Machine Learning for Navy Applications
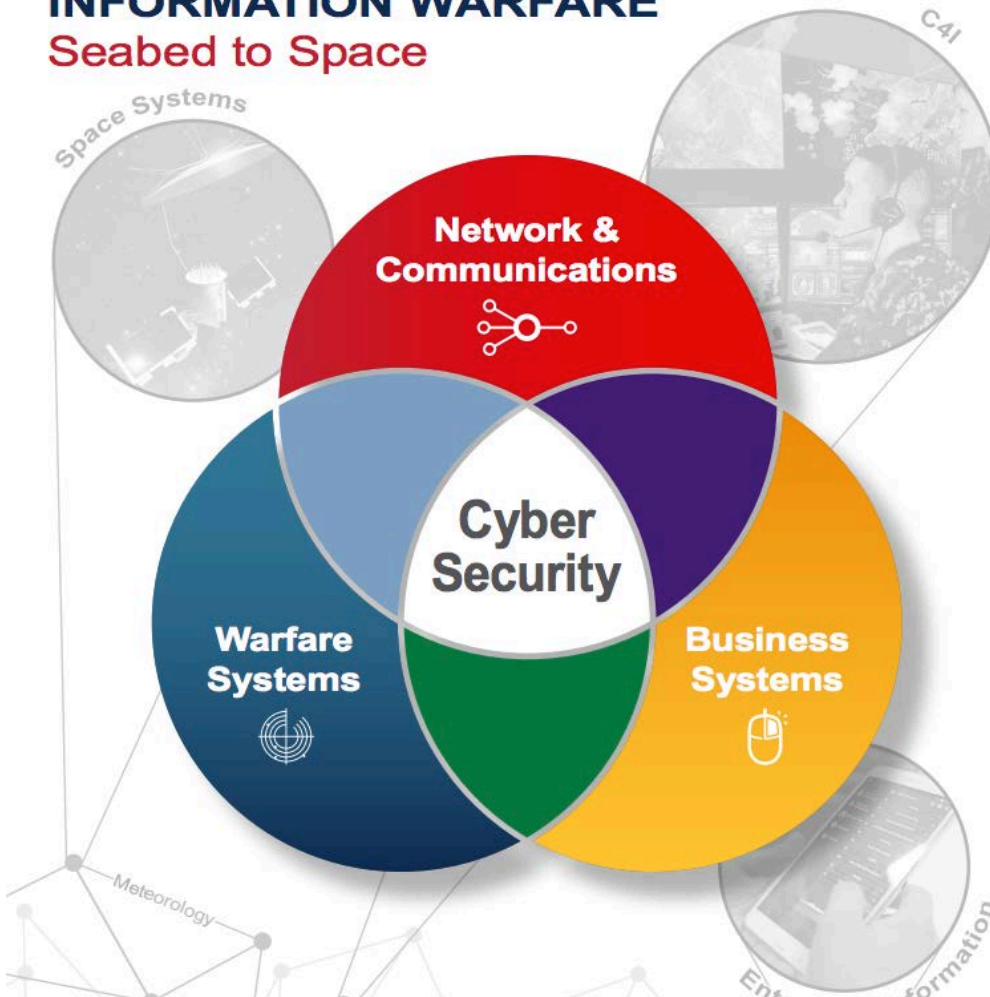
NDIA Fall Defense and Industry Forum
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INFORMATION WARFARE
Seabed to Space

Space Systems

C4I

Network & Communications

Cyber Security

Warfare Systems

Business Systems

Meteorology

"[The] era of precision and observation is giving way to an era of **competition for decision**. The sensors are now omnipresent, the positioning information is embedded, so now the competition is to orienting, finding a way through that information, and making a decision."

