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(19) **United States**(12) **Patent Application Publication** (10) **Pub. No.: US 2005/0177390 A1**
Young et al. (43) **Pub. Date: Aug. 11, 2005**(54) **METHOD AND SYSTEM FOR COLLECTING,
MANAGING AND REPORTING FEEDLOT
CATTLE DATA AND FEED ADDITIVE
CONSUMPTION DATA****Related U.S. Application Data**(60) Provisional application No. 60/539,685, filed on Jan.
28, 2004.**Publication Classification**(76) Inventors: **Joseph Young**, Olathe, KS (US);
Marcel Sarzen, Dunwoody, GA (US)(51) **Int. Cl.⁷** **G06F 17/60**(52) **U.S. Cl.** **705/1**

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CHICAGO, IL 60606-1080 (US)(57) **ABSTRACT**

A method and system for collecting, managing and reporting feedlot cattle data and feed additive consumption data is provided. In particular, the present invention is directed to a method and system for collecting data including demographic data, animal health data, feedlot performance data, feed data, and carcass data from standard accounting systems, validating the data, normalizing the data using mapping and matching protocols, and reporting the data.

(21) Appl. No.: **11/046,318**(22) Filed: **Jan. 28, 2005****Days on Ration summary: Steers**
Twelve months ending Dec 2005

	In weight group			
	<u>500</u>	<u>600</u>	<u>700</u>	<u>800</u>
Ration 1	11	11	9	6
Ration 2	13	9	6	7
Ration 3	9	8	4	8
Ration 4	182	160	150	125
Ration 44 - storm	5	3	3	2
Ration 5	0	0	0	0
Ration 55 - storm	0	0	0	0
<u>XYZ Feeders</u>				
Avg days on feed	207	183	158	133
Avg day of inflection	46	42	33	29
<u>Central Plains region</u>				
Avg days on feed	211	179	155	129
Avg day of inflection	67	43	36	28

Days on Ration summary: Heifers
Twelve months ending Dec 2005

	In weight group			
	<u>500</u>	<u>600</u>	<u>700</u>	<u>800</u>
Ration 1	11	11	9	6
Ration 2	13	9	6	7
Ration 3	9	8	4	8
Ration 4	182	160	150	125
Ration 44 - storm	5	3	3	2
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Ration 55 - storm	0	0	0	0
<u>XYZ Feeders</u>				
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<u>Central Plains region</u>				
Avg days on feed	211	179	155	129
Avg day of inflection	67	43	36	28

