

# Predicting acute health events in aging populations using Sovrinti in-home sensing data

Artificial Intelligence Technology Collaboration (AITC)  
Jan 2023 -Dec 2023 Sovrinti Research program results



## Acknowledgements

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# Sovrin IoT Solution

Automatically quantifies change in ADL patterns on an individual level

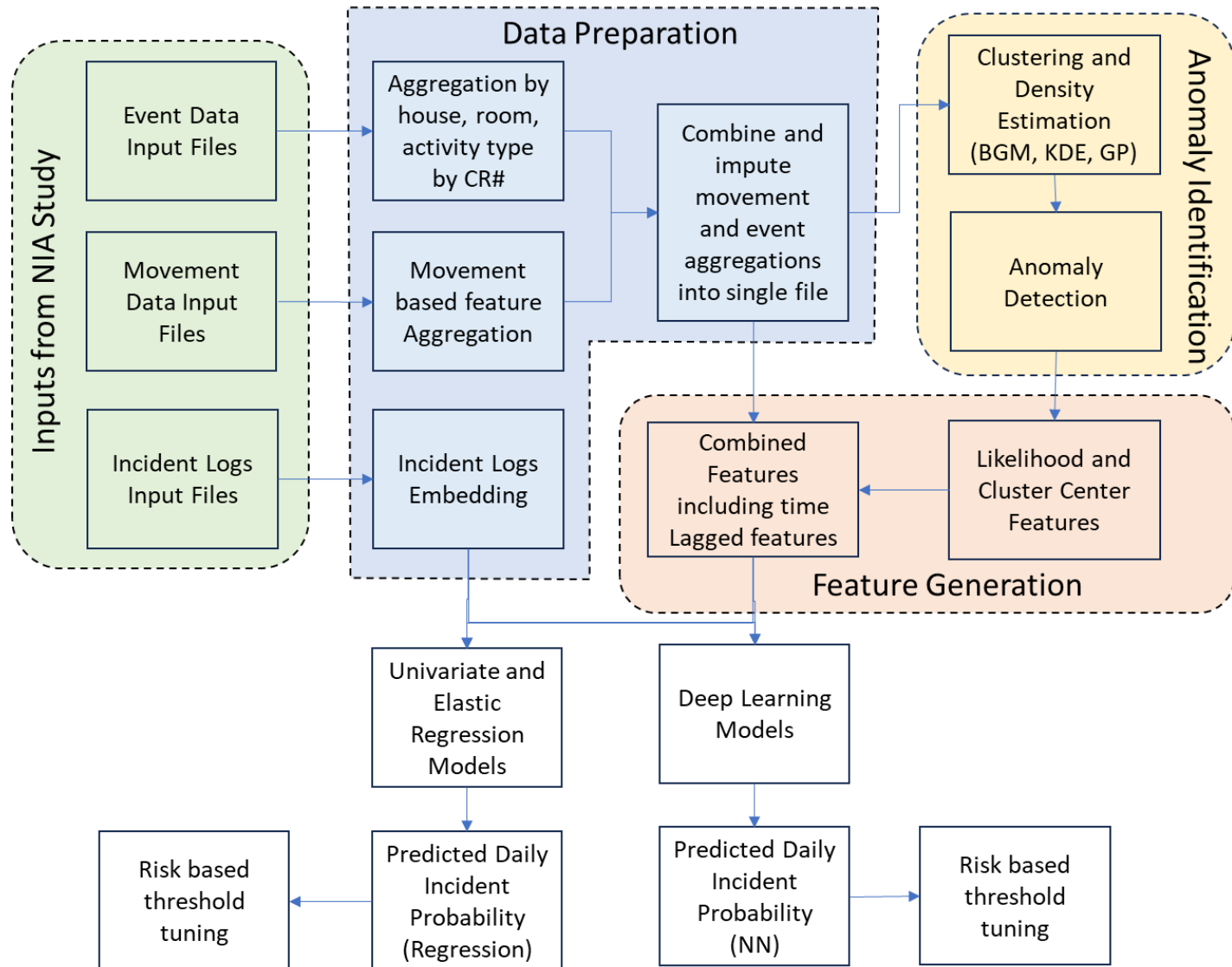
- 1 Smart power strip
- 2 Faucet temp sensor
- 3 Light sensors in cabinets, drawers, fridge
- 4 Appliance sensor for range & dishwasher