CNO Admiral Richardson, Naval War College, June 2017

http://www.public.navy.mil/spawar/News/Pages/StrategicVision.aspx
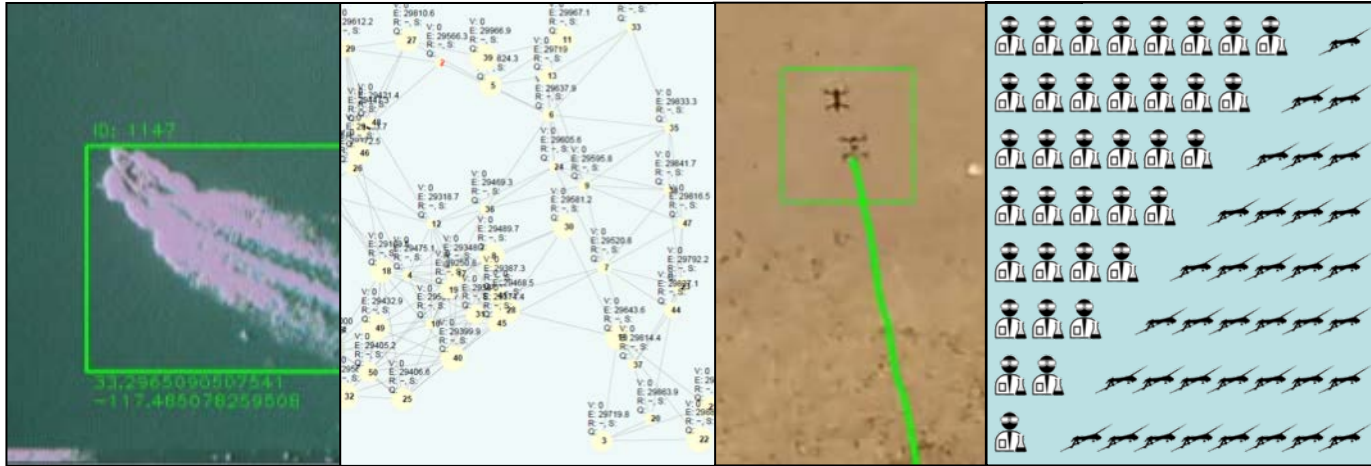
Machine Learning Center of Excellence

Computer Vision

Bio-Inspired Systems

Data Analytics

Autonomous Systems

Cyber Autonomy

Supervisory Autonomy
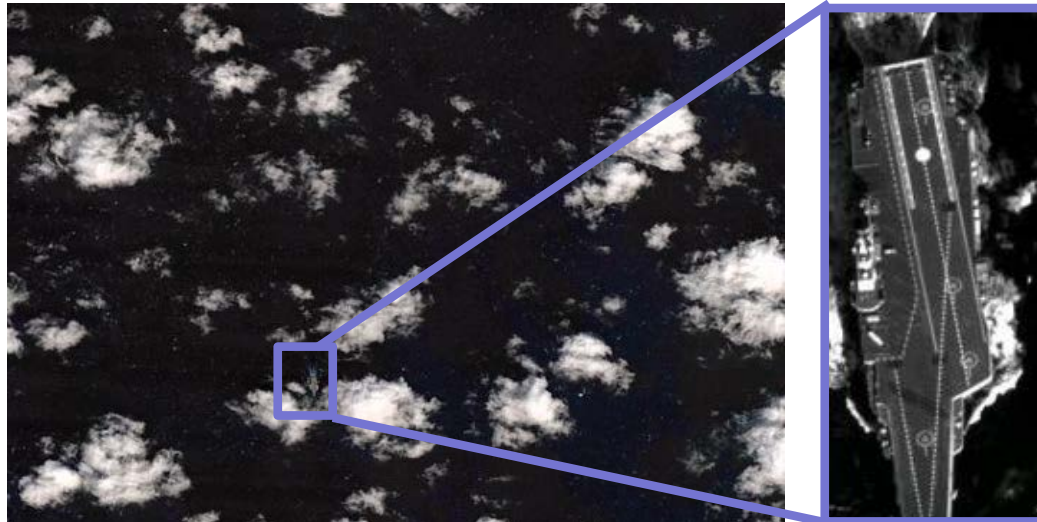
GROUP FOR HYPERDIMENSIONALLY OPTIMIZED STATISTICAL TRAINERS

GHOST

What makes machine learning hard for the Navy?

