Fig 1. Schematic of NiChart software suite. Modality-specific image processing toolboxes are used to calculate imaging derived phenotypes. After statistical data harmonization of derived values, models pre-trained on large reference datasets are applied to calculate machine learning based imaging phenotypes of various diseases and conditions, allowing to position the individual into the neuroimaging chart, a multi-dimensional quantitative coordinate system of brain health.

Fig 2. Reference MRI dataset used for data harmonization and for training machine learning (ML) models

Study	Clinical Emphasis (marked)	PT	sMRI	fMRI	dMRI	Asian	African	MultiOther	NativeAm
ABIDE**	PH	1257	1490	1490	0	TBD	TBD	TBD	TBD
ACCORD*	Di	629	1414	0	TBD	0	67	0	0
ADNI*	AD	2515	10853	4267	2959	39	105	20	4
AIBL	AD	1264	1978	0	0	0	0	0	0
ANMerge*	AD	453	~1350	0	0	0	0	0	0
BIOCARD	AD	319	1152	0	0	3	4	1	0
BLSA	Ag	1174	3928	2233	164	55	239	17	4
CARDIA*	CVD, Di, RS	894	1379	1636	1658	0	372	0	0
CoorMD**		2858	3001	3001	0	TBD	TBD	TBD	TBD
EDIC*	Di	490	490	460	490	TBD	TBD	TBD	TBD
HANDLS	RS	263	263	0	263	0	63+	0	0
HCP*	OTHR	1200	1200	1200	1200	TBD	TBD	TBD	TBD
LookAhead*	Di	320	320	0	320	0	70	0	0
MESA*	CVD, RS	1063	1063	1062	1062	158	267	0	0
OASIS	AD	1094	2154	3621	2450	5	165	0	0
PENN	AD	1314	1549	320	TBD	20	203	34	0
PHENOM**	PH	2277	2288	0	0	TBD	TBD	TBD	TBD
SHIP*	Ag, CVD	3311	3311	0	0	0	0	0	0
SPRINT*	CVD	788	1336	~1330	~1330	7	241	9	0
UKBIOBANK*	Ag	40580	40991	~37000	~37000	594	256	383	0
WHIMS*	OTHR	1305	1966	0	0	23	57	0	4
WRAP	AD	325	735	0	0	2	6	11	3
Total	Ag, AD, CVD, Di, PH, RS, OTHR	**65693**	**84211**	**57620**	**48896**	**906**	**2115**	**475**	**15**

