

ENHANCE.
ENRICH.
EMPOWER.

gondwana LLC

Ecological Defense Microservices

IoT, Platform Analytics, & Modeling to Protect Coral Reefs

#HackinSAS 2021 – [Track: Data for Good]



gondwana [gond-wah-nuh] (landmass) *noun*
an ancient supercontinent that broke up into Africa,
South America, Australia, Antarctica, India, and Arabia.

OUR MISSION

We empower our conservation customers with technology and data-driven tools - ensuring fast, accurate, & actionable insights, and safer and more effective ecological protection efforts.

OUR VISION

Protected environments that are more secure and more open, with improved biodiversity, for the benefit of society at-large.



**ENHANCE.
ENRICH.
EMPOWER.**



WHY CORAL REEFS?

PROBLEM / OPPORTUNITY

- Coral reef [*disease / destruction*] is increasing at an alarming rate.
- A variety of factors contribute to this:
 - climate change, human activity, unknowns
- Reef health factors *are* known / measurable:
 - light, temperature, salinity, sedimentation

IoT, Data Analytics, & Modeling can help conservationists more effectively protect, maintain, & restore coral reef health !

THE PAINS

- Sparse and varied data
- Limitations in actionable information
- Unknown accuracies in risk identification
- Time-delay with protection efforts
- Rapid changes in environment

HOW? – TECHNIQUES

DATA FUSION

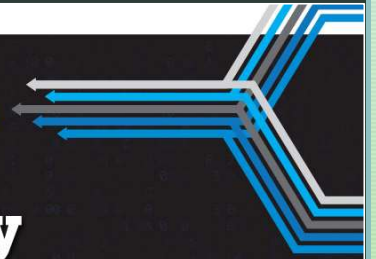
- IoT Sensor(s) (Data Stream)
- Climatology (Open Source)
- Trends (Historical / Global)