1. Data
2. Computing Environment
3. Trust

Navy data is noisy, sparse, and unstructured

Chinese aircraft carrier in South China Sea. *DigitalGlobe*

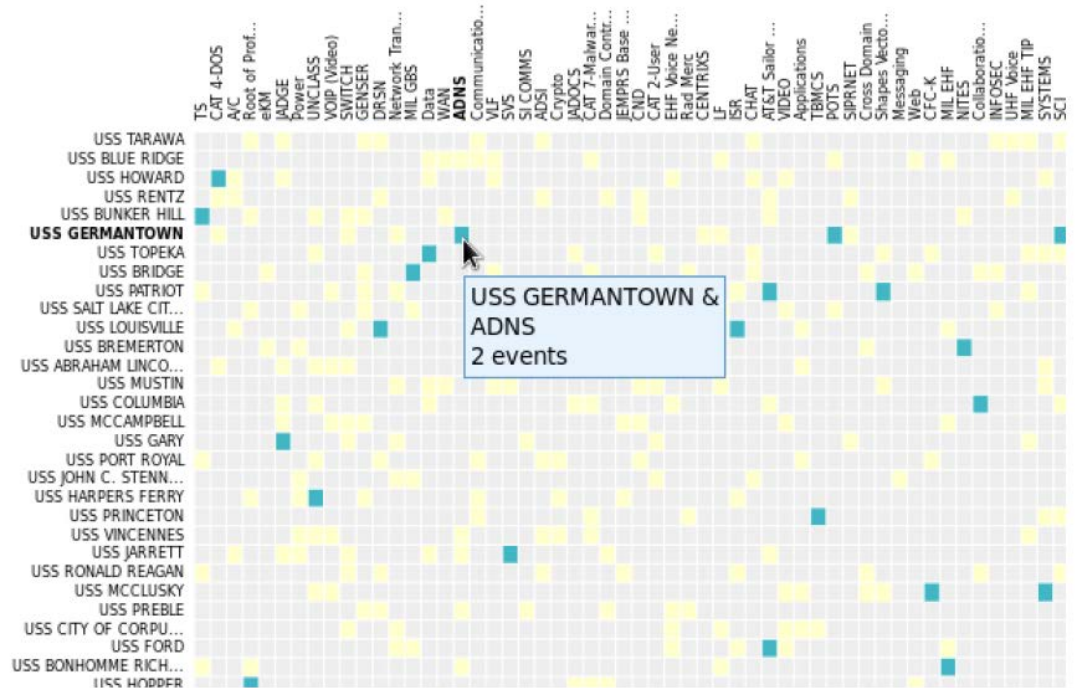# Navy data is noisy, sparse, and unstructured

Vehicles in desert environment. *DVIDS*

Navy data is noisy, sparse, and unstructured

Fisher's *Iris* dataset. *Wikipedia*

Service outage heat map.

Easier

Hard

What makes machine learning hard for the Navy?

1. Data
2. Computing Environment
3. Trust

The Navy has challenging computing environments

▼ Disconnected, Intermittent, and Limited (DIL) environments

▼ Legacy systems

▼ Data silos

▼ Multiple classification domains

▼ Unique human-machine interface requirements

DVIDS

What makes machine learning hard for the Navy?

1. Data
2. Computing Environment
3. Trust

Trust in the system is at least as important as the system itself

- ▼ Human-*in*-the-Loop vs Human-*on*-the-Loop
- ▼ Consequences when system is wrong
- ▼ Understandable failure
- ▼ Ethics of automation

When exploring machine learning for Navy applications...

▼ Use representative data

▼ Consider the system's capabilities and limitations

▼ Remember the user

Workshop on Naval Applications of Machine Learning 2018

▼ 13-15 February, 2018, San Diego, California

- Tentatively: two days S&T focused, one day operationally focused
- Short technical talks and poster sessions
- Dr. Guna Seetharaman (ST, NRL) scheduled as keynote speaker
- Panel discussions on collaboration efforts / other topics
- Potential for classified sessions / meetings

▼ Open to government, industry, academia

▼ **Now accepting abstracts until Nov. 12, 2017**

Email **mlworkshop@spawar.navy.mil** for more info

THANK YOU

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