Ag: aging; AD: Alzheimer's disease; CVD: cardio-vascular disease; Di: Diabetes; PH: psychosis/mental health, RS: race/socio-economics; OTHR: other; PT: number of participants; FU: MRI Follow-Up; *: multi-site; **: multi-study
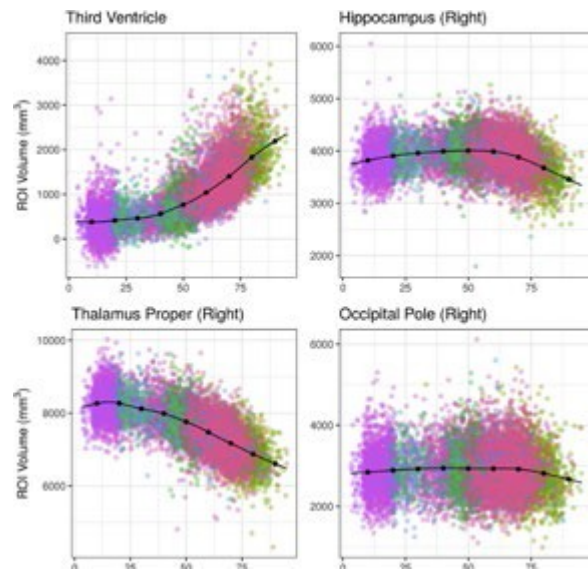
Fig 3. Age trends of selected imaging derived phenotypes after data harmonization
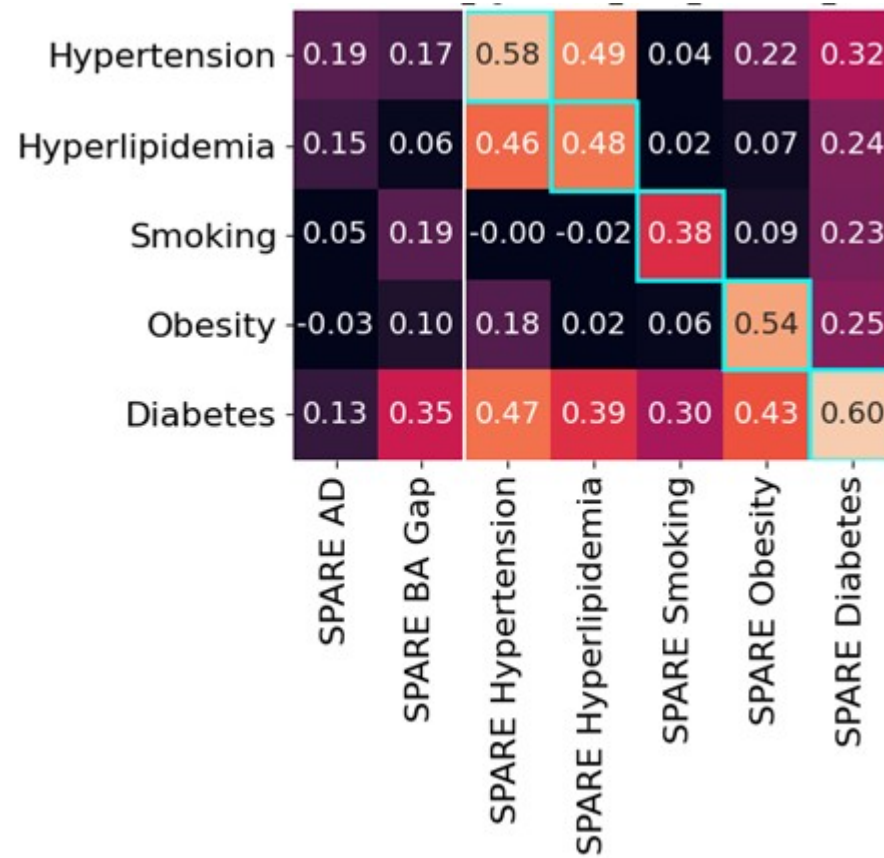
Fig 4. Panel of machine learning based imaging phenotypes (SPARE scores) derived from the reference dataset. Correlations between SPARE scores for various diseases and conditions
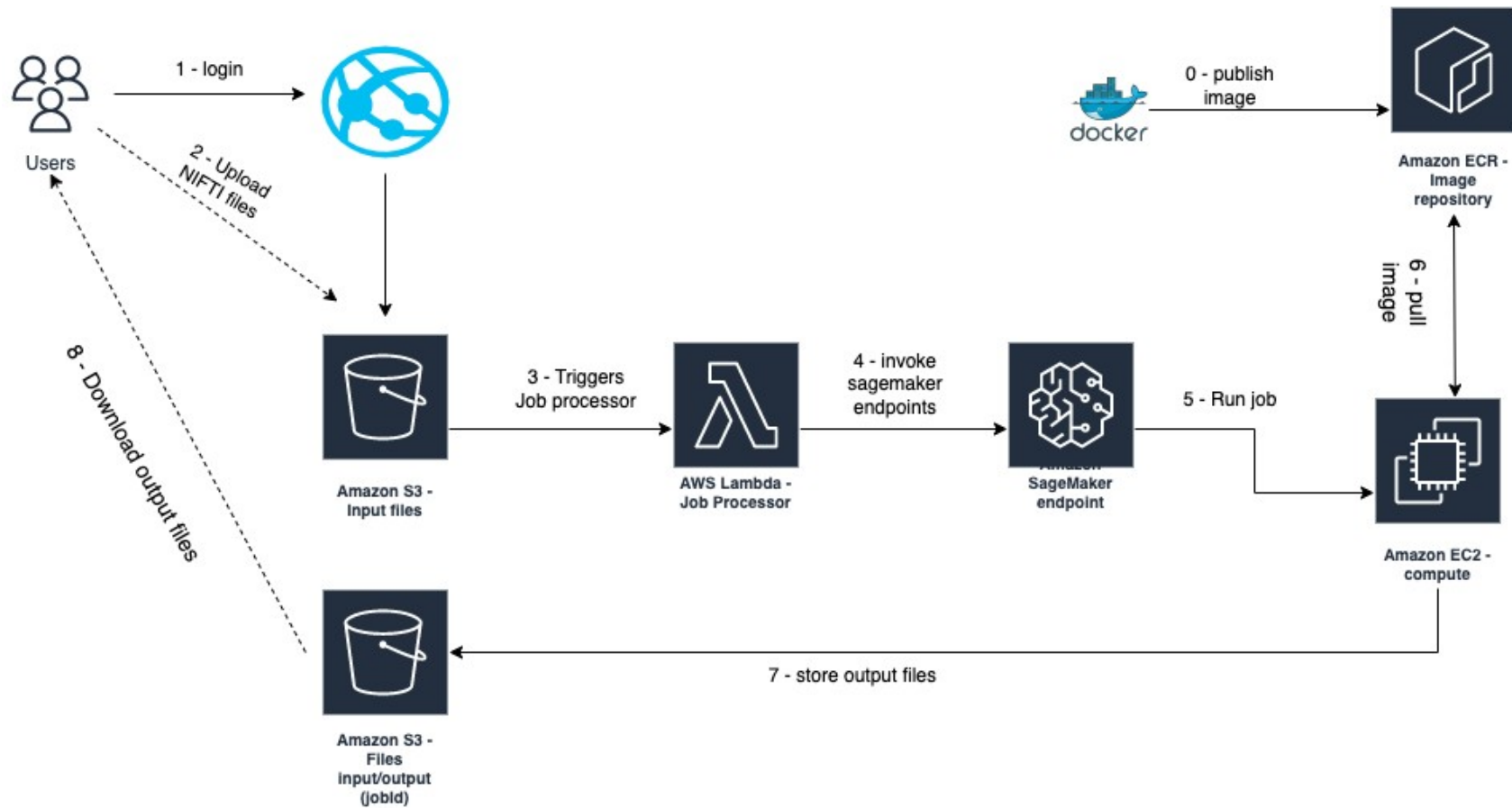
Fig 5. Architecture diagram of the web interface