

# **Using Collective Knowledge (starts with Data-Entry)**

## ***Focusing on the Inputs for the Data Sciences***

Software for Analytics, Diagnostics & Search

(Examples: Automotive & Healthcare datasets, among many others)

**Nandit Soparkar**

**Ubiquiti Inc.**

**Ann Arbor, MI**



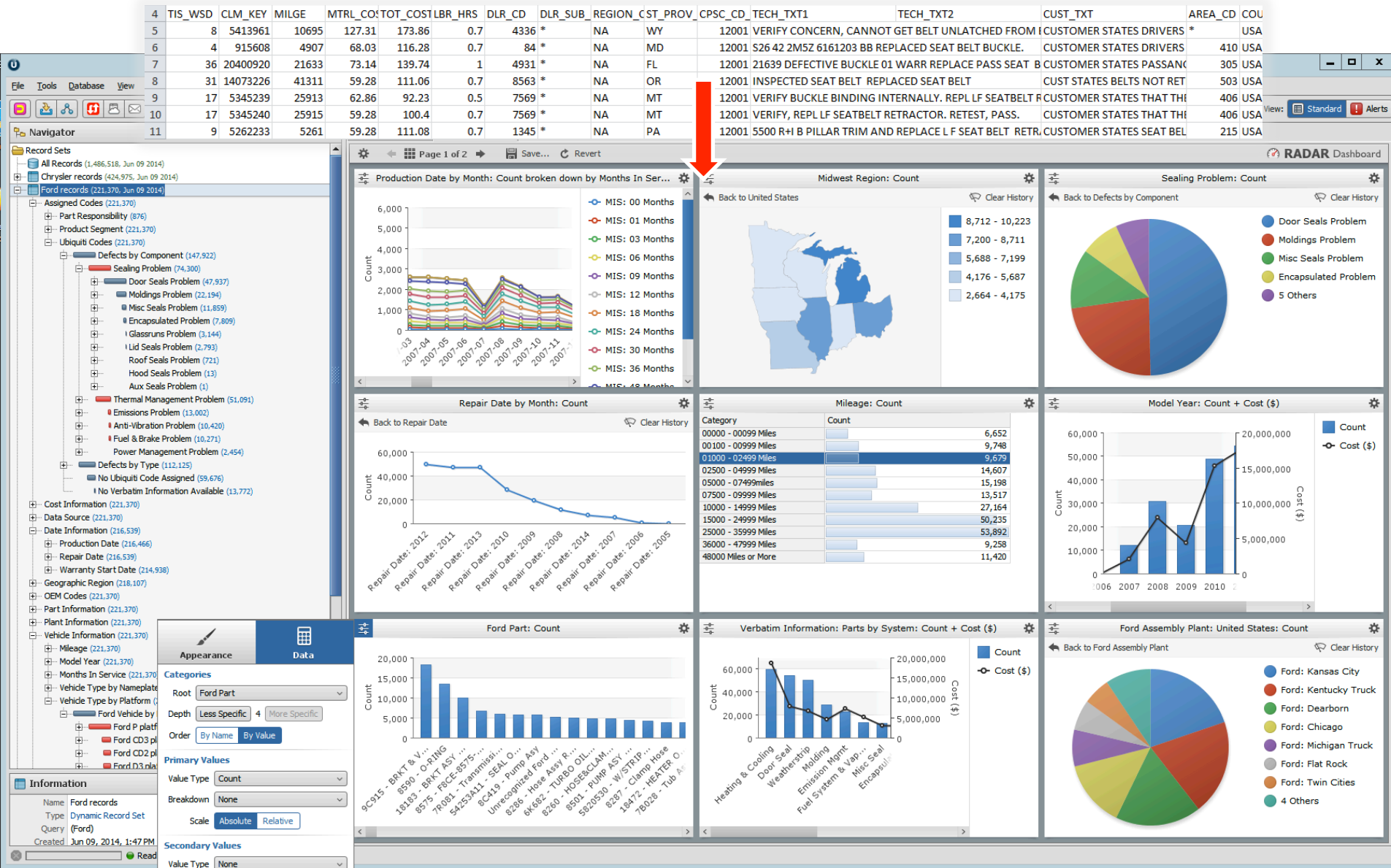
Science, 2/11



**Data → Information → Knowledge**

courtesy Prof. Pramod Khargonekar, currently heads NSF Engineering Directorate, previously Dep. Director for Technology at ARPA-e, detailed from UFL

