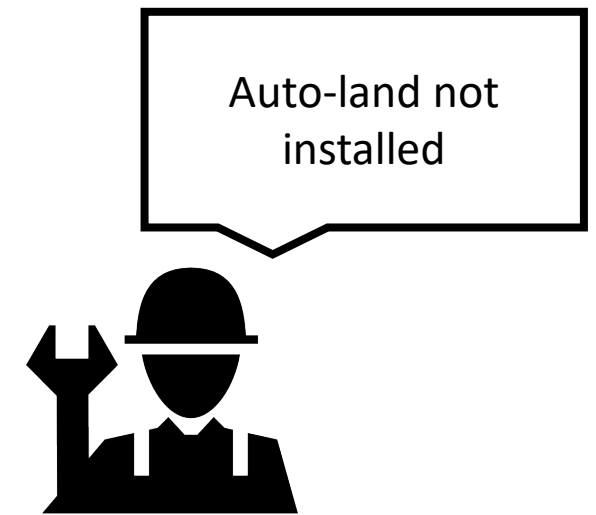


# ATA Auto Coder

**Challenges, Approaches, Implementation and Success**

# Agenda

- What is Coding
- The benefits of coding
- Historical Approaches
- Initial AI/ML Approaches
- AIXI
- Knowledge Transfer
- AIXI's Approaches
- Integration and Rollout
- The Future



# Passion and Technology



Cameron Byrd

CEO / Co-Founder AIXI / Private Pilot

- Born a Computer Science Engineer
- BS in Computer Science and Engineering w/ Minor in Math from Bucknell University
- Raytheon - TS-SCI clearances
- Became an instrument rated private pilot
- Flew and maintained a Lancair IV-P
- Literally walked into Artificial Intelligence by chance
- Saffron Technologies -> Intel
- Started AIXI