Fig. 1

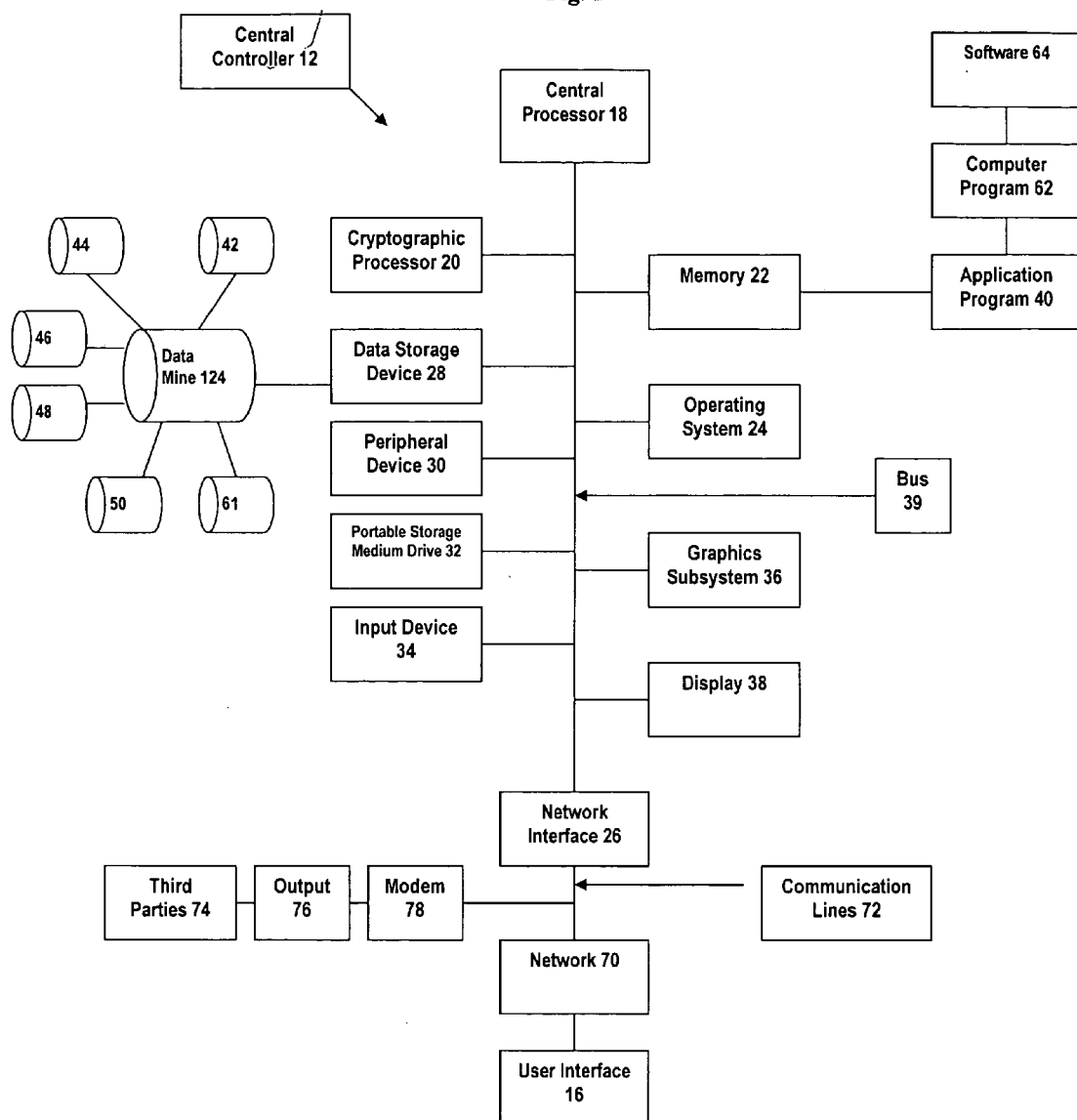


Fig. 2

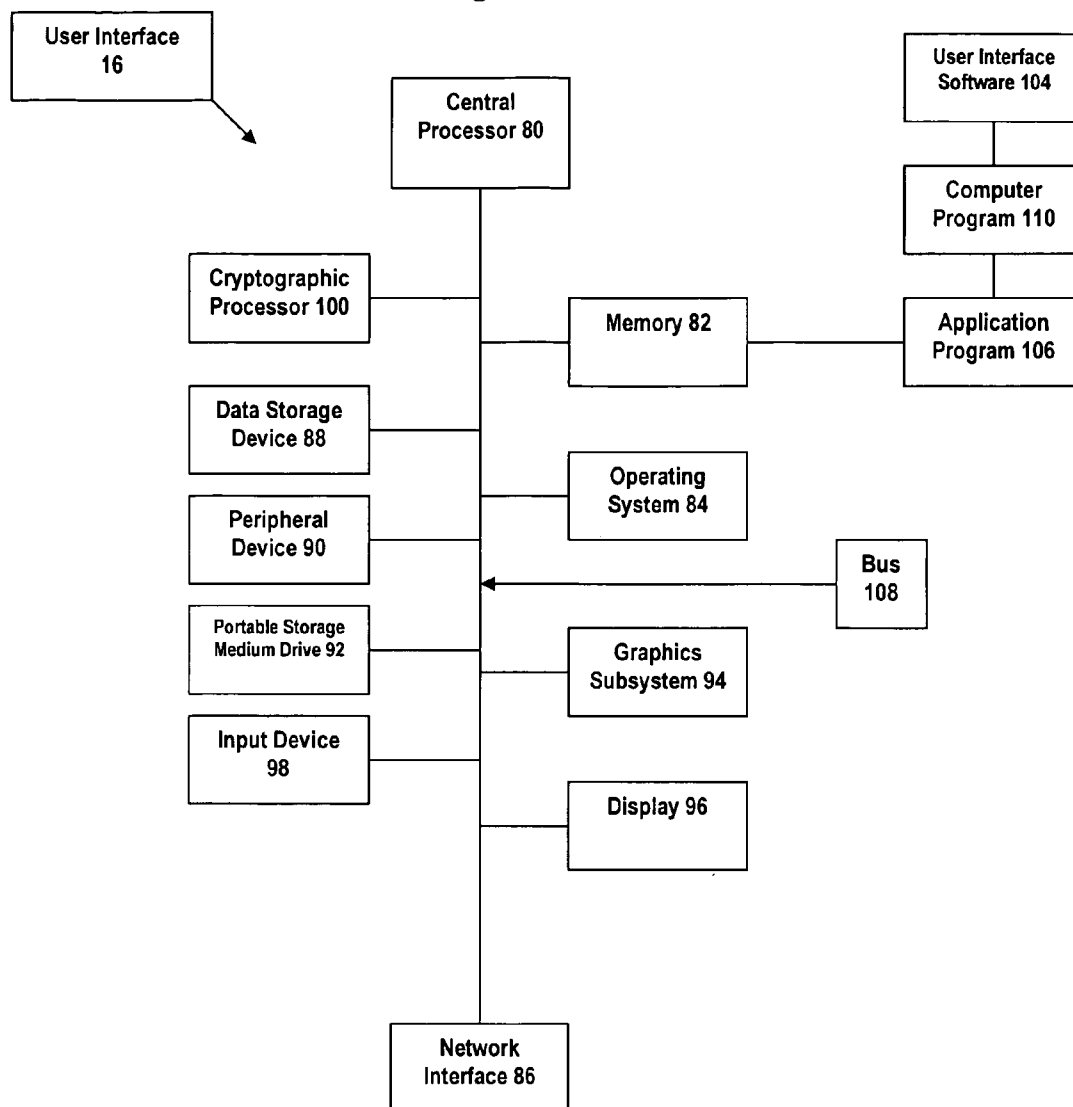


Fig. 3

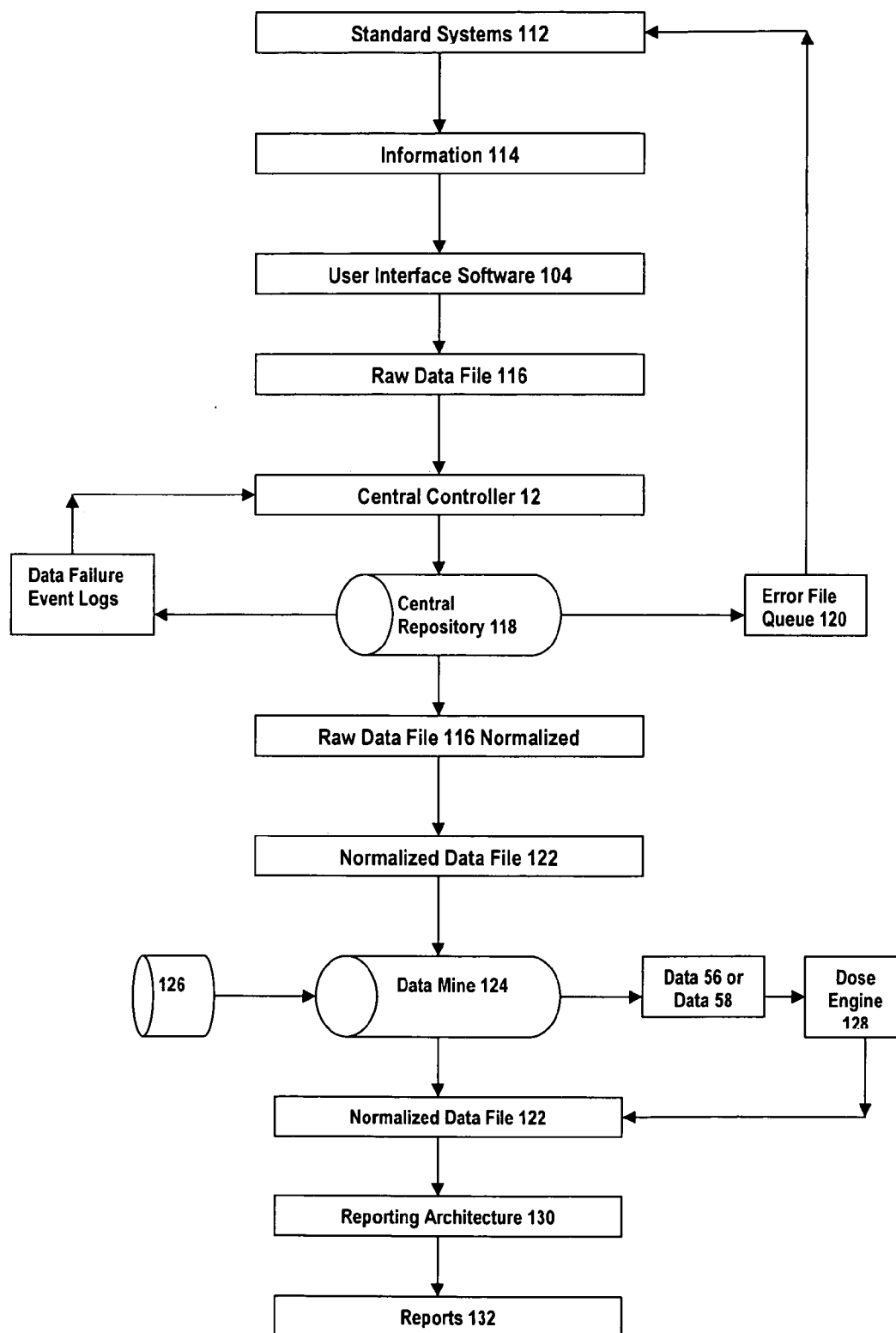


Fig. 4

Login Page

Login Name
Password

Remember UserID and Password (sets AgSpan cookie on local workstation)?

☐


Login Name - The login name is a user's email address. Therefore, if a password is forgotten, the user can click on Forgot Password and the password associated with the email account is sent to that email account.
New User - launches the New User Request that generates a task for the administrator to review and activate a new user account.

