How We Democratized Artificial Intelligence with Acumos AI

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Linux Foundation Deep Learning Foundation (LFDL)

Linux Foundation Deep Learning Foundation is driving open source innovation in, and enabling use of, Artificial Intelligent by building and supporting an ecosystem of Artificial Intelligent / Machine Learning / Deep Learning projects, and we would like you to participate in our growing community.
LFDL goals

- **Accelerate** the development and adoption of Artificial Intelligent / Machine Learning / Deep Learning

Enable Artificial Intelligent / Machine Learning / Deep Learning that is **easy to implement and use**

- **Create** an ecosystem of collaboration for developers and users
The power of machine learning
Before using machine learning
Long process, skill dependent

Medical diagnosis A
Medical diagnosis B

Fracture of the 3rd rib
No fractures

X-Ray technician

Medical diagnosis A
Medical diagnosis B

Fracture of the 3rd rib
No fractures

X-Ray technician
What is machine learning?

Fracture of the 3rd rib

No fractures

Trained algorithm

Medical diagnosis
Before using machine learning
Long process, Skill dependent

HR specialist

Moving forward

Reject

Recruitment decision
CV A

Recruitment decision
CV B
Resume analysis

Moving forward

Reject

Further analysis

Trained algorithm

Hiring recommendation
Before using machine learning
Long process, skill dependent

1. Network diagnosis A
   - Network technician
   - Scale out

2. Network diagnosis B
   - Divert traffic to DC X
Applying machine learning to networks
Simplified view

- Span new VM
- Migrate service
- Load balance

Trained algorithm
Network solution
Applying machine learning to networks

Advanced view

FW Load – Scale out

New network status

Trained algorithm

Network solution
Breaking the information silos
Acumos overview

1. Create and on-board model
   - TensorFlow
   - H2O
   - Apache Spark

2. Enhancing model with application data sets
   - Training dataset
   - Training/testing lifecycle

3. Sharing models in Marketplace
   - Search
   - Review
   - Chaining
   - Rating★★★★★

4. Execute in target environment
   - AI Application (Docker)
   - Runtime Systems

Connecting data silos
Micro services & cloud
Reduce dependency on data scientists
Open source
Acumos – training and running an AI model

1. developer selects a model
   - AI models

2a. “Bid” for data
   - Data Owner A: $0.09
   - Data Owner B: $0.08
   - Data Owner C: $0.05

2b. Use data to train a model (Predictor)
   - Data Owner C: $0.05

3. Wrap trained model, as docker image & publish in marketplace

4. Create AI application (Docker Image file) for runtime
   - Customer runtime environment
     - Medical diagnosis

- Medical diagnosis
Acumos: a distributed, federated model for better business flexibility

Acumos Instance: download the framework from acumos.org, install on your own environment, enhance with models

On board data sources for training models and creating predictors

Acumos Marketplace provide access to catalogs in any local instance. Users can examine, compare, discuss and explore components developed on different instances

Selective sharing of proprietary components, published into specialized catalogs
Before using machine learning

**A patient is in severe pain**

**Question**: define the key problem to solve

Examine all available medical information by multiple physicians

Combine to one medical diagnosis
Acumos Marketplace

Marketplace

BROWSE BY
Search here

Filter By Category
- Prediction
- Classification
- Regression
- Data Transformer

Tags
- Topic Modelling
- ATT-Image Classification
- Cross Sell
- Face
- Image
- Digital Customer Segmentation

Showing - 7 Models

- Topic Modelling Model
- Image classification
- Cross Sell
- Customer Segmentation
- Face Privacy Filter
- Face detection
- Image mood classifier
Acumos federation

Sharing with the whole Acumos federation

Sharing with selected members

External Marketplace Company A

Internal marketplace

External Marketplace Company B

Internal Marketplace

Linux Foundation marketplace
Artificial-intelligence-assisted network orchestration
Real live scenarios are complicated…
Network orchestrator
Applying AI on network orchestration

Network Orchestrator

DCAE collectors

Network AI

DCAE

Network Operator
Applying AI on network orchestration – example

Network Orchestrator

DCAE collectors

FW Load

Scale out FW

Network AI

DCAE

in the AI mind…

Scale out FW
Applying AI on network orchestration – example

Network Orchestrator

DCAE collectors

Network AI

DCAE
Acumos

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3. Sharing models in Marketplace
4. Execute in target environment

- Training dataset
- Training/testing lifecycle
- Enhancing model with application data sets
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- Review
- Chaining
- Rating ★★★★★

- Connecting data silos
- Micro services & cloud
- Reduce dependency on data scientists
- Open source

Information Security Level 2 – Sensitive
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Example use cases – AI in networks

- **RF coverage**
- **NW Consumption**
  - Usage vs. Time
- **Cloud zone load**
- **Customer NW experience**

Predictor

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Example use cases – AI in networks

RF coverage

NW Consumption

- Usage
- Time

Cloud zone load

- Preload to DC X
- Postpone NW backup to weekend

Customer NW experience

- Migrater service from Zone A to zone B
- Scale out
Summary

• Linux Foundation is **democratizing** Artificial Intelligent, Machine Learning and Deep Learning allows any small company / data owner to play in this game

• Those technologies **reduce the time and resources** required for handling **real time** network issues as well as **proactively identify and prevent** them
Thank you