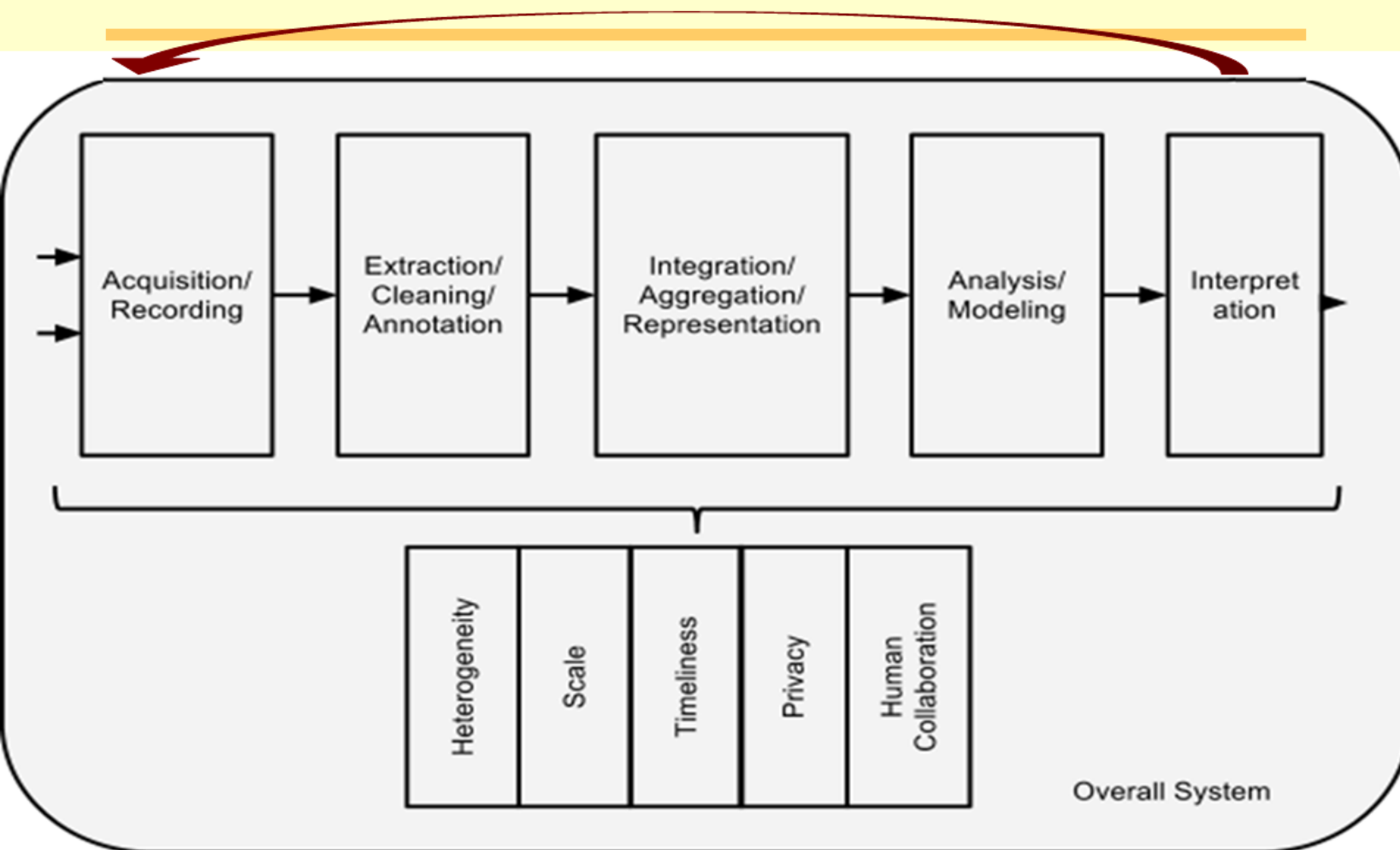
# Ubiquiti Analytics: Raw Data to Actionable Info