Fig. 5

XYZ Feeders

	<u>Weight</u>	<u>lots</u>	<u>head</u>	<u>mean</u>	<u>min</u>	<u>max</u>	<u>std</u>
Steers	400-499	10	1500	15.0	11.3	19.5	0.6
	500-599	15	2250	16.5	12.4	21.5	0.7
	600-699	33	4950	18.0	13.5	23.4	0.8
	700-799	44	6600	19.5	14.6	25.4	0.9
	800-899	29	4350	21.0	15.8	27.3	1.0

	<u>Weight</u>	<u>lots</u>	<u>head</u>	<u>mean</u>	<u>min</u>	<u>max</u>	<u>std</u>
Heifers	400-499	10	1500	15.0	11.3	19.5	0.6
	500-599	15	2250	16.5	12.4	21.5	0.7
	600-699	33	4950	18.0	13.5	23.4	0.8
	700-799	44	6600	19.5	14.6	25.4	0.9
	800-899	29	4350	21.0	15.8	27.3	1.0

Region

<u>lots</u>	<u>head</u>	<u>mean</u>	<u>std</u>
1000	150000	15.0	0.6
1500	225000	16.5	0.7
3300	495000	18.0	0.8
4400	660000	19.5	0.9
2900	435000	21.0	1.0

<u>lots</u>	<u>head</u>	<u>mean</u>	<u>std</u>
1000	150000	15.0	0.6
1500	225000	16.5	0.7
3300	495000	18.0	0.8
4400	660000	19.5	0.9
2900	435000	21.0	1.0

Fig. 6

Central Plains

<u>INT Index</u>	<u>Lots</u>	<u>Head</u>	<u>ADFI</u>	<u>ADG</u>	<u>F/G</u>
10	1	10	10.36	1.37	7.58
13	1	62	13.14	1.47	8.93
14	1	45	14.96	1.69	8.86
15	6	369	15.65	2.70	5.82
16	28	2416	16.62	2.67	6.31
17	86	11743	17.58	2.80	6.41
18	314	45902	18.58	3.08	6.10
19	534	87336	19.49	3.21	6.11
20	491	67761	20.47	3.38	6.12
21	353	44135	21.44	3.55	6.08
22	165	18813	22.46	3.67	6.18
23	59	6305	23.36	3.82	6.17
24	25	2225	24.37	3.91	6.29
25	8	1756	25.35	4.08	6.25
26	3	161	26.22	3.75	7.05
All	2075	289039	19.85	3.42	5.86

XYZ Feeders

<u>Lots</u>	<u>Head</u>	<u>ADFI</u>	<u>ADG</u>	<u>F/G</u>
2	132	14.42	2.56	5.65
2	126	15.91	2.44	6.55
3	359	16.49	2.82	5.89
23	3866	17.63	2.93	6.15
38	5587	18.54	3.15	5.92
61	10323	19.49	3.42	5.72
61	11155	20.47	3.50	5.87
33	4184	21.52	3.68	5.86
15	2290	22.58	4.01	5.65
4	396	23.34	3.84	6.11
1	96	24.23	4.72	5.14
243	38514	19.85	3.42	5.86

Fig. 7

Days on Ration summary: Steers
Twelve months ending Dec 2005

	In weight group			
	<u>500</u>	<u>600</u>	<u>700</u>	<u>800</u>
Ration 1	11	11	9	6
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Avg day of inflection	67	43	36	28

Days on Ration summary: Heifers
Twelve months ending Dec 2005

	In weight group			
	<u>500</u>	<u>600</u>	<u>700</u>	<u>800</u>
Ration 1	11	11	9	6
Ration 2	13	9	6	7
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Avg day of inflection	67	43	36	28

Fig. 8

XYZ Feedyard
4 Year Performance Report

As of 12/2004

Steers - All Weights

<u>Year</u>	<u>Head</u>	<u>InWt</u>	<u>OutWt</u>	<u>DOF</u>	<u>COG</u>	<u>ADG</u>	<u>FG</u>	<u>VM</u>	<u>Death</u>	<u>Dress</u>	<u>PrCh</u>
2001	47,911	710	1,241	158	44.15	3.31	5.72	11.27	0.79	64.40	50.20
2002	51,791	710	1,259	165	46.77	3.29	5.80	11.87	0.90	64.60	51.10
2003	54,352	739	1,242	143	50.25	3.48	5.61	12.82	0.68	64.10	45.50
2004	52,962	724	1,261	155	51.72	3.42	5.68	13.09	0.90	64.00	31.30

XYZ Feedyard
4 Year Performance Report

As of 12/2004

Heifers - All Weights

<u>Year</u>	<u>Head</u>	<u>InWt</u>	<u>OutWt</u>	<u>DOF</u>	<u>COG</u>	<u>ADG</u>	<u>FG</u>	<u>VM</u>	<u>Death</u>	<u>Dress</u>	<u>PrCh</u>
2001	35,368	640	1,102	155	46.88	2.93	5.95	12.17	1.06	64.70	54.50
2002	47,602	677	1,135	148	49.29	3.03	5.98	12.46	0.90	64.80	62.40
2003	50,990	678	1,114	135	53.06	3.16	5.80	13.89	0.87	64.00	58.00
2004	43,058	653	1,107	148	54.74	3.02	5.88	13.63	0.91	63.70	49.20

Fig. 9

XYZ Feedyard

Steers

12 Months Ending 12/2004

	All Yards	Central Plains	XYZ Feedyard
Head	3,749,724	968,178	52,962
In Wt	722	741	724
Out Wt	1,255	1,257	1,261
DOF	170	158	155
ADG	3.06	3.19	3.42
F/G	6.31	6.16	5.68
COG	56.34	56.38	51.72
VM	12.55	12.52	13.09
Death	1.45	1.56	0.90
HCW	801.0	805.0	769.0
Dress	64.0	64.0	64.0
Prime	1.0	0.0	0.0
Choice	44.0	42.0	31.0
YG1&2	63.0	63.0	52.0
YG4&5	5.0	6.0	8.0
Heavy	3.0	3.0	0.0
Light	0.0	0.0	1.0
Dark	0.0	0.0	0.0

Fig. 10

Reimplanted Cattle

12 months ending 12-2004

	Steers				Heifers			
	XYZ Feeders		Central Plains		XYZ Feeders		Central Plains	
	<u>Total Lots</u>	<u>Reimplanted</u>	<u>Reimplanted</u>	<u>Reimplanted</u>	<u>Total</u>	<u>Reimplanted</u>	<u>Reimplanted</u>	<u>Reimplanted</u>
	<u>Lots</u>	<u>Percent</u>	<u>Percent</u>	<u>Percent</u>	<u>Lots</u>	<u>Lots</u>	<u>Percent</u>	<u>Percent</u>
400	4	4	100	90	8	8	100	80
500	44	44	100	92	79	78	99	85
600	106	105	99	85	128	126	98	81
700	140	139	99	69	108	106	98	55
800	113	111	98	39	25	25	100	26
900	29	23	79	13	2	1	50	5

Terminal Implant Windows

(Reimplanted Steers and Heifers Only)

12 Months Ending 12/2004

<u>Days</u>	<u>Lots</u>
40	1
50	17
60	120
70	264
80	222
90	104
100	32
110	7
120	3
130	0
140	0
150	0

Fig. 11**Number of head/carcasses per quarter: Steers**

YG	Central Plains		All U.S.	
	Live	Carcass	Live	Carcass
02Q1	178,948	85,501	752,230	342,913
02Q2	207,134	120,620	930,792	448,874
02Q3	214,585	117,111	939,557	490,659
02Q4	172,961	89,294	802,420	362,651
03Q1	184,819	89,459	826,334	393,211
03Q2	238,156	124,020	1,022,533	490,901
03Q3	282,566	119,788	1,110,752	536,912
03Q4	228,633	106,537	835,624	406,487
04Q1	231,111	96,113	901,502	408,849
04Q2	247,167	101,473	964,735	418,599
04Q3	285,380	99,907	1,078,009	498,913
04Q4	204,520	76,705	805,478	363,475

Number of head/carcasses per quarter: Heifers

YG	Central Plains		All U.S.	
	Live	Carcass	Live	Carcass
02Q1	251,069	92,866	690,239	243,130
02Q2	251,919	95,851	737,695	291,605
02Q3	262,411	123,575	731,982	324,385
02Q4	252,212	115,594	734,719	298,628
03Q1	233,686	105,712	727,793	295,129
03Q2	284,828	136,358	789,778	358,867
03Q3	266,769	123,731	863,868	397,925
03Q4	218,836	92,573	662,694	272,547
04Q1	249,408	126,940	747,042	352,393
04Q2	262,407	108,820	795,507	316,370
04Q3	259,028	99,181	756,746	327,452
04Q4	200,603	82,488	694,263	272,528

METHOD AND SYSTEM FOR COLLECTING, MANAGING AND REPORTING FEEDLOT CATTLE DATA AND FEED ADDITIVE CONSUMPTION DATA

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application Ser. No. 60/539,685, filed Jan. 28, 2004, which document is hereby incorporated by reference to the extent permitted by law.