# Experience



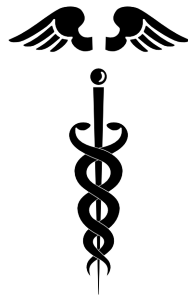
Oil and Gas



Defense



Finance



Medical

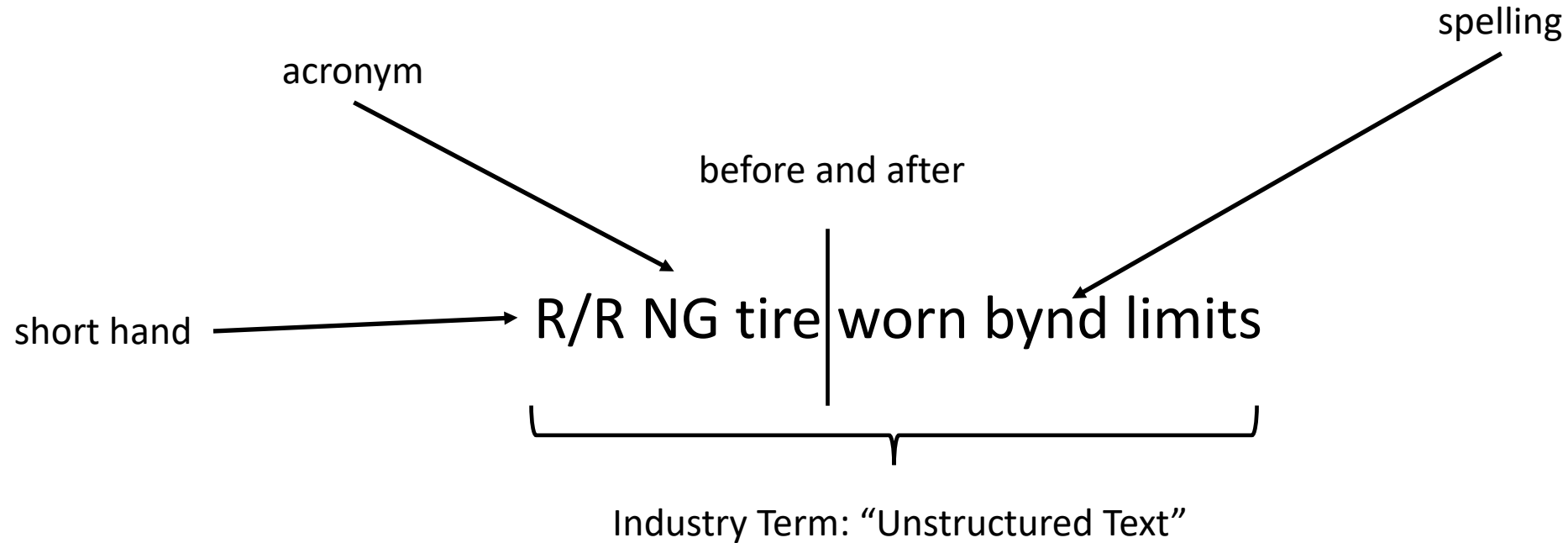


Aviation

AIXI

Southwest

# What is Coding: Understanding a log entry?



# What is Coding: Structuring the unstructured?

R/R NG tire worn bynd limits



- ATA: 3245
- Failure Mode: Worn
- Object Code: Tire
- Action Code: Replaced

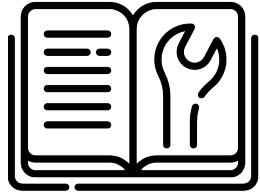
# The Benefits of Coding

## Data Normalization

FAA - 1956



ATA Spec 100



Maintenance Manual



### Current State

- Quick accurate search
- Root cause Analysis

### Future State

- Anomaly detection
- Predictive maintenance
- Prescriptive maintenance



### Efficiencies



- Improved Safety
- Happier customers
- Improved efficiencies
- Reduced downtime
- Cost savings

Peter Kivetsu

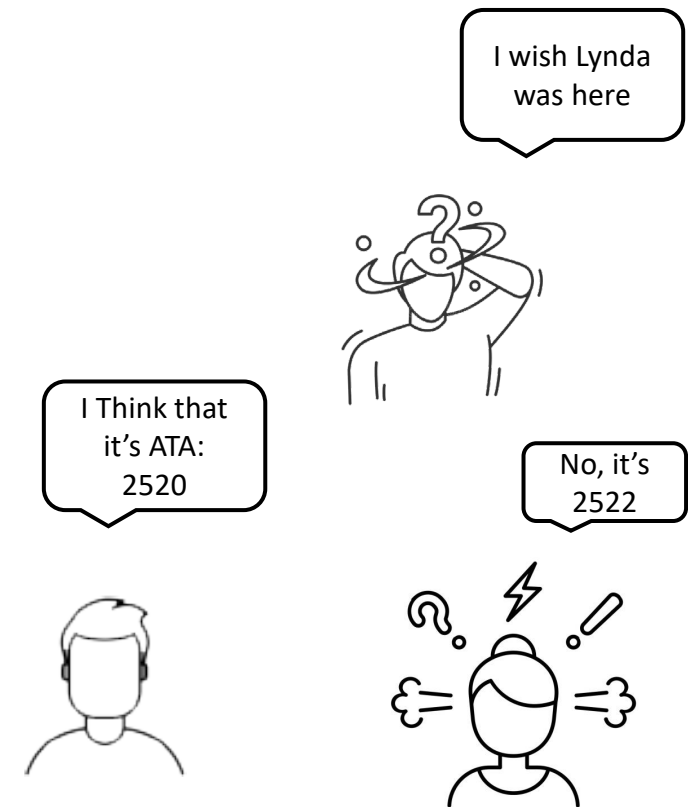
“Spec 2000 Gets Data Ready for AI”

“Quality and Consistency of Data is Important”