DATA CURATION

- Format / Control
- Merge
- Validate

The Unstoppable
Convergence Between

**Physical and
Cybersecurity**



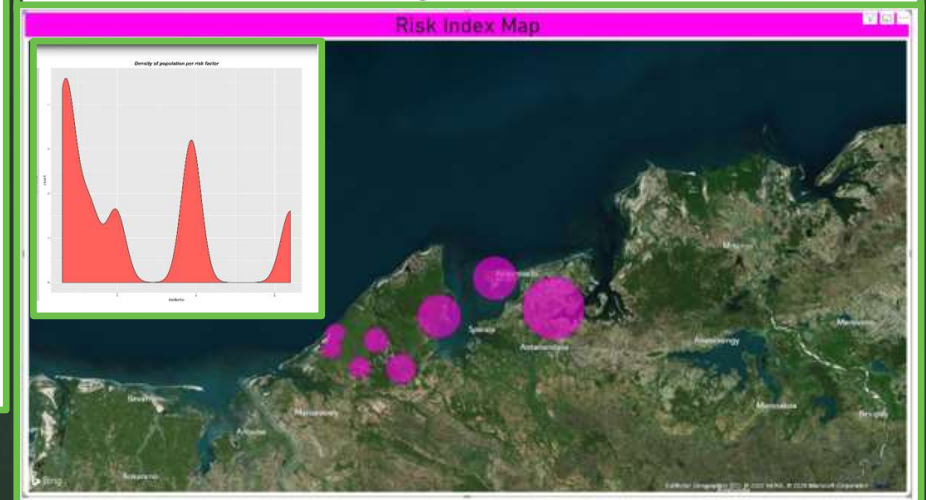
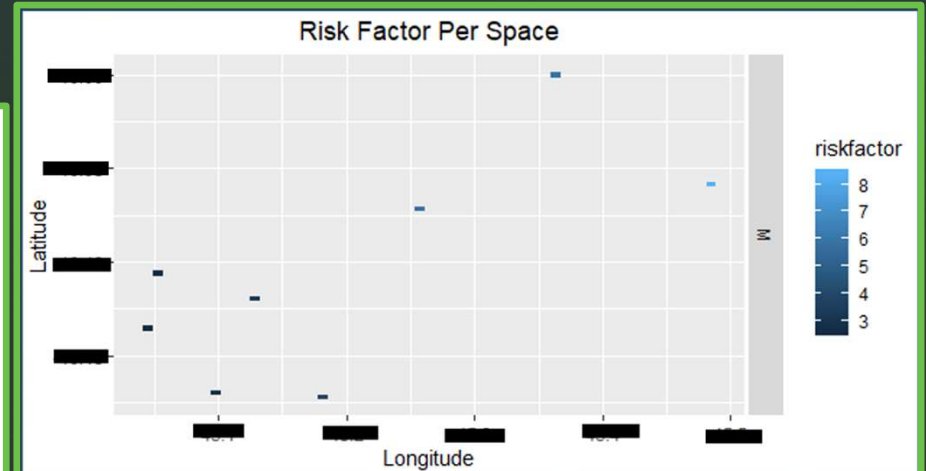
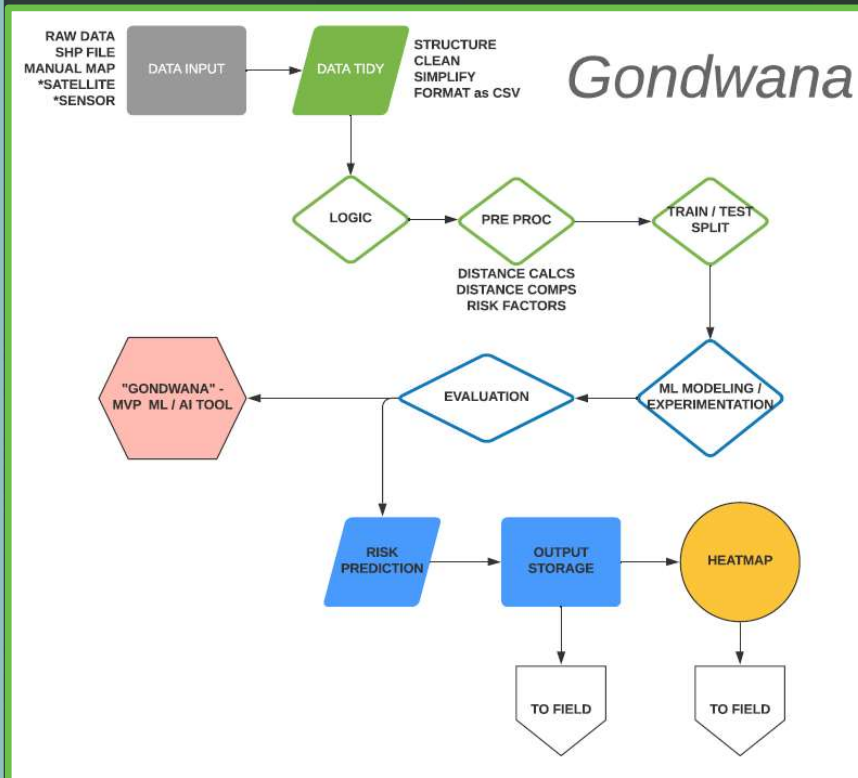
ANALYZE / MODEL / REPEAT