No cameras or microphones

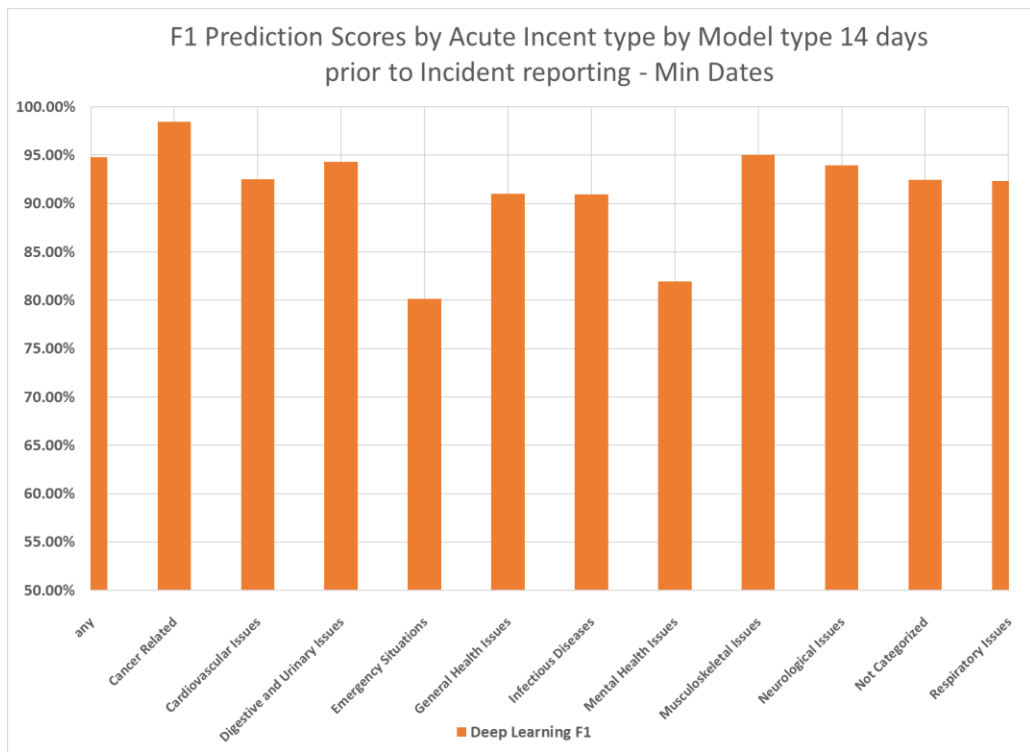




# AITC Research Program Execution

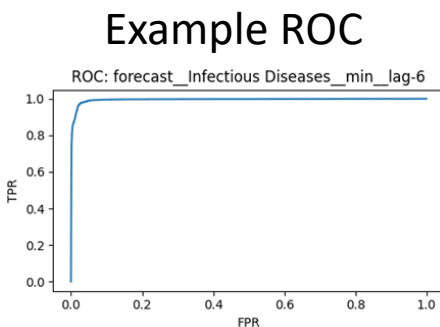


# Sovrinti Predictions of Acute Events 0-14\* days in advance of occurrence > 90% (avg. all incident types)



Acute Incident Event Groupings	Adverse Health Event Types
Cardiovascular Issues	Blood clot, Acute blood pressure issue (Blood Pressure), Acute heart issue (Heart)
Respiratory Issues	Breathing trouble, COPD, Pneumonia
Musculoskeletal Issues	Broken bone, Starting to use a cane (Cane), Fall, Starting to use a walker (Walker), Weakness, Starting to use a wheelchair (Wheelchair)
Neurological Issues	Blackout, Concussion, Corticobasal Syndrome, Confused, Seizure, Acute speech production issue (Speech), Stroke
Digestive and Urinary Issues	Bleeding, Catheter, Digestive Issues (Digestive), Dehydrated, Gallstones, Gastrointestinal issue, UTI, Kidney failure
Cancer Related	Cancer diagnosis (Cancer), Cancer treatment
Mental Health Issues	Anxiety, Newly blind (Blind), Depression episode (Depressed), Delirious, Hallucination, Unstable mood
Infectious Diseases	COVID-19, Infection, Lice, Virus, Shingles
Emergency Situations	Car Crash (Crash), Death from any cause, Dental procedure (Dental), Emergency room visit (Emergency room), EMS
General Health Issues	Acute diabetes issue (Diabetes), Diet change (Diet), Acute Fatigue (Fatigue), Heat stroke, Hospice, Hospital visit (Hospital), Hyperglycemia, Numbness, Low oxygen (Oxygen), Pain, Rehab, Sick, Surgery, Swelling (Swollen), Start of PT/OT (Therapy), Vision issue (Vision change), Vomit, Unexplained weight loss (Weight loss), Needing a higher level of care (Withdrawn)
Not Categorized	Medicine, Non-surgical procedure, Injured, Bedbound (Bed), Faint

Acute Incident Type	Max Dates			Min Dates		
	Elastic Regression F1 - max	Deep Learning F1 - max	mean positives - max	Elastic Regression F1 - min	Deep Learning F1 - min	mean positives - min
any	0.78	0.95	0.58	0.77	0.95	0.54
Cancer Related	0.45	0.98	0.02	0.14	0.98	0.02
Cardiovascular Issues	0.65	0.93	0.06	0.65	0.92	0.06
Digestive and Urinary Issues	0.62	0.94	0.13	0.60	0.94	0.12
Emergency Situations	0.58	0.75	0.05	0.63	0.80	0.04
General Health Issues	0.62	0.90	0.37	0.71	0.91	0.33
Infectious Diseases	0.55	0.90	0.12	0.59	0.91	0.11
Mental Health Issues	0.32	0.84	0.06	0.48	0.82	0.06
Musculoskeletal Issues	0.68	0.87	0.10	0.66	0.95	0.07
Neurological Issues	0.65	0.89	0.05	0.65	0.94	0.04
Not Categorized	0.58	0.93	0.22	0.54	0.92	0.21
Respiratory Issues	0.63	0.93	0.05	0.65	0.92	0.05



Note: Preliminary analysis meeting limited scope of AITC program goals – see full report @ [www.sovrinti.com](http://www.sovrinti.com) for further analysis, limitations, and next steps. \*Range is due to the average incident occurrence date knowledge error.