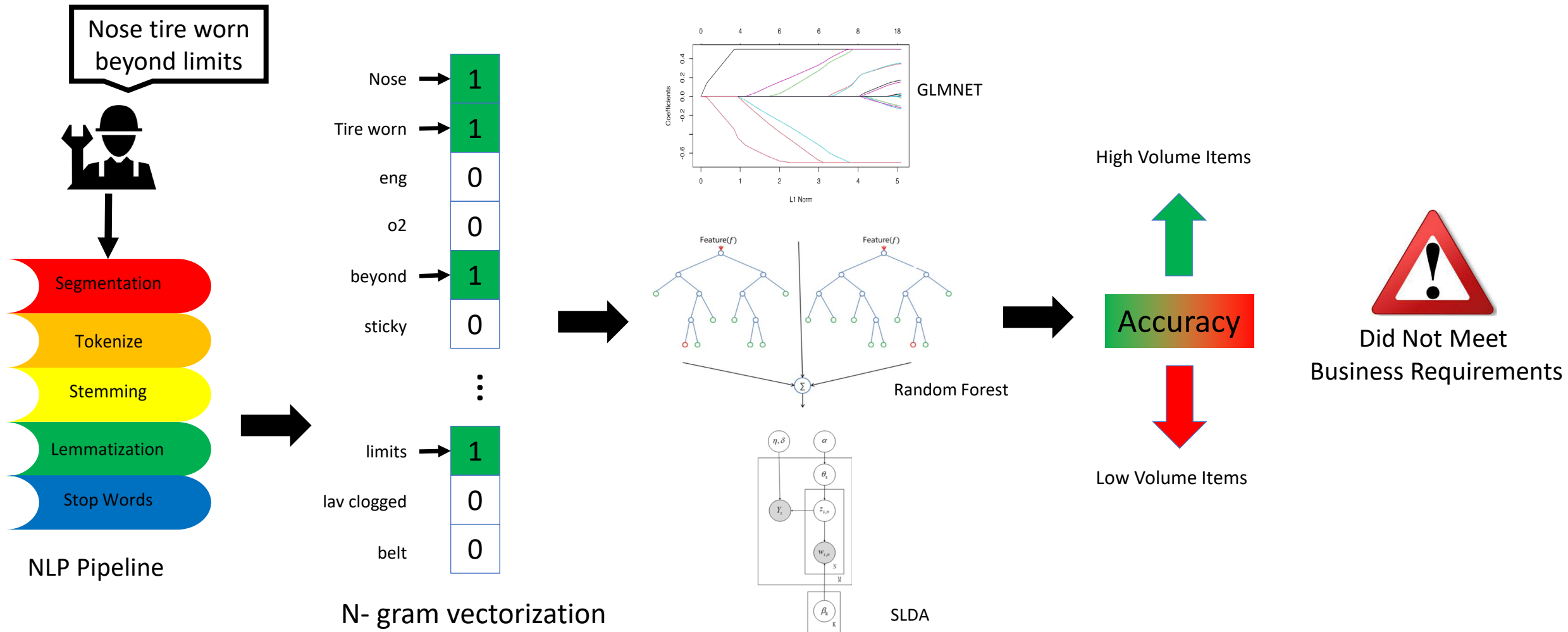


# Historical Approaches to Coding

- Lynda – coding by hand
  - Memorized codes
  - 1000s of records a day
  - Consistent
- Multiple coders replaced Lynda
  - Require training
  - Inconsistent
  - Human error
  - Expensive
  - Time consuming