- Model
- Detect (Anomaly)
- Profile (Risk vs. Normal)
- Alert / Early Warning

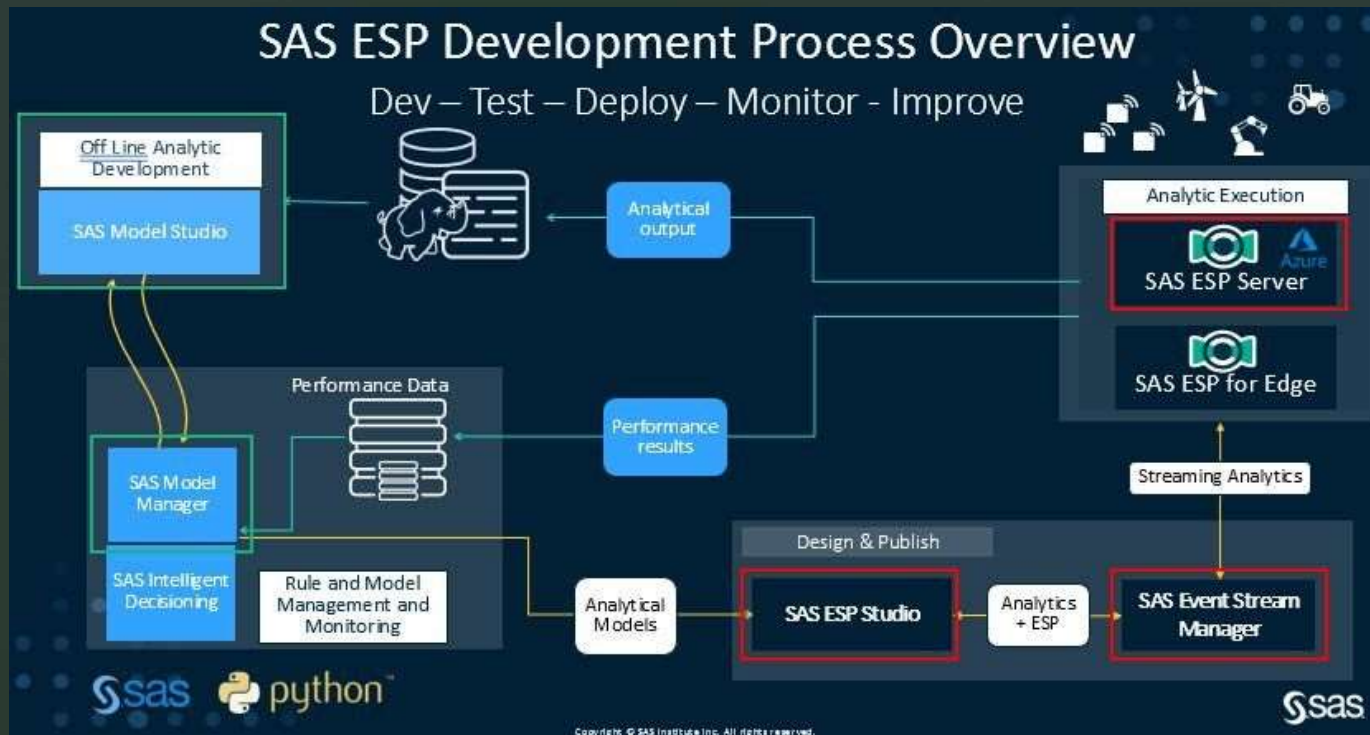
**Retrain / Iterate / Improve !
Precision / Quality !!**



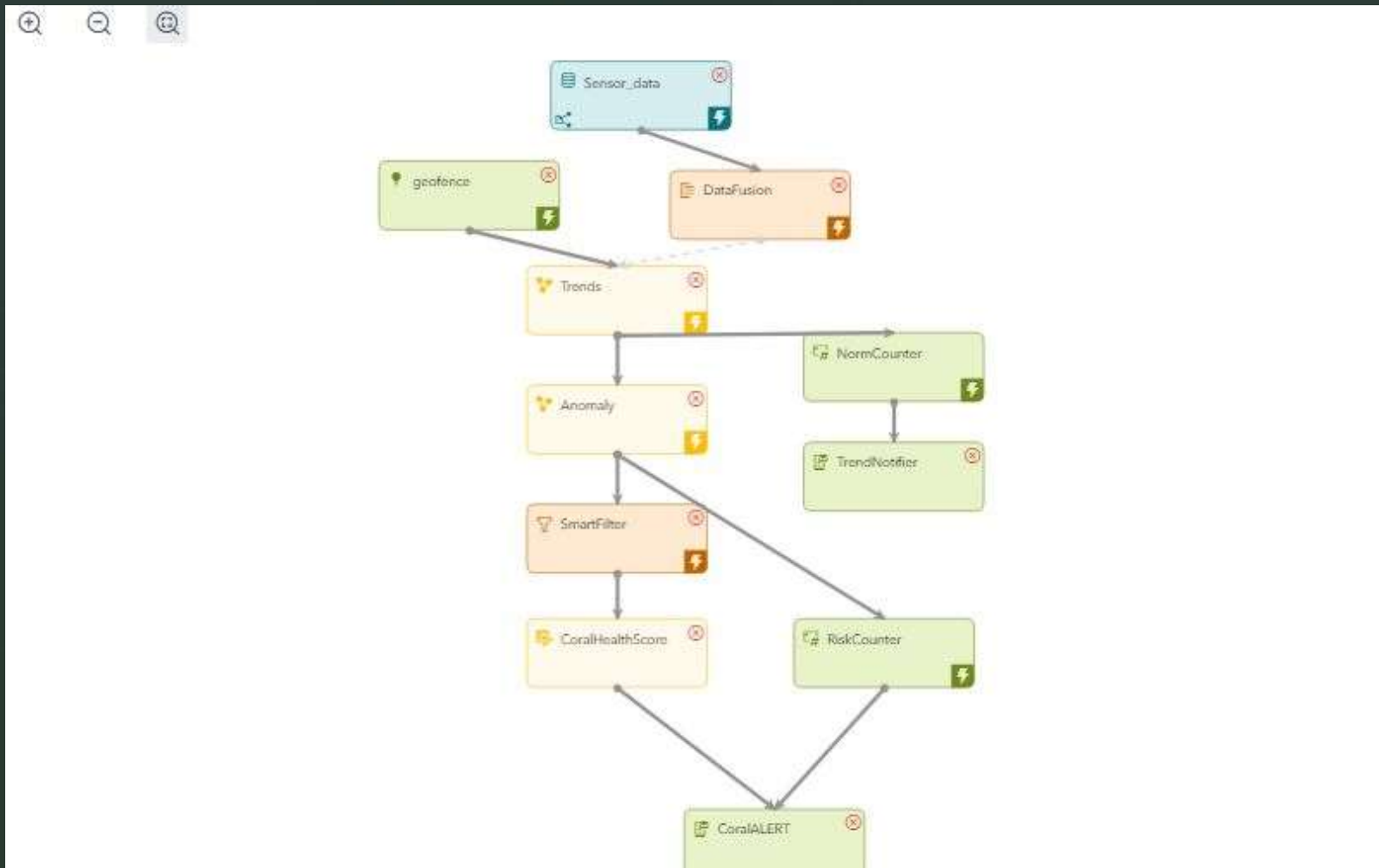
GONDWANA 2020 – SMALL SCALE / TAILOR MADE !