# Big Data: It's Not Just the Analytics

Prof. H.V. Jagadish ... UMich, Ann Arbor

## More Involved ETL

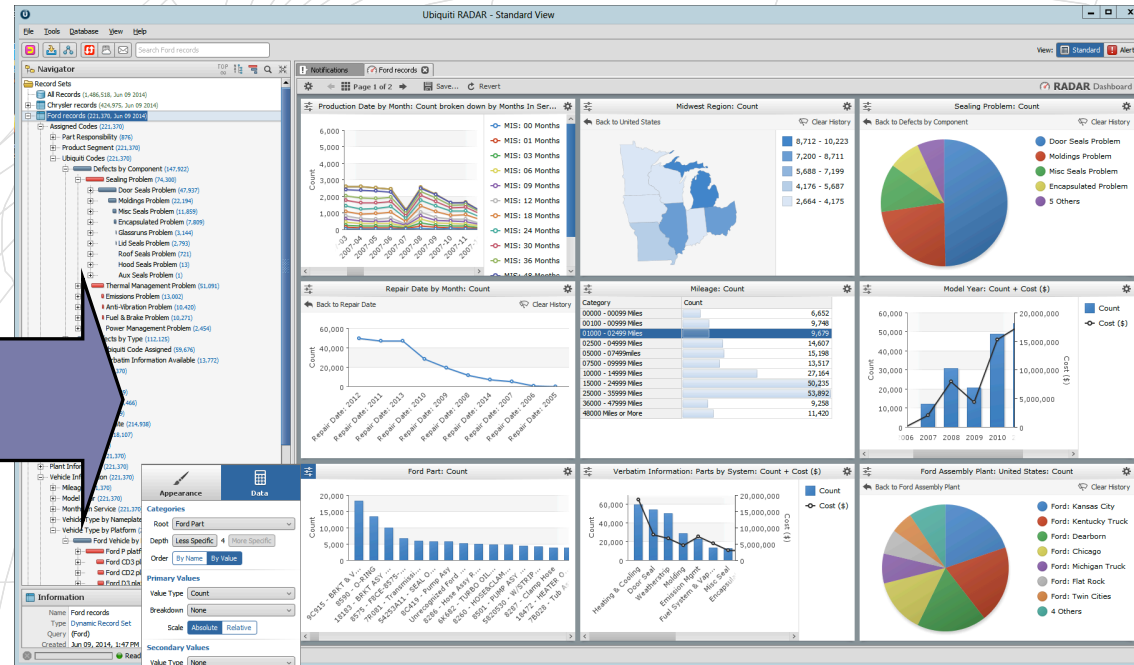


# Under-served, yet Crucial: Data-entry

Entered: “7 DD40 BASC 54566 CK OUT AC INOP  
PREFORM PID CK CK PCM PID ACC CK OK OPERAT ING  
ON AND OFF PRE FORM POWER AND GRONED CK AT  
COMPRESOR FONED NO GRONED PREFORM PINPONT  
DIAG AND TRACE GRONED FONED BADCO NECTION  
AT S778 REPAIR AND RETEST OK CK AC OPERATION”

## Automated Coding / Indexing:

- Primary Group: Electrical
- Subgroup: Climate Control
- Part: Connector 1008?
- Problem: Bad Connection
- Repair: Reconnect
- Location: Engin. Compartment



# Ubiquiti Strategic (now Tactical) Market Sizes:

Automotive: Essentially unshared

1. Warranty Booking & Admin: **>\$0.75B**
2. Universal CarsFix auto-coding: **>\$1B**
3. Service & Maintenance Marketing: **>\$5B**
4. Online Analytical Repair Diagnosis: **>\$10B**

Healthcare: At least ~10x of Automotive

1. Computer-assisted Coding
2. Health & Patient Diagnostics

Other Data-driven Techs: Very large...


