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Manson

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(54) **COMPUTER SYSTEM WITH NATURAL LANGUAGE TO MACHINE LANGUAGE TRANSLATOR**

6,029,123 A 2/2000 Suda et al.
6,070,134 A 5/2000 Richardson et al.
6,108,620 A 8/2000 Richardson et al.
6,311,150 B1 * 10/2001 Ramaswamy et al. 704/1

(75) Inventor: **Keith S. Manson**, Albany, CA (US)

OTHER PUBLICATIONS

(73) Assignee: **Ravenflow, Inc.**, Emeryville, CA (US)

Pereira, *Categorial Semantics and Scoping* (1990) *Computations Linguistics* V.1, p. 1-10.*

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1095 days.

Uchinami et al., *Linguistic model based on the generative topological information space*, Osaka University (1980), p. 93-100.*

(21) Appl. No.: **09/883,693**

Warren et al., *Using Semantics in Non-Context-Free Parsing of Montague Grammar*, 1982, *American Journal of Computational Linguistics*, V.8, No. 3-4, Jul.-Dec. 1982, p. 123-138.*

(22) Filed: **Jun. 18, 2001**

* cited by examiner

(65) **Prior Publication Data**

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Related U.S. Application Data

(60) Provisional application No. 60/235,165, filed on Sep. 23, 2000.

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(51) **Int. Cl.**

G06F 17/27 (2006.01)

ABSTRACT

(52) **U.S. Cl.** 704/9; 704/1

(58) **Field of Classification Search** 704/9

See application file for complete search history.

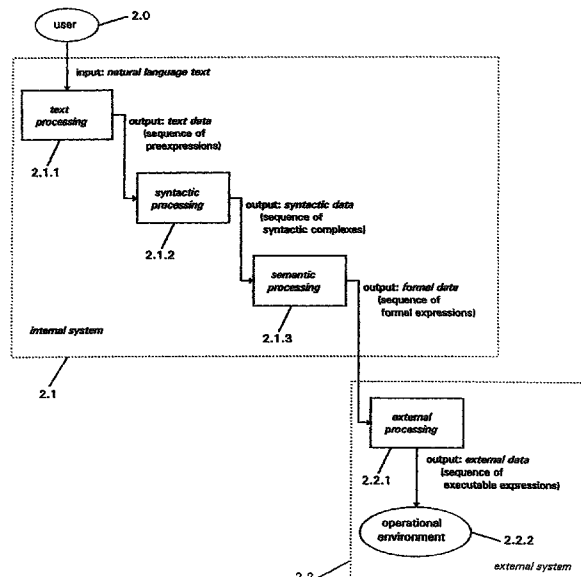
Presented is a system and method for converting or translating expressions in a natural language such as English into machine executable expressions in a formal language. This translation enables a transformation from the syntactic structures of a natural language into effective algebraic forms for further exact processing. The invention utilizes algorithms employing a reduction of sequences of terms defined over an extensible lexicon into formal syntactic and semantic structures. This term reduction incorporates both syntactic type and semantic context to achieve an effective formal representation and interpretation of the meaning conveyed by any natural language expression.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,321,608 A * 6/1994 Namba et al. 704/9
5,555,169 A * 9/1996 Namba et al. 704/9
5,682,539 A * 10/1997 Conrad et al. 704/9
5,878,385 A 3/1999 Bralich et al.
5,884,302 A * 3/1999 Ho 707/3
5,966,686 A 10/1999 Heidorn et al.

9 Claims, 7 Drawing Sheets



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EXHIBIT 1009