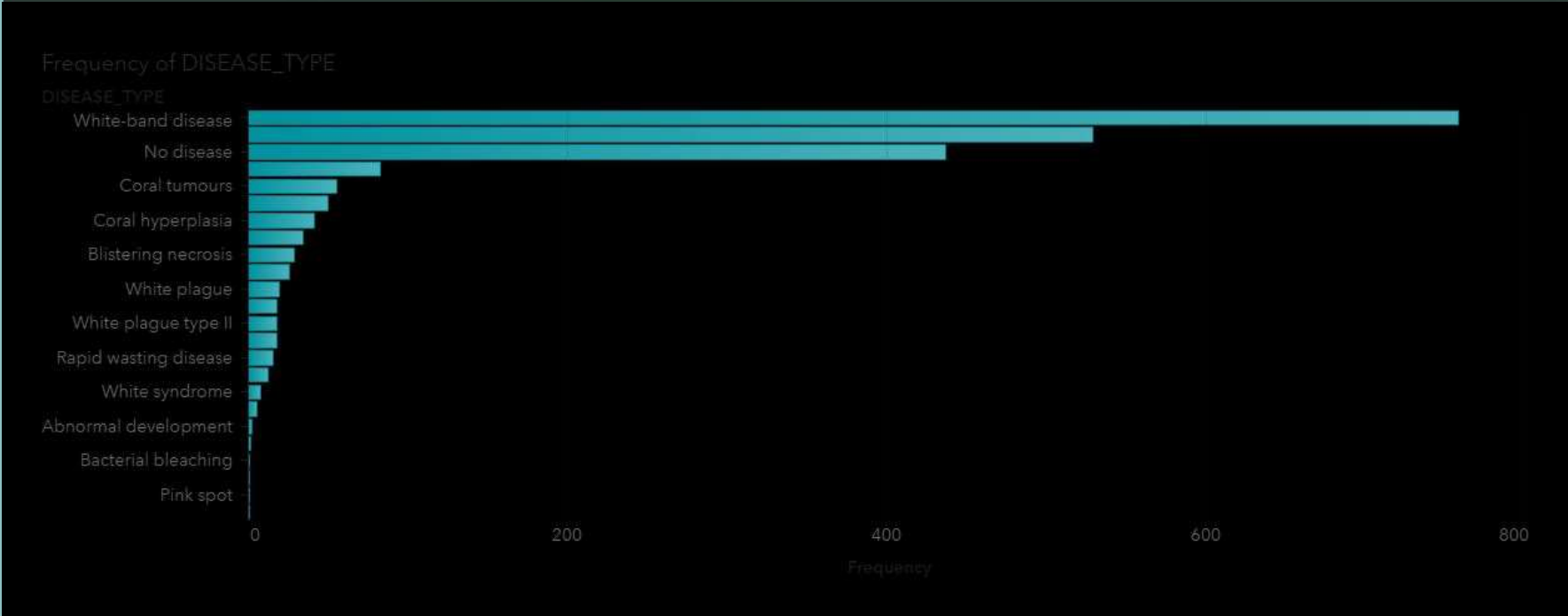
GONDWANA 2021 – PLATFORM THINKING / SCALABLE !!