1. Text & Self-serve Add-on
2. Data-driven Non-parametric techniques

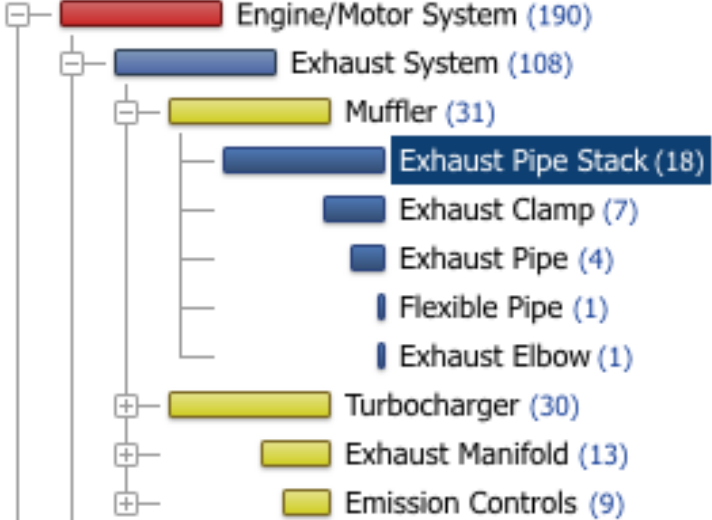
# Ubiquiti Diagnostics

- **Repairs & Maintenance data** form the Knowledge Base  
Use all –  
Technicians' experiences, Geographic regions, Time points
- **For Each New Repair Instance** use existing knowledge
  - Essentially use of *Machine Learning*
  - Report *differential diagnoses, differentiators, fixes* etc.
- **Simple interface** (eg, Google) – anytime & anywhere









# Ubiquiti Rapid Diagnostics ... screenshot

**Ubiquiti  
TechAssist**  
  
VIN or Make/Model:  
FTL 300  
  
Symptoms:  
BLACK SMOKE FROM  
EXHAUST  
  
**Submit** [Manual Search](#)  
  
**Vehicle Type**  
Vehicle: FTL  
  
**Symptoms**  
Black  
Exhaust System / Exhaust  
Smoke  
  


**Defects**  
Select a defect to view more details  
  


- Engine/Motor System (190)
  - Exhaust System (108)
    - Muffler (31)
    - Exhaust Pipe Stack (18)
    - Exhaust Clamp (7)
    - Exhaust Pipe (4)
    - Flexible Pipe (1)
    - Exhaust Elbow (1)
  - Turbocharger (30)
  - Exhaust Manifold (13)
  - Emission Controls (9)

**Exhaust Pipe Stack**  
[18 Cases](#) [View Repair Records](#)  
  

Repairs	Specific Defects	Differentiators
	Adjust Exhaust Stack / Exhaust Pipe Stack (15)	
	Turn Exhaust Stack / Exhaust Pipe Stack (8)	
	Replace Exhaust Stack / Exhaust Pipe Stack (3)	
	Turn Trailer (3)	
	Turn Smoke (2)	
	Repair Exhaust Stack / Exhaust Pipe Stack (1)	



# Easily Add On Ubiquiti to Existing Infrastructure/Software

## Ubiquiti Nav-frame

**Diverse Data Sources**

**Select & Export**

Ubiquiti RADAR - Standard View

File Tools Database View Help

Search S\_Data.CSV

Navigator

Record Sets

- All Records (73,034, Sep 19 2013)
- Ford Data
- GM Data
- Honda\_demo
- Indiana (from S\_Data.CSV) (266, Sep 19 2013)
- S\_Data.CSV (10,542, Sep 19 2013)

View Records

View Charts/Reports...

Dashboard

Search Records... Ctrl-F

Show Related Records

Recode Records

Rename... F2

Move...

Delete

Export

Share...

Create Excel Pivot Table

Export Records to CSV...