BACKGROUND OF THE INVENTION

[0002] The present invention is directed to a method for collecting, managing and reporting feedlot cattle data and feed additive consumption data. In particular, the present invention is directed to a method of collecting information gathered from standard livestock accounting and medical systems, managing the information, and reporting the information in a useful format.

[0003] The beef industry is constantly evolving and, recently, began consolidating. As a result, cattle and beef marketing methods have evolved at a rapid rate. Branded beef, while still a small portion of the total beef supply, is growing in volume as packers and retailers look for ways to differentiate and add value to their products. Many “block-buster” patents covering animal health products are also expiring thereby leading to competition from generic manufacturers. These generic manufacturers are looking for ways to acquire market share from the pioneer manufacturers while managing price erosion.

[0004] This environment in the beef industry is driving a need for accurate, timely information and knowledge that enables feedlot managers, marketing managers, loan managers, and the like, to guide their companies. While the beef industry currently uses sophisticated accounting and medical system software to track individual feedlot or packer performance, there is a need in the art for a system to collect data from many sources in a meaningful way so as to provide valuable knowledge and information to the players in this ever-changing industry in order to aid cattle feeders, packers, animal health companies, and the like to identify strengths, weaknesses, opportunities and niches that may be exploited.

[0005] Accordingly, there is a need in the art for a data collection and validation system that interfaces with industry accounting and medical systems to facilitate the collection of feedlot and carcass data and dramatically reduce manual data collection requirements. Moreover, there is a need in the art for a system configured to collect and process large amounts of industry-wide livestock data in order to provide industry-standardized reports.

BRIEF SUMMARY OF THE INVENTION

[0006] A method for managing livestock data is provided wherein the method include the steps of collecting raw livestock data from a plurality of livestock data acquisition locations, determining through an iterative process the validity of the raw livestock data, normalizing the validated data using a conversion factor based upon the type and unit of measurement for the data, and presenting the normalized data in a report format.

[0007] The present invention also includes a system for managing livestock data, means for accessing and collecting livestock data from legacy software applications, means for transmitting the data to a livestock data management system, means for validating the data, means for normalizing the data, and means for reporting the data.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWING

[0008] FIG. 1 is a flowchart of the central controller of the present invention;

[0009] FIG. 2 is a flowchart of the user interface of the present invention;

[0010] FIG. 3 is a flowchart of the steps of the method of the present invention;

[0011] FIG. 4 is an illustrative screen shot of one embodiment of the present invention;

[0012] FIG. 5 is an illustrative report of one embodiment of the present invention;

[0013] FIG. 6 is an illustrative report of one embodiment of the present invention;

[0014] FIG. 7 is an illustrative report of one embodiment of the present invention;

[0015] FIG. 8 is an illustrative report of one embodiment of the present invention;

[0016] FIG. 9 is an illustrative report of one embodiment of the present invention;

[0017] FIG. 10 is an illustrative report of one embodiment of the present invention; and

[0018] FIG. 11 is an illustrative report of one embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] The feedlot data management system 10 of the present invention includes a central controller 12, a transmission means 14, and a user interface 16. As used herein, a user may be an individual, a feedlot, a packer, a corporation, a partnership, a government, or any other entity. FIG. 1 illustrates a high-level block diagram of central controller 12 which may be used to implement the method of the present invention. Central controller 12 includes a central processor 18, an optional cryptographic processor 20, memory 22, operating system 24, network interface 26, data storage device 28, peripheral device(s) 30, portable storage medium drive(s) 32, input device(s) 34, graphics subsystem 36, and display 38. The components of central controller 12 are those typically found in general purpose computer systems, and are intended to represent a broad category of such computer components that are well known in the art.

[0020] In one embodiment, central controller 12 may be a conventional personal computer or computer workstation with sufficient memory and processing capability to perform the necessary functions of the present invention. In another embodiment, central controller 12 operates as a web server, both receiving and transmitting queries and requests generated by users. Regardless of its architecture, central controller 12 must be capable of high volume transaction process-

ing and performing a significant number of mathematical calculations in processing communications and repository searches. One skilled in the art will also appreciate that the functionality of central controller **12** may also be distributed over a plurality of computers such as network of computers or a plurality of stand-alone computers. Central controller **12** may be configured in a distributed architecture wherein the repositories and processors are housed in separate units or locations. Some controllers perform the primary processing functions and contain, at a minimum, both memory and a general processor. Each of these controllers is attached to a WAN hub which serves as the primary communication link with the other controllers and interface devices. The WAN hub may have minimal processing capability itself, serving primarily as a communications router. Those skilled in the art will appreciate that an almost unlimited number of controllers may be supported and other types of hubs known in the art or developed in the future for similar purposes may be used instead of a WAN hub. This arrangement yields a more dynamic and flexible system that is less prone to catastrophic hardware failures affecting the entire system.

[0021] Central processor **18** may contain a single micro-processor or it may contain a plurality of microprocessors for configuring central controller **12** as a multi-processor system. Examples of currently available processors that may be suitable as central processor **18** include 64 bit AMD opteron and 64 bit Itanium from Intel. Equivalent processors may also be used. However, one skilled in the art will appreciate that newer and faster models will be developed and would be suitable for use in the present invention.

[0022] Cryptographic processor **20** is a processor that supports the authentication of communications from and to users and central controller **12**. Cryptographic processor **20** is also suitable for providing anonymity in transactions, secure processing of electronic transactions, secure electronic data interchange (EDI), Internet commerce servers and all other applications that require high-volume transactions and maximum security. Examples of suitable, currently available apparatus include the IBM® PCI Cryptographic Coprocessor, the Okiok RAC/M IX ICP Cryptographic Processor and the like. Equivalent processors may also be used. However, one skilled in the art will appreciate that newer and faster models will be developed and would be suitable for use in the present invention.

[0023] Memory **22** includes random access memory (RAM), dynamic random access memory (DRAM), read-only memory (ROM) as well as high-speed cache memory. Memory **22** may also include an application program **40** that stores, in part, instructions and data for execution by central processor **18**. If the system **10** of the present invention is wholly or partially implemented in software, including a computer program, memory **22** stores the executable code when in operation.

[0024] Controller **12**, as shown in FIG. 1, illustrates operating system **24** as a Windows®-based platform available from Microsoft Corporation that may be used for implementing the method of the present invention. However, numerous other platforms can also suffice for use as operating system **24**, such as Macintosh-based platforms available from Apple Computer, Inc., platforms with different bus configurations, networked platforms, multi-processor platforms, other personal computers, personal digital

assistants (e.g., Palm Pilot®, Blackberry®, Clie®, 3Com, etc.), workstations, mainframes, navigation systems, and the like.