WORKFLOW: SAS ESP FOR CORAL REEF IOT MONITOR / MODEL

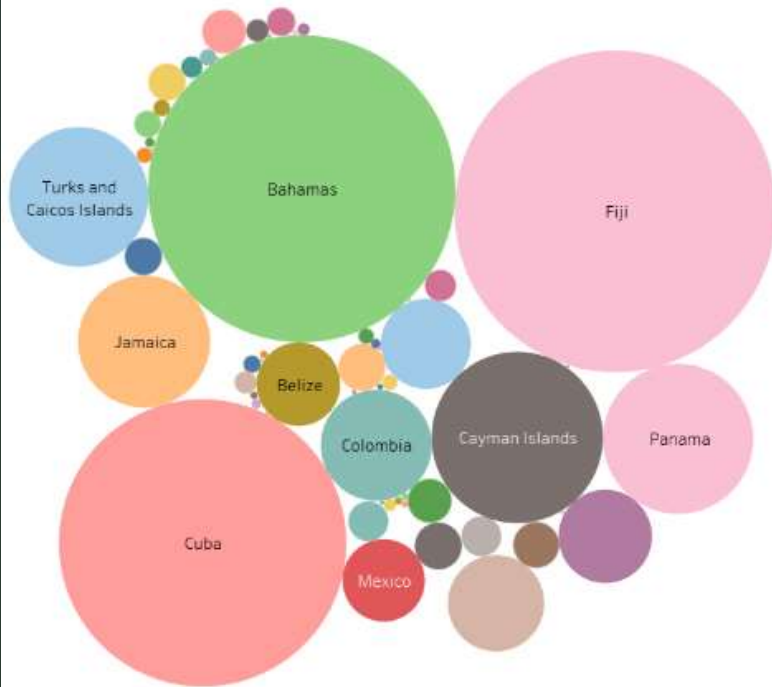


WORKFLOW: SAS VISUAL ANALYTICS

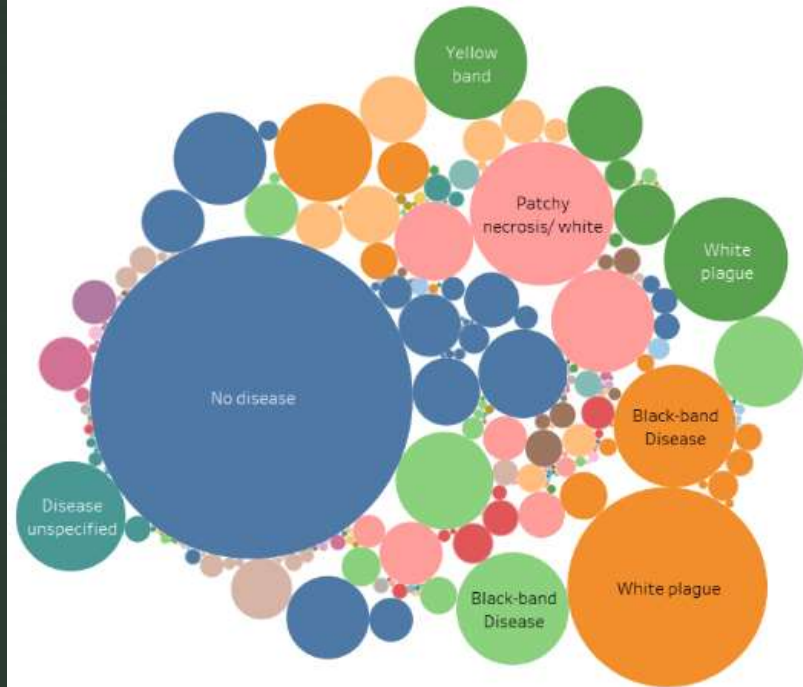


WORKFLOW: PLATFORM ANALYTICS (FASTER INSIGHTS)