View Records in Excel

Weibull Analysis

Information

Name S\_Data.CSV

Created Sep 19, 2013, 8:25 AM

Count 10,542 records

Ready

## Existing Visualization / Infrastructure / Analytics / Training



# Example: Ubiquiti Add-on for MS Excel

The screenshot displays the Microsoft Excel interface with the 'Ubiquiti' add-on ribbon active. The ribbon includes tabs for Font, Alignment, Number, Styles, Cells, and Editing. The 'Filtering on 2 selected concepts (182 rows)' button is highlighted in the top right of the ribbon. The data table below shows columns A through N, with the 'C/DD' filter applied to the 'VEH\_LINE' column. The 'Navigator' pane on the right shows the 'Geographic Region: United States' concept selected, with a list of sub-concepts and their counts.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	MDL_YR	VIN_CD	LBR_COST	VEH_LINE	MKT_DERI	BOD_CAB	VER_SERIE	DRIVE_CD	ENG_CD	TRANS_CD	PLANT_CD	PRODN_D	WRTY_STA	NAME
2	2003	1MEFM50	50.35	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	7-Dec-02	#####	HOLLYWO
9	2003	1MEFM50	66.22	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	16-Jan-03	31-Jan-03	BELK FOR
16	2003	1MEFM50	103.68	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AD	2-Jan-03	9-Jan-03	BOBBY JO
21	2003	1MEFM50	39.73	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	31-Jan-03	#####	HERTZ RA
22	2003	1MEFM50	34.76	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	9-Jan-03	24-Jan-03	SCANLON
23	2003	1MEFM50	44.44	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	28-Jan-03	#####	CHARLIE H
27	2003	1MEFM50	165.44	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	23-Jan-03	8-Feb-03	HOLLYWO
33	2003	1MEFM50	46.67	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	9-Jun-03	ALTMAN L
52	2003	1MEFM50	46.42	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	#####	ED HOWA
55	2003	1MEFM50	79.6	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AD	#####	9-May-03	SOUTHPO
61	2003	1MEFM50	92.74	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AD	#####	10-Jun-03	MTN. VIE
63	2003	1MEFM50	97.14	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	7-Jan-03	22-Jan-03	LONGWO
64	2003	1MEFM50	98.68	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	11-Oct-02	SATCHER I
66	2003	1MEFM50	91.75	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	6-Jan-03	21-Jan-03	COURTESY
67	2003	1MEFM50	35.33	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	#####	WILLIAMS
78	2003	1MEFM50	76.91	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	#####	DAYTONA
79	2003	1MEFM50	73.04	C/DD	C/M	C/FA	C/GA	C/A	C/LA	C/DX	AB	#####	#####	ALL AMER
84	2003	1MEFM55	60.97	C/DD	C/M	C/FA	C/GB	C/A	C/LD	C/DX	AB	#####	#####	LEE MOTO
85	2003	1MEFM55	44.55	C/DD	C/M	C/FA	C/GB	C/A	C/LD	C/DX	AB	#####	2-Apr-03	HERTZ RA
90	2003	1MEFM55	56.33	C/DD	C/M	C/FA	C/GB	C/A	C/LD	C/DX	AB	#####	8-Apr-03	HERTZ RA
104	2003	1MEFM55	104.32	C/DD	C/M	C/FA	C/GB	C/A	C/LD	C/DX	AB	#####	14-Oct-02	PUGMIRE