[0025] Network interface **26** is the gateway to communication with users through user interface **16** as well as with other users of system **10**. Network interface **26** may be a network interface card for interfacing central controller **12** to a network, a modem, or the like. Conventional internal or external modems may also serve as network interface **26**. Network interface **26** supports modems at a range of baud rates from 1200 upward, but may combine such inputs into a T1 or T3 line if more bandwidth is required. In a preferred embodiment, network interface **26** is connected with the Internet and/or any of the commercial on-line services such as America Online, MSN, etc., allowing users access from a wide range of on-line connections. Several commercial electronic mail servers include the above functionality in, for example, mail software packages designed to link people and information over enterprise networks and the Internet. These types of products are platform independent and utilize open standards based upon Internet protocols. Users can exchange messages with enclosures such as files, graphics, video and audio. The system also supports multiple languages. Alternatively, network interface **26** may be configured as a voice mail interface, web site, BBS, or electronic mail address.

[0026] Data storage device **28** is a non-volatile storage device for storing data, software and instructions for use by central processor **18** and is typically implemented with a magnetic disk drive or an optical disk drive. Data storage device **28** also contains data repositories used in the processing of data in the present invention, including a data mine **124** or other data repository containing a demographic data repository **42**, a animal health data repository **44**, a feedlot performance data repository **46**, a feed data repository **48**, a carcass data repository **50**, and a user account data repository **61**. Demographic data repository **42** maintains demographic data **52** on cattle, either individually or in groups (lots or pens), with fields containing information both pre-feedlot arrival and post-arrival such as gender, genetics, geographic origin, buyer, health score, hide color, frame score, gene markers, gene mapping indicators, breed types, delivering trucking company, ranch of origin, current location, feedlot location, slaughter location, pre-arrival health protocols, pre-arrival nutrition protocols, pre-arrival pharmaceutical usage, and age.

[0027] Animal health data repository **44** maintains animal health data **54** for cattle after arrival in a feedlot such as pharmaceutical usage, biological agent usage, and health practices protocols. Pharmaceutical usage data may include anti-infectives, antimicrobials, growth promotants, antibiotics, steroidal, anti-inflammatories, estrogen-based pharmaceuticals, parasiticides, and any other pharmaceutical that is or anti-infectives, antimicrobials, growth promotants, antibiotics, steroidal, anti-inflammatories, estrogen-based pharmaceuticals, parasiticides, and any other pharmaceutical that is or may be administered to the animal during its stay in the feedlot. Biological agents may include any biologicals typically administered as vaccinations such as IBR, BVD, BRSV, and viral diseases. Health practices may include de-horning, tail docking, castration, ear tagging, identification (electronic and/or visual tags), pregnancy, and any other health practice being conducted at an individual feedlot.

Dosages of any pharmaceuticals or biologics administered to an animal may also be included in animal health data **54**.

[0028] Feedlot performance data repository **44** maintains feedlot performance data **56** such as head in, head out, pay weight out, average daily gain, in weight, out weight, days on feed, mortality, purchase cost, total receipts, total charges, feed and yard age charges, veterinary/medical charges, other charges, pounds gained, head days, feed pounds, moisture, lot of closeout, sex type, date closed, head days, feedyard of closeout, feedyard name, feedyard phone, start period, end period, source name, and any other type of information that might be useful in determining feedlot performance or requested by a user.

[0029] Feed data repository **48** maintains feed data **58** such as feed rations by lot, pen, or individual animal, feed composition including, for example, additives, grains, protein, micro-ingredients, minerals, growth promotants, antibacterials, beta-agonists, parasiticides, direct fed microbials, bacteria, and any other ingredient in the animal feed. Feed data **58** may also include the individual rations, brand labels, dosages, or any other feed-based information that may be desired by a particular user.

[0030] Carcass data repository **50** maintains carcass data **60** such as packer name, plant location, head, yield, total carcass weight, prime, CAB, choice, select, no roll, standard, dark cutter, other quality grades, hard bones, heavy weight, light weight, condemned, packer carcass ID, packer lot, customer number, customer lot, customer animal ID, final quality grade, final yield grade, program, individual carcass, gender, hot carcass weight, marbling score, quality grade, fat thickness, ribeye area, internal fat, yield grade, comments, or any other carcass data that may be desired by a particular user.

[0031] Individual or grouped user account data **59** may also be stored in data mine **124** in a user account data repository **61** or some other suitable data storage location. User account data **59** may include, but is not limited to, the user's name, location, business type, username, password, contact information, veterinarian, nutritionist, corporate profiles, and feedlots associated therewith, and any other information desirable in identifying a particular user. User account data **59** may also be linked to any one of data **52, 54, 56, 58** and **60** that have been previously provided by the particular user so that a user may access archived data already entered into controller **12**. As one skilled in the art will appreciate, any suitable type of software may be used to create and manage these repositories.

[0032] In another embodiment, data storage device **28** may also store application program **40** for the purpose of loading program **40** to memory **22**. Computer software, instructions or data, including data **52, 54, 56, 58, 59** and **60** may also be stored in central processor **18** rather than data storage device **28**.

[0033] Controller **12** may further include peripheral device(s) **30**, portable storage medium drive(s) **32**, input device(s) **34**, graphics subsystem **36** and display **38**. For purposes of simplicity, the components shown in **FIG. 1** are depicted as being connected via a single bus **39**. However, one skilled in the art will appreciate that the components may be connected through one or more data transport means. For example, processor **18** and memory **22** may be con-

nected via a local microprocessor bus, and data storage device **28**, peripheral device(s) **30**, portable storage medium drive(s) **32**, and graphics subsystem **36** may be connected via one or more input/output (I/O) buses.

[0034] Peripheral device(s) **30** may include any piece of hardware or computer support device, such as an input/output (I/O) interface, used to add additional functionality to central controller **12**. Other examples of peripheral device(s) **30** include, but are not limited to, printers, scanners, disk and tape drives, microphones, speakers, joysticks, plotters, and cameras.

[0035] Portable storage medium drive(s) **32** operates in conjunction with a portable non-volatile storage medium, such as a floppy disk, CD-ROM, or other computer-readable medium, to input and output data and code to and from central controller **12**. In one embodiment, program **40** or data **52, 54, 56, 58, 59** and **60** is stored on a portable medium, and is then inputted to central controller **12** via portable storage medium drive **32**.

[0036] Input device(s) **34** provides a portion of a user interface with central controller **12**. Input device(s) **34** may include an alpha-numeric keypad for inputting alphanumeric and other key information, or a pointing device, such as a mouse, a trackball, stylus, wheel, cursor or direction keys. Such devices provide additional means for interfacing with repositories **42, 44, 46, 48** and **50**.

[0037] In order to display textual and graphical information, central controller **12** includes graphics subsystem **36** and display **38**. Graphics subsystem **36** receives textual and graphical information and processes the information for output to display **38**. Display **38** may include a cathode ray tube (CRT) display, liquid crystal display (LCD), projection displays, other suitable display devices, or means for displaying, that enables a user to view data. Display **38** can be used to display data, component interfaces and/or display other information that is part of a user interface.

[0038] In a further embodiment, the present invention also includes a computer program **62** that includes a storage medium (media) component having instructions stored thereon which can be used to program a computer to perform the method of the present invention. The storage medium can include, but is not limited to, any type of computer-readable medium including floppy disks, optical disks, DVD, CD-ROMs, magnetic optical disks, RAMs, EPROM, EEPROM, magnetic or optical cards, or any type of media suitable for storing electronic instructions.

[0039] Stored on any one of the computer-readable medium (media), the present invention may also include software **64** for controlling both the hardware of central controller **12** or processors **18** and **20**, and for enabling central controller **12**, processor **18** and cryptographic processor **20** to interact with a human user or other mechanism utilizing the results of the present invention. Software **64** may include, but is not limited to, device drivers, operating systems and user applications. Ultimately, such computer-readable media further includes analyst software **68** for performing the method of the present invention. In a preferred embodiment, software **68** is downloaded to central controller **12** and stored in memory **22** as part of application program **40**. For the purposes of simplicity, all references herein to application program **40** and software **64** include

software 68. However, it will be appreciated by those skilled in the art that software 68 may also be stored and executed separately from application 40.