Countrys



Disease Types

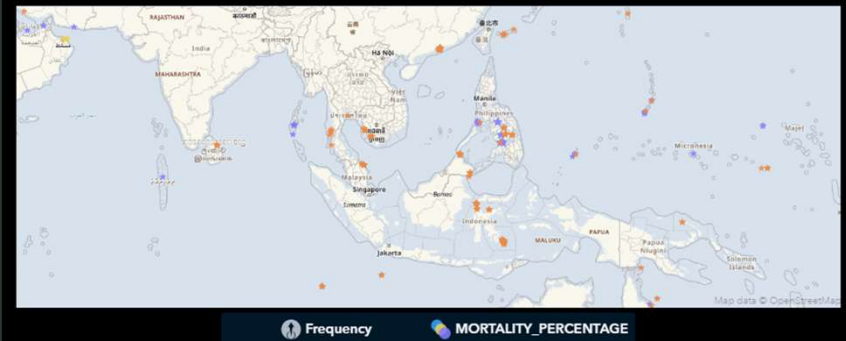


WORKFLOW: PLATFORM ANALYTICS (FASTER INSIGHTS)

PERCENTAGE_INCIDENCE by Coral Diseases_LOCATION sized by YEAR



MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency



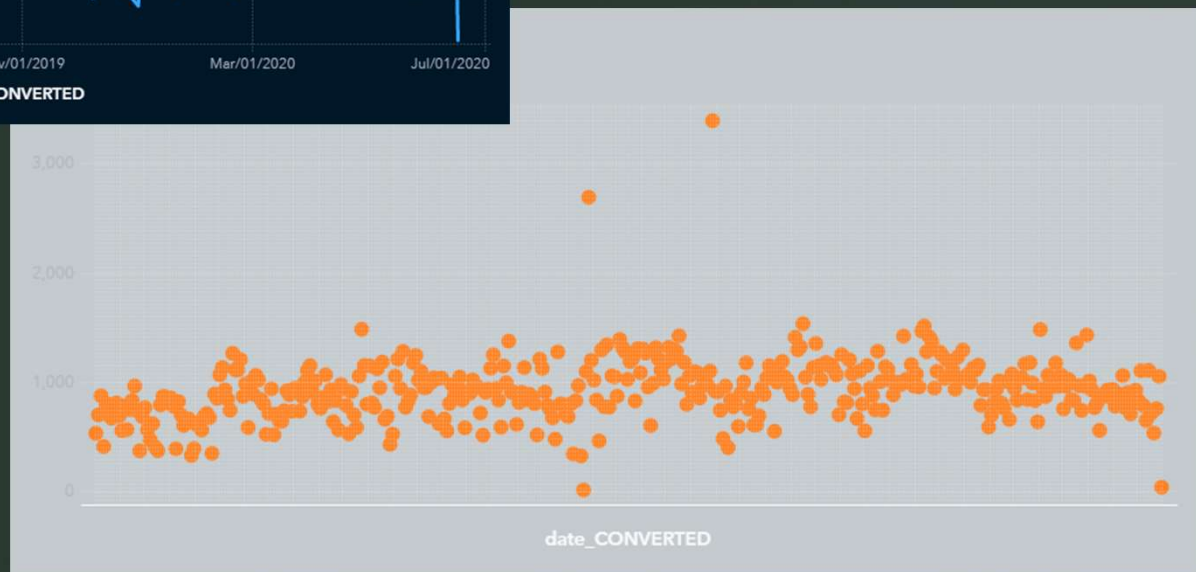
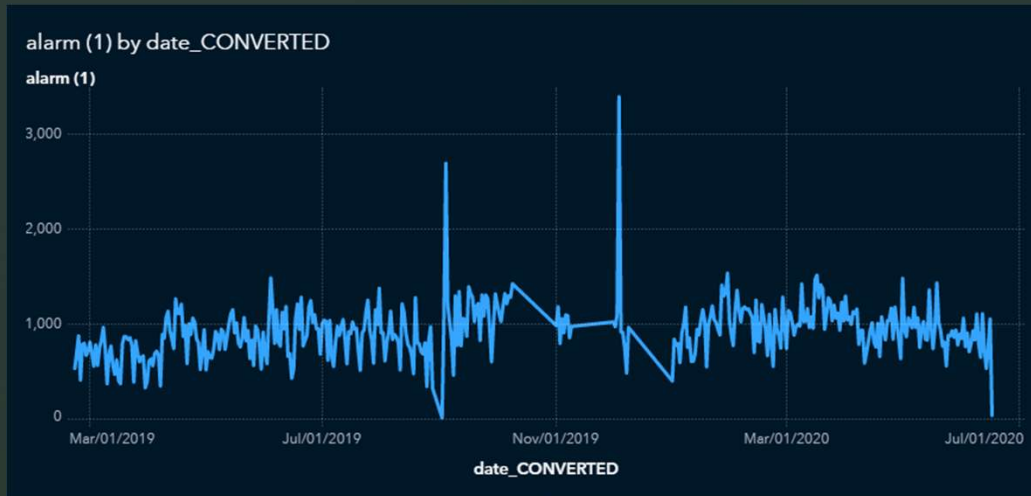
MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency