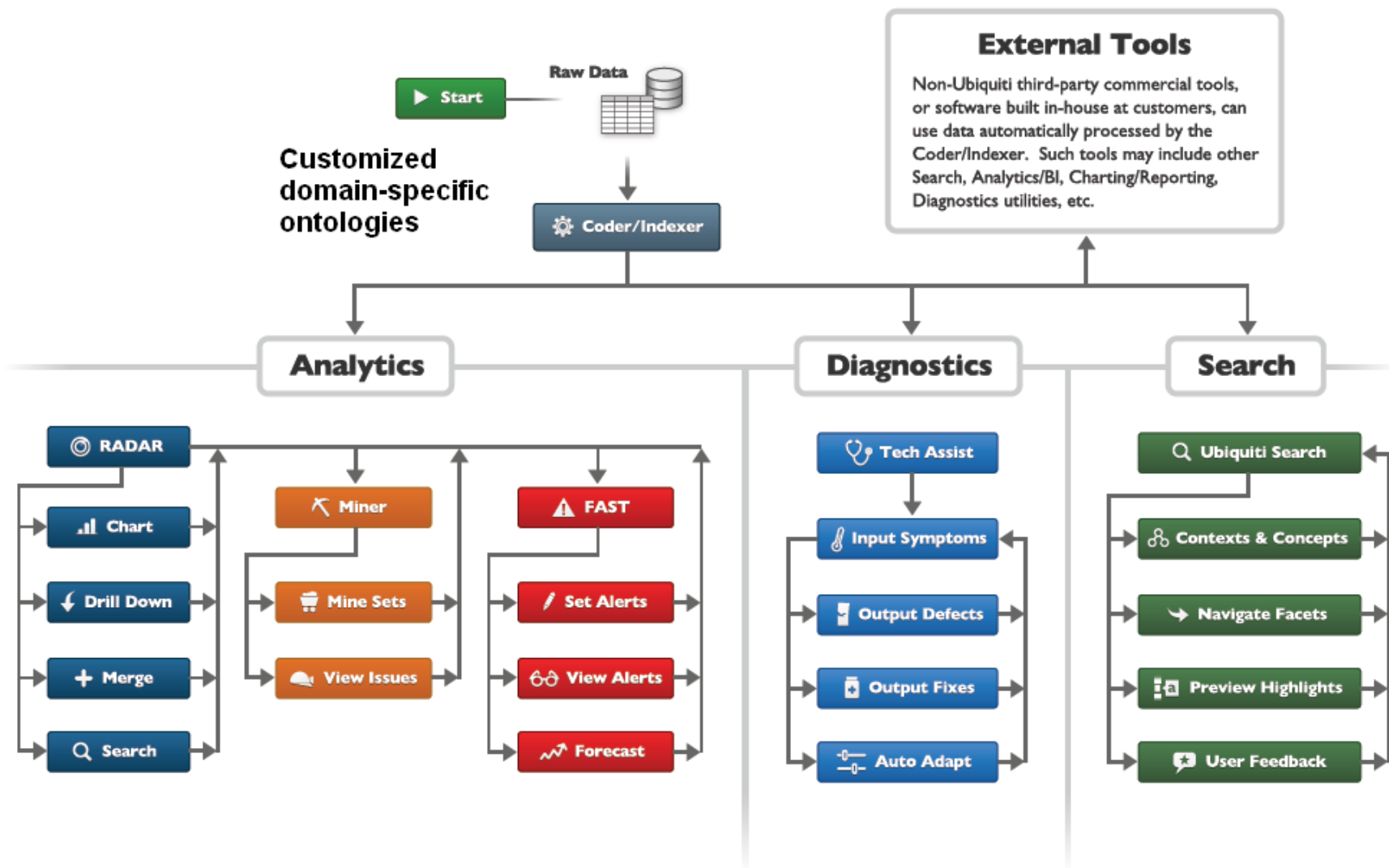
Navigator

Filtering on 2 selected concepts (182 rows) Clear Filter

Search This Worksheet

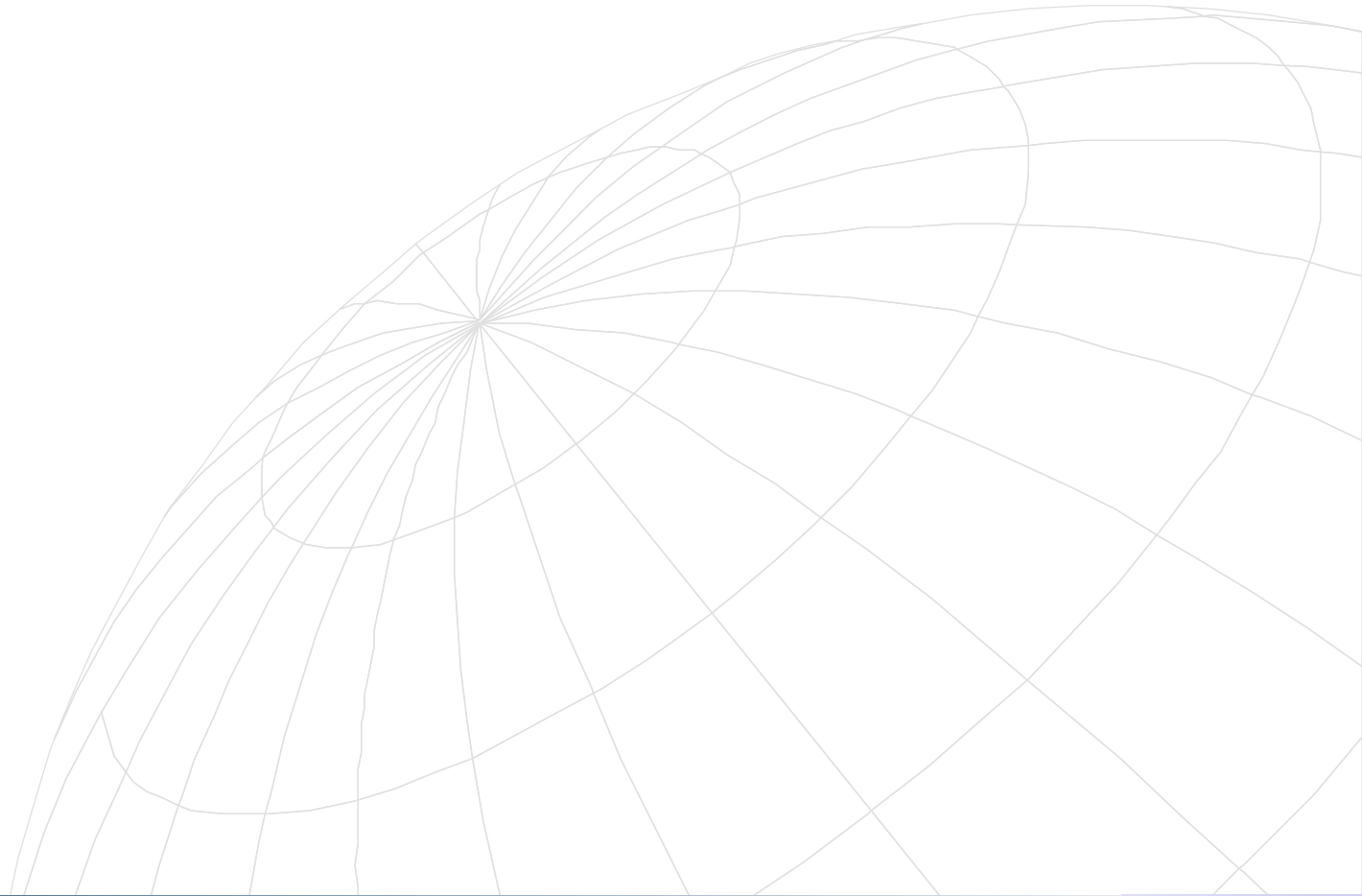
- This Worksheet (1,000)
  - Assigned Codes (1,000)
  - Cost Information (1,000)
  - Data Source (1,000)
  - Date Information (1,000)
  - Geographic Region (1,000)
    - Geographic Region: United States (1,000)
      - Geographic Region: Midwest (261)
      - Geographic Region: Northeast (208)
      - Geographic Region: Southeast (199)
      - Geographic Region: West (170)
      - Geographic Region: Southwest (110)
      - Geographic Region: West Central (52)
  - OEM Codes (1,000)
  - OEM Part (1,000)
  - Plant Information (1,000)
  - Vehicle Information (1,000)
  - Verbatim Concepts (984)
    - Defects (Verbatims) (968)
      - Leaking (918)
        - Loose/Disconnected (67)
        - Dirty (61)
        - Burnt/Fire (48)
        - Lack Of (29)
        - Defective (27)
        - Failed (27)

# A Flowchart for Ubiquiti Technologies



- All data – structured, unstructured & numeric handled
- Ubiquiti can be added on modularly to existing IT, BI & Reporting infrastructure

# Quick Demo(s)



# Experience indicates Importance of Inputs

ML & Stats algorithms: Input data crucial for accuracy

Sensor data: Still unreliable, and also, of limited value

Data Sciences & Technology: A Human Endeavor

- By the People
- For the People

**Must take into account the Human Factors**



*Decision Support with Text*

Web: [www.ubiquiti.com](http://www.ubiquiti.com)  
Email: [info@ubiquiti.com](mailto:info@ubiquiti.com)  
Phone: (734) 997-8800  
Fax: (413) 622-3123

Ubiquiti Inc.  
303 Detroit Street  
Suite 202  
Ann Arbor, MI 48104