[0040] As illustrated in FIG. 1, central controller 12 is connected via network interface 26 to transmission means 14 such as a network 70 (e.g., an intranet, the Internet, or other network), across communications lines 72. Preferably, communications lines 72 are dedicated lines (e.g., LAN, WAN, standard dial-out telephone line, satellite, dedicated lease line, DSL) with a frame relay (or point-to-point) connection. Central controller 12 may also be directly linked to third party computer systems 74 rather than communicating with central controller 12 through network 70. Third party computer systems 74 may be, for example, a mainframe or PCs of at least XX486 processing ability (e.g., Pentium CPU) having at least one gigabyte drive, 16 megabytes of RAM, with typical I/O accessories including a keyboard, mouse, and printer or similar workstation. Each third party computer system 74 and central controller 12 and, more specifically, an output device(s) or a server(s) 76, also have a modem 78 (e.g., CSDSU, T1 communication, DSL, satellite or cable modems) for coupling to communication lines 72 and enabling communications between central controller 12 and third party computer system 74.

[0041] Data storage device 28, output device or server 76 and memory 22 may be implemented by one digital processor 18. In that case, consolidation, scheduling, initial and subsequent segmenting of end users and execution of working programs are accomplished through the one processor 18. In using the present invention, end users may be assisted by a third party. Alternatively, rule-based expert systems may be similarly employed in the present invention to provide dynamic end user behavioral and characteristics segmentation.

[0042] In a preferred embodiment, user interface 16 is a conventional personal computer having, at a minimum, an input device, such as a keyboard, mouse or conventional voice recognition software package, a display device, such as a video monitor, a processing device such as a CPU, and a network interface such as a modem. A cryptographic processor may also be included for stronger authentication protection. These devices interface with central controller 12. Alternatively, user interface 16 may also be a voice mail system, or other electronic or voice communications system such as a PDA, digital telephone, pocket personal computer or the like.

[0043] Referring now to FIG. 2, user interface 16 is described in more detail. User interface 16 may include a central processor 80, a memory 82, an operating system 84, a network interface 86, a data storage device(s) 88, a peripheral device(s) 90, a portable storage medium drive(s) 92, a graphics subsystem 94, a display 96, and an input device(s) 98. Cryptographic processor 100 may also be added for stronger authentication and verification capabilities.

[0044] Central processor 80 may contain a single microprocessor, such as a Pentium microprocessor, or it may contain a plurality of microprocessors for configuring user interface 16 as a multi-processor system. Cryptographic processor 100 is a processor that supports the authentication of communications to and from user interface 16 and central controller 12. Cryptographic processor 100 is also suitable

for providing anonymity in transactions, secure processing of electronic transactions, secure electronic data interchange (EDI), Internet commerce servers and all other applications that require high-volume transactions and maximum security. Examples of suitable, currently available apparatus include the IBM® PCI Cryptographic Coprocessor, the Okiok RAC/MIX ICP Cryptographic Processor and the like. Equivalent processors may also be used. However, one skilled in the art will appreciate that new and faster models will be developed and would be suitable for use in the present invention.

[0045] Memory 82 includes random access memory (RAM), dynamic random access memory (DRAM), read-only memory (ROM) as well as high-speed cache memory. Memory 82 may also include an application program 106 that stores, in part, instructions and data for execution by central processor 80. If user interface 16 is wholly or partially implemented in user interface software 104, including a computer program 110, memory 82 also stores the executable code when in operation. Operating system 84 is shown in FIG. 2 as a Windows®-based platform available from Microsoft Corporation. However, numerous other platforms can also suffice for use as operating system 84, such as Macintosh-based platforms available from Apple Computer, Inc., platforms with different bus configurations, networked platforms, multi-processor platforms, other personal computers, personal digital assistants (e.g., Palm Pilot®, Blackberry®, Clie®, 3Com, etc.), workstations, mainframes, navigation systems, and the like.

[0046] Network interface 102 is the gateway to communication with central controller 12. Network interface 102 may be a network interface card for interfacing user interface 16 to a network, a modem, or the like. Conventional internal or external modems may also serve as network interface 102. In a preferred embodiment, network interface 102 is connected with the Internet and/or any of the commercial on-line services such as America Online, MSN, etc., allowing users access to central controller 12 from a wide range of on-line connections. Several commercial electronic mail servers include the above functionality in, for example, mail software packages designed to link people and information over enterprise networks and the Internet. These types of products are platform independent and utilize open standards based upon Internet protocols. Users can exchange messages with enclosures such as files, graphics, video and audio. The system also supports multiple languages. Alternatively, network interface 102 may be configured as a voice mail interface, web site, BBS, or electronic mail address.

[0047] Data storage device 88 is a non-volatile storage device for storing data, software and instructions for use by central processor 80 and is typically implemented with a magnetic disk drive or an optical disk drive. Data storage device 88 may be used for archiving demographic data 52, animal health data 54, feedlot performance data 56, feed data 58, user account data 59 and carcass data 60. In another embodiment, data storage device 88 may also store application program 106 for the purpose of loading program 106 to memory 82. Computer software, instructions or data, including data 52, 54, 56, 58, 59 and 60 may also be stored in central processor 80 rather than data storage device 88.

[0048] User interface 16 may further include peripheral device(s) 90, portable storage medium drive(s) 92, graphics

subsystem **94**, display **96**, and input device(s) **98**. For purposes of simplicity, the components shown in **FIG. 2** are depicted as being connected via a single bus **108**. However, one skilled in the art will appreciate that the components may be connected through one or more data transport means. For example, processor **80** and memory **82** may be connected via a local microprocessor bus, and data storage device **88**, peripheral device(s) **90**, portable storage medium drive(s) **92**, and graphics subsystem **94** may be connected via one or more input/output (I/O) buses.

[0049] Peripheral device(s) **90** may include any piece of hardware or computer support device, such as an input/output (I/O) interface, used to add additional functionality to user interface **16**. Other examples of peripheral device **90** include, but are not limited to, printers, scanners, disk and tape drives, microphones, speakers, joysticks, plotters, and cameras.

[0050] Portable storage medium drive **92** operates in conjunction with a portable non-volatile storage medium, such as a floppy disk, CD-ROM, or other computer-readable medium, to input and output data and code to and from user interface **16**. Program **106** or data **52, 54, 56, 58, 59** and **60** may be stored on a portable medium, and then inputted to user interface **16** via portable storage medium drive **92**.

[0051] In order to display textual and graphical information, user interface **16** includes graphics subsystem **94** and display **96**. Graphics subsystem **94** receives textual and graphical information and processes the information for output to display **96**. Display **96** may include a cathode ray tube (CRT) display, liquid crystal display (LCD), projection displays, other suitable display devices, or means for displaying, that enables a user to view data. Display **96** can be used to display data, component interfaces and/or display other information that is part of a user interface.

[0052] Input device(s) **98** provides a portion of a user interface with user interface **16**. Input device(s) **98** may include an alpha-numeric keypad for inputting alphanumeric and other key information, or a pointing device, such as a mouse, a trackball, stylus, wheel, cursor or direction keys. Such devices provide additional means for interfacing with user interface **16** and, ultimately, central controller **12**.