MORTALITY_PERCENTAGE by Coral Diseases_LOCATION sized by Frequency

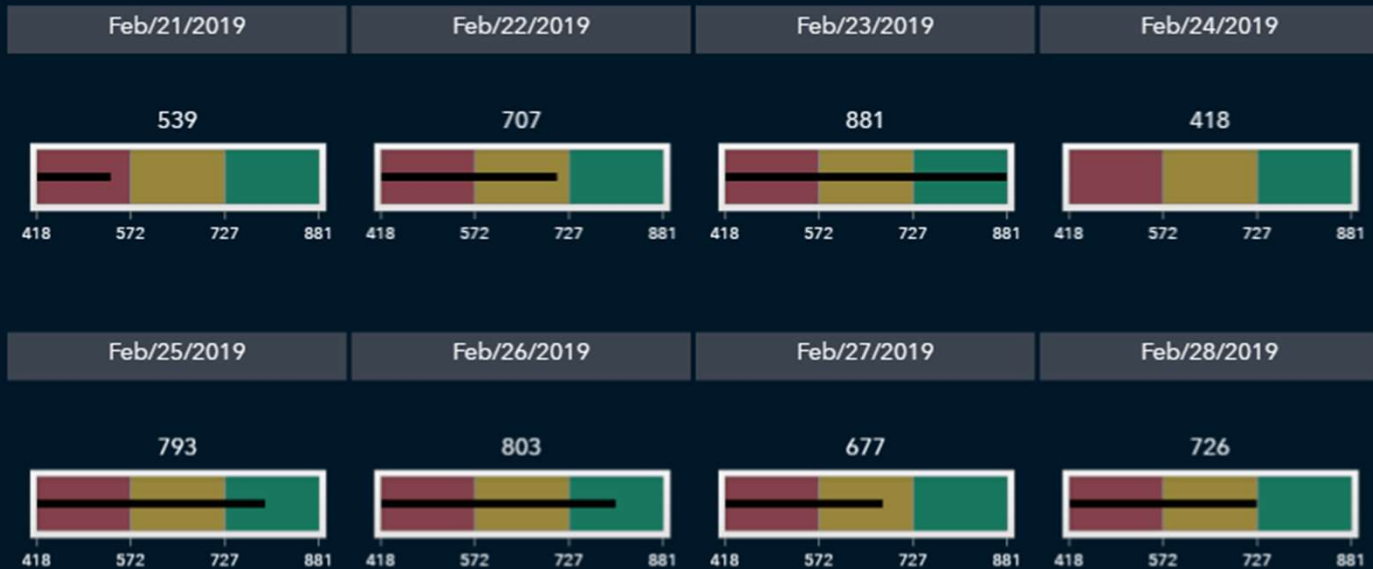


WORKFLOW: IOT/ESP ANOMALY DETECTION (IMPACT)



WORKFLOW: SAS RISK MODELING (OUTCOME)

alarm (1)



COMMERCIALIZATION POTENTIAL

Desirable

- ✓ Precision
- ✓ Quality with speed
- ✓ Domain expertise
- ✓ Interoperable
- ✓ Simple to Use

Feasible

- ✓ Usable
- ✓ Scalable
- ✓ Portable
- ✓ Iterative
- ✓ Platform Thinking

Viable

- ✓ System Agnostic
- ✓ One-Time Setup
- ✓ Robust by Design
- ✓ Low-Cost
- ✓ Plug and Play





CO-FOUNDER TEAM

Faiz Ikramulla

Operations +
Engineering

K. Vamshi Mohan

Machine Learning +
Data Science

Dipak Sunar

Product
Management +
Cybersecurity

Andrei Petrou

Business
Development +
Solutions