# Initial AI/ML Approaches



# Introduce AIXI

# Knowledge Transfer

- Deep dive in person
- Intensive
- Meeting people
- Understand Process

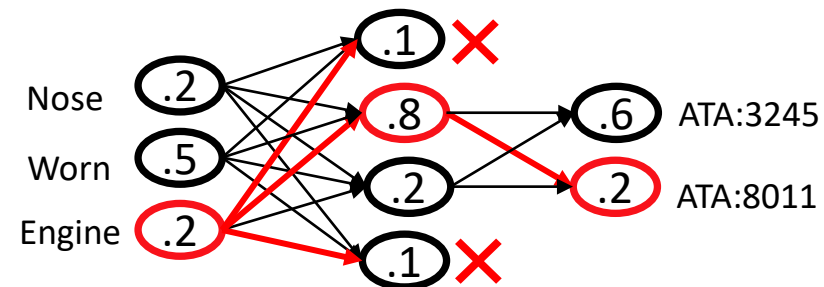
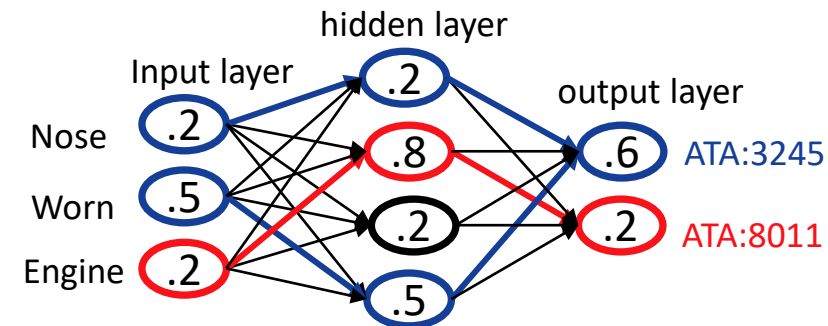


- ATAs
- Custom fields - 2018
  - Object\_code
  - Failure\_mode
  - Action\_code

# AIXI's Approaches

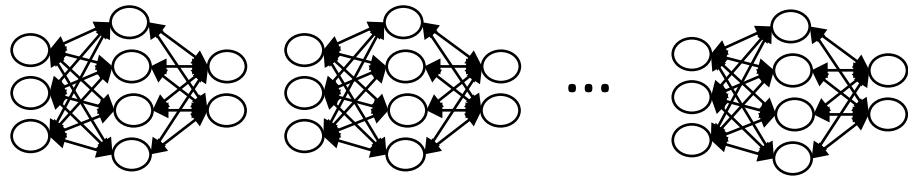
- K-Nearest Neighbor
  - Simple bag of words matching
  - Fast
  - 62% accuracy
- Neural Networks / Deep Learning
  - Slow
  - 90% accuracy
- FastText – FaceBook AI Research
  - Faster
  - Approximation
  - 90% accuracy – No improvement

word	word	word	word	word	LABEL
Nose	Tire	Worn	Beyond	Limits	ATA:3245
Tire	Worn				ATA:3245
Engine	No	Start			ATA:8011



# AIXI Approaches

Many Different Bidirectional Neural Networks



Big Hardware



Weeks to Build Model Language

Input Encoding

Input Embedding [ "Nose", "Tire", "Worn", "Beyond", "Limits" ]  
Encoded ( [ 1 , 2 , 3 , 4 , 6 ] )

Determine Positional Importance

"Nose"	Focus →	[ "Nose", "Tire", "Worn", "Beyond", "Limits" ]
"Tire"	Focus →	[ "Nose", "Tire", "Worn", "Beyond", "Limits" ]
"Worn"	Focus →	[ "Nose", "Tire", "Worn", "Beyond", "Limits" ]
"Beyond"	Focus →	[ "Nose", "Tire", "Worn", "Beyond", "Limits" ]
"Limits"	Focus →	[ "Nose", "Tire", "Worn", "Beyond", "Limits" ]

95% - 99%

\*depending on category

# Vitali Volovoi

## “80/20 Rule”

# Success

Kicks Ass!!

- 2 Months into Productions
- High Accuracy and Expecting Higher as it Learns
- Time/Cost Savings

Our first accuracy test was designed to contrast human coders with AIXI's platform, but we ran into inconsistency problems with the humans.

We've gained 80 hours per week



# Conclusion

# Questions



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