[0053] In a further embodiment, the present invention also includes a computer program **110** that includes a storage medium (media) component having instructions stored thereon which can be used to program a computer to perform the method of the present invention. The storage medium can include, but is not limited to, any type of computer-readable medium including floppy disks, optical disks, DVD, CD-ROMs, magnetic optical disks, RAMs, EPROM, EEPROM, magnetic or optical cards, or any type of media suitable for storing electronic instructions.

[0054] Stored on any one of the computer-readable medium (media), the present invention may also include user interface software **104** for controlling both the hardware of user interface **16** or processor **80**, and for enabling user interface **16** and processor **80** to interact with a human user or other mechanism utilizing the results of the present invention. Software **104** may include, but is not limited to, device drivers, operating systems and user applications. Software **104** is configured to interface with standard bunk readers or feedlot accounting and medical systems **112** such

as Turnkey, Hi-Plains, Dalex, Advanced Computer Systems, Micro Beef, USI CattleXpert, Feedlot Solutions, Ltd., Feedlot Monitor by ISU Research Foundation, and Walco—ITA, Lextron—Micro Tech for easy transfer of data from these accounting and medical systems to software **104** for use in the method of the present invention. In a preferred embodiment, software **104** is configured to interface and collect information **114** from at least three different systems thereby providing an accounting system interface, a health system interface, and a feed/ration system interface. Information **114** may include, but is not limited to, any data collected or generated by standard systems **112**.

[0055] Many commercial software applications are available to enable the communications required by user interface **16**. When central controller **12** acts as a web server, conventional communications software such as the Internet Explorer web browser from Microsoft Corporation or the Netscape Navigator® web browser from Netscape Corporation may also be used. No proprietary software is required.

[0056] Referring now to **FIG. 3**, the present invention also provides a method for collecting, managing and reporting feedlot cattle data and feed additive consumption data. In accordance with the method of the present invention, information **114** is electronically transferred from standard systems **112** into user interface software **104** or information **114** may be manually entered into software **104** wherein information **114** is converted into at least one raw data file **116**. Raw data file **116** may contain any of data **52, 54, 56, 58, 59** and **60** and may be collected, used or sent as individual files or batches. Raw data file **116** is then transferred to central controller **12** electronically via interface software **104** or electronically via standard electronic messaging programs. In a preferred embodiment of the present invention, raw data file **116** is transferred to central controller as XML following a Document Content Description File or Microsoft Excel files generated by a template from interface software **104**.

[0057] When central controller **12** acts as a web server, a user may also log on to the central controller **12** in order to transfer raw data file **116**. Central controller **12** is connected to a corresponding web site on the Internet thereby allowing the user to provide and request information through the interface of conventional web browser software such as Internet Explorer from Microsoft Corporation. The web site has a home page with topic selections and links (e.g., hypertext HTML technology) to application program **40** thereby triggering searches and initiating transfer of raw data file **116** and other desired information. In particular, for each topic or field selection there may be a respective hyperlink to application program **40** and optionally an event for initiating program **40**. Upon the user's selection of a topic from the web page, the present invention applies the linked event, if any. If the criteria of the event are met (or if there is no initiating event), then the present invention executes the corresponding application program **40**.

[0058] Rather than sending electronic mail or using web-based servers, users may also transfer information **114** or raw data file **116** via a telephone, fax machine, postal mail, or other off-line communication tool. For example, the user may call central controller **12** and be connected with an agent wherein the agent inputs information **114** or raw data file **116** into digital form by typing it into a terminal or other input device **34**. The user may also fax copies of information

114 or raw data file **116** to an agent connected with central controller **12**. In an alternative off-line embodiment, the user calls central controller **12** and is connected with a conventional interactive voice response unit which allows the user to enter information **114** or raw data file **116** without the aid of a live agent. The user initially selects from a menu of subjects using the touch-tone keys of a telephone, and then the call is either directed to a live agent specializing in that subject area, or the user is prompted for further information.

[0059] Regardless of the method or transmission means of inputting raw data file **116**, upon receipt of raw data file **116** at central controller **12**, raw data file **116** is collected in a central raw data repository **118**. In a verification step, raw data **116** is then reviewed automatically, electronically or manually for errors or for data that is outside standard deviation parameters via a rules engine containing standard minimums and maximums particular to the type of data being reviewed. If raw data **116** contains errors or data outside standard deviation parameters, it is moved from the central repository **118** into an error file queue **120** and may be returned via any transmission means to the user for review and correction in order to resolve the error or deviation. Raw data **116** may then be re-transmitted to central controller **12** via any of the transmission means discussed above. As used herein, transmission means or transfer means includes any information or data transmission or transfer means currently known to the computer industry or hereafter developed. Data failure event logs and/or automated electronic messages may be generated to agents of central controller **12** for maintenance of the system and data evaluation. If raw data **116** does not contain errors or data outside standard deviation parameters, raw data **116** is then normalized for coding consistency. Normalized data file **122** is then transferred to data mine **124** or other repository where it is mapped and/or compared and/or validated using tolerances based on historical data file archive(s) **126** that may reside within data mine **124** or some other data repository. Historical data **126** may include any one or more of data **52**, **54**, **56**, **58**, **59** and **60** that has been previously entered into the system. During the mapping step, normalized data **122** may be converted into standardized units of measure. Product labels may be verified and standardized. Further, normalized data **122** may be inserted into pre-built tables, record-sets, forms, or other data collection tools for use in analysis or comparison against historical data **126**. If normalized data **122** is a duplicate of data **52**, **54**, **56**, **58**, **59** or **60** already residing within data mine **124**, it can be deleted or used to overwrite the previously existing data **52**, **54**, **56**, **58**, **59** and **60**.

[0060] If normalized data **122** contains feedlot performance data **56** and/or feed data **58** wherein feed, ration, pharmaceuticals or biological agent data is being generated, the product label, manufacturer identification, feed type, pharmaceutical or biological agent type, active ingredient, administration method used, start date, end date and dosage given information may be processed through a calculated dose engine **128** to be validated. During validation, the dosages may be calculated and a record-set built. Labels may be then automatically applied to the calculated dosages. Alternatively, individual record validation of the particular dataset may occur and the product label validated. Validation tolerances for invalid record sets may be pre-determined so that invalid record sets can be identified and re-validated or calculated. A label audit step may also occur within data

mine **124** or after the labels and dosages have been validated and transmitted to another repository for audit records. A similar process may be utilized for each of data **52**, **54**, **56**, **58**, **59** and **60** depending upon the needs of the user or analyst.

[0061] Normalized data **122** may also be compared against historical data **126** as well as other data sets included within normalized data **122** and mapped using data-type specific mapping or matching algorithms in order to link certain types of data to particular lots, pens or individual animals. For example, feed ration ingredient data for a particular lot may be linked, using a data-specific matching algorithm, to ration consumption data. Following mapping, normalized data **122** may then be compared against historical data **126** in order to update error and validation tolerances as well as provide information useful in a reporting step.

[0062] Following the comparison step, normalized data **122** is then transmitted to a reporting architecture **130**. Reporting architecture **130** contains pre-built data groupings, report views, and report engines that allow reporting architecture to receive normalized data **122** and generate reports **132** containing information from normalized data **122** based upon the needs of the user or analyst such as those shown in FIGS. 5-11. For example, reports **132** may be generated as data files, charts, tables, or any other reporting format that a user or analyst may require. In addition to normalized data **122**, reports **132** may contain feedlot location (state, region, country), corporate information, date ranges, and the like. Reports **132** may also contain matched data such as a feed ration and feed ingredient report showing all ingredients and amounts of feed consumed by a particular animal, lot or pen. Similarly, a particular animal's (or pen or lot) carcass data could be matched against that animal's feedlot performance, feed data, health data, and the like. Thus, reports **132** may be generated in response to the request of a user or analyst desiring monthly or quarterly performance reports from a particular feedlot, groups of feedlots, a particular packer, groups of packers, animal health companies, and the like or an overview of all data collected. Reports **132** may then be transmitted to a user or analyst via any transmission means desired in any report format desired. Reports **132** may be particularly useful for determining what feedlot products have actually been consumed and the performance of the feedlot associated therewith. Similarly, users may wish to receive such reports to evaluate actual market share and dose volume or market share trend data by, for example, geographic region, feedlot capacity, and weight. Users may also desire reports regarding whether feedlots are using products per the users' recommendations and other information such as how many days after arrival or slaughter was a product administered or what other products are being used in conjunction with a particular product.

