_az	Azimuth of T-wave area vector	\deg
t_area_el	Elevation of T-wave area vector	\deg
svg_area_mag	Magnitude of the SVG vector [svg_x, svg_z, svg_z]	$\mathrm{mV}{\cdot}\mathrm{ms}$
svg_area_az	Azimuth of the SVG vector	\deg
svg_area_el	Elevation of the SVG vector	\deg
qrst_angle_area	Area (mean) QRST angle: 3D angle between area QRS and area T wave vectors	\deg
qrst_angle_peak	Peak QRST angle: 3D angle between peak QRS and peak T wave vectors	\deg
qrst_angle_peak_frontal	Projection of area QRST angle into frontal plane	\deg
qrst_angle_area_frontal	Projection of peak QRST angle into frontal plane	\deg
XQ_area	Area under median X QRS complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
YQ_area	Area under median Y QRS complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
ZQ_area	Area under median Z QRS complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
XT_area	Area under median X T wave	$\mathrm{mV}{\cdot}\mathrm{ms}$
YT_area	Area under median Y T wave	$\mathrm{mV}{\cdot}\mathrm{ms}$
ZT_area	Area under median Z T wave	$\mathrm{mV}{\cdot}\mathrm{ms}$

YQ_peak Value of med ZQ_peak Value of med XT_peak Value of med YT_peak Value of med Yalue of Median speed_min Minimum Speed_med Yalue of Median speed_min Minimum Speed_qrs_max Time after Oxide Yalue of Median Speed_t_max Maximum Speed_t_max Maximum Speed_t_max Minimum Speed_t_med Median Speed_t_med Time after Oxide Yalue of Median Speed_t_min Time a	dian X QRS complex at time of maximum distance from origin dian Y QRS complex at time of maximum distance from origin dian Z QRS complex at time of maximum distance from origin dian X T wave at time of maximum distance from origin dian Y T wave at time of maximum distance from origin dian Z T wave at time of maximum distance from origin dian Z T wave at time of maximum distance from origin deed across the entire VCG loop deed across the entire VCG loop QRS onset of maximum VCG speed QRS onset of minimum VCG speed deed across the QRS VCG loop deed across the QRS VCG loop	mV mV mV mV mV mV mV mV mV ms mv/ms mv/ms ms
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time_speed_t_min Time after (d across the T wave loop	mV/ms
	QRS onset of maximum T-wave speed	${ m ms}$
qrst_distance_area Distance bet	QRS onset of minimum T-wave speed	ms
	ween the area QRS and area T vectors	mV
qrst_distance_peak	ween the area QRS and area T vectors	mV
$oldsymbol{vcg_length_qrs}$ Length of Q	RS VCG loop	mV
vcg_length_t Length of T	wave VCG loop	mV
vcg_length_qrst	${ m RST~VCG~loop} = { m vcg_length_qrs} + { m vcg_length_t}$	mV
vm_tpeak_time Time after (QRS onset of peak of median VM Twave	${ m ms}$
vm_tpeak_tend_abs_diff	nce between T wave peak and T wave end in median VM lead	${ m ms}$
vm_tpeak_tend_ratio Ratio betwe	en time of T wave peak and time of T wave end in median VM lead	_

Lead Morphology Class (Lead_Morphology.m)

 $\textbf{[lead]} \ \mathrm{refers} \ \mathrm{to} \ \mathrm{any} \ \mathrm{of} \ \mathrm{the} \ 16 \ \mathrm{leads} \ (\mathrm{L1}, \ \mathrm{L2}, \ \mathrm{L3}, \ \mathrm{avR}, \ \mathrm{avL}, \ \mathrm{avF}, \ \mathrm{V1-V6}, \ \mathrm{X}, \ \mathrm{Y}, \ \mathrm{Z}, \ \mathrm{VM})$

Variable	Description	Units
[lead]_r_wave	Magnitude of R wave on median beat of [lead]	$\overline{\mathrm{mV}}$
$[lead]_{-}s_{-}wave$	Magnitude of S wave on median beat of [lead]	mV
$[lead]_{-}$ rs $_{-}$ wave	${ m Magnitude} \ { m of} \ { m entire} \ { m QRS} \ { m complex} = exttt{[lead]_r_wave} + { m abs([lead]_s_wave}$	mV
$[lead]_{-}$ rs $_{-}$ ratio	$Ratio\ of\ R\ wave\ to\ magnitude\ of\ entire\ QRS\ complex=\texttt{[lead]_r_wave}\ /\ \texttt{[lead]_rs_wave}$	=
$[lead]_sr_ratio$	$Ratio\ of\ S\ wave\ to\ magnitude\ of\ entire\ QRS\ complex=\texttt{[lead]_s_wave}\ /\ \texttt{[lead]_rs_wave}$	_
$[lead]_{-}t_{-}max$	Maximum magnitude of T wave in [lead]	mV
$[\operatorname{lead}]_{-}t_{-}max_{-}loc$	Timing of T wave maximum (after QRS onset) in [lead]	${ m ms}$
[lead]_qrs_area	Area of [lead] median beat QRS complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
$[lead]_{-}t_{-}area$	Area of [lead] median beat T wave	$\mathrm{mV}{\cdot}\mathrm{ms}$
[lead]_qrst_area	Area of [lead] median beat full QRST complex	$\mathrm{mV}{\cdot}\mathrm{ms}$
cornell_lvh_mv	$\operatorname{Cornell} \operatorname{LVH} = extsf{V3_s_wave} + \operatorname{avL_r_wave}$	mV
sokolow_lvh_mv	$Sokolow\text{-}Lyon \ LVH = \texttt{V1_s_wave} + \max(\texttt{V5_r_wave}, \ \texttt{V6_r_wave})$	mV
qrs_frontal_axis	Fontal plane QRS axis	\deg