[0063] Alternatively, a user may access reports **132** directly from system **10** via a web page. It will be appreciated by those skilled in the art that buttons or drop-down menus may be provided on the web page for ease of selection and linking to appropriate web pages during performance of the method of the present invention. The user logs on to central controller **12** using network interface **86** of user interface **16** thereby establishing a communication link. A unique username and password may be provided to the user which allows information particular to the user to be

made available for viewing by the user. The user inputs an assigned username and password into appropriate fields on the web page and the user's identity is verified by transmitting the information to central controller 12 which then matches the username and password against a particular account in user account data repository 61. A representative screen shot of the user log-in page is shown in FIG. 4. If a correct username and password has been provided by the user, central controller 12 transmits that portion of user account data 59 that corresponds to the user's account information to user interface 16. The user may then select to view its account information including, but not limited to, any of data 52, 54, 56, 58, 59 and 60.

[0064] A user may select a field(s) from which to search for a desired data set. The user inputs the desired information into the relevant field thereby requesting controller 12 to search within the fields and search criteria inputted. For example, the user may want information regarding feed additive dosages given within a particular date range within user's feedlot. The user would either input or select from drop-down menus these search criteria. Once the search criteria have been selected, the user transmits them to central controller 12. This is done by clicking on a "search" button, or functionally-equivalent action, located on the search screen provided by the graphical user interface. The search criteria are received by controller 12 and checked for matches against data mine 124. Data 58 meeting the search criteria is then copied or otherwise transferred from data mine 124 and transmitted to user interface 16 for viewing by the user. The user may choose to start over and enter new search criteria in fields or the user may choose to refine the search criteria to narrow the number of results achieved. If, however, the user is satisfied with the search results, the user may select a particular data set developed by the search for viewing. Once selected, a screen is provided having the data 58 applicable to the data ranges and feed additive dosages selected by the user thereon. Data 58 may be provided as a report 132 or other easily-viewable format. After reviewing data 58, the user may choose to view additional available data 52, 54, 56, 58, 59 or 60, get a more detailed report containing data 52, 54, 56, 58, 59 or 60, or add raw data 112.

[0065] In use, application program 40 instructs central controller 12 to connect to transmission means 14 via network interface 26 and sends, for example, data 58 to user interface 16 which is then displayed for the user in order to aid the user's management of its account and data. Both audio and visual data may be included in data 58 and transmitted in such a manner. Similarly, desired user account data 59 may be inputted into central controller 12 and application program 40 wherein user account data 59 is collected in such a way as to correspond to a specific user. Application program 40 then connects to transmission means 14 via network interface 26 and sends user account data 59 to user interface 16 which is then displayed for the user.

[0066] The foregoing description of the embodiments of the invention has been presented for purposes of illustration and description, and is not intended to be exhaustive or to limit the invention to the precise form disclosed. The description was selected to best explain the principles of the invention and practical application of these principles to enable others skilled in the art to best utilize the invention in various embodiments and modifications as are suited to the

particular use contemplated. In particular, hardware, software and transmission means have been described for purposes of illustration and description. It will be appreciated by those skilled in the art that any hardware, software, and transmission means now known or hereafter developed that would be suitable for user in the method of the present invention may be used in accordance with the present invention. Furthermore, while the foregoing description of the embodiments of the invention has been presented in the context of the beef cattle industry, the present invention would be suitable for use in any other type of livestock industry such as swine, poultry, dairy cattle, sheep, goats, ostrich, and the like. It is intended that the scope of the invention not be limited by the specification, but be defined by the claims set forth below.

We claim:

1. A method for managing livestock data comprising the steps of:

- collecting raw livestock data from a plurality of livestock data acquisition locations;
- determining through an iterative process the validity of said raw livestock data;
- normalizing the validated data using a conversion factor based upon the type and unit of measurement for the data; and

- presenting the normalized data in a report format.

2. The method of claim 1 further comprising the step of transmitting livestock data from a plurality of livestock data acquisition locations.

3. The method of claim 2 further comprising the step of converting said raw livestock data into a standardized format prior to transmitting said raw data.

4. The method of claim 1 further comprising the step of receiving said raw livestock data in a central repository.

5. The method of claim 4 further comprising the step of validating said raw livestock data using standard deviation parameters and at least one rules engine configured to provide standard minimums and maximums particular to the type of raw data transmitted.

6. The method of claim 5 further comprising the step of transmitting un-validated raw livestock data back to said livestock data acquisition locations.

7. The method of claim 1 further comprising the step of mapping said validated data.

8. The method of claim 7 further comprising the step of converting said validated data into standardized units of measure and inserting the converted data into at least one data collection tool.

9. The method of claim 7 further comprising the step of converting product label data contained in said validated data into a standard format and inserting said label data into at least one data collection tool.

10. The method of claim 1 further comprising the step of matching said validated data using a matching algorithm configured to link data identifying a particular animal, pen or lot.

11. The method of claim 1 further comprising the step of matching said validated data using a matching algorithm configured to link data identifying feed rations and feed ingredients consumed by a particular animal, pen or lot.

12. The method of claim 1 further comprising the step of matching said validated data using a matching algorithm

configured to link data identifying pre- and post-slaughter characteristics of a particular animal, pen or lot.

13. The method of claim 1, said livestock data being selected from the group consisting of demographic data, animal health data, feedlot performance data, feed data, carcass data, and user account data.

14. A system for managing livestock data comprising:

means for accessing and collecting livestock data from legacy software applications;

means for transmitting said data to a livestock data management system;

means for validating said data;

means for normalizing said data; and

means for reporting said data.

15. The system of claim 14 further comprising means for converting said raw livestock data into a standardized format prior to transmitting said raw data.

16. The system of claim 14 further comprising means for receiving said raw livestock data in a central repository.

17. The system of claim 16 further comprising means for validating said raw livestock data using standard deviation parameters and at least one rules engine configured to provide standard minimums and maximums particular to the type of raw data transmitted.

18. The system of claim 17 further comprising the step of transmitting un-validated raw livestock data back to said livestock data acquisition locations.

19. The system of claim 14 further comprising means for mapping said validated data.

20. The system of claim 19 further comprising means for converting said validated data into standardized units of measure and inserting the converted data into at least one data collection tool.

21. The system of claim 19 further comprising means for converting product label data contained in said validated data into a standard format and inserting said label data into at least one data collection tool.

22. The system of claim 14 further comprising means for matching said validated data using a matching algorithm configured to link data identifying a particular animal, pen or lot.

23. The system of claim 14 further comprising means for matching said validated data using a matching algorithm configured to link data identifying feed rations and feed ingredients consumed by a particular animal, pen or lot.

24. The system of claim 14 further comprising means for matching said validated data using a matching algorithm configured to link data identifying pre- and post-slaughter characteristics of a particular animal, pen or lot.

25. The system of claim 14, said livestock data being selected from the group consisting of demographic data, animal health data, feedlot performance data, feed data, carcass data, and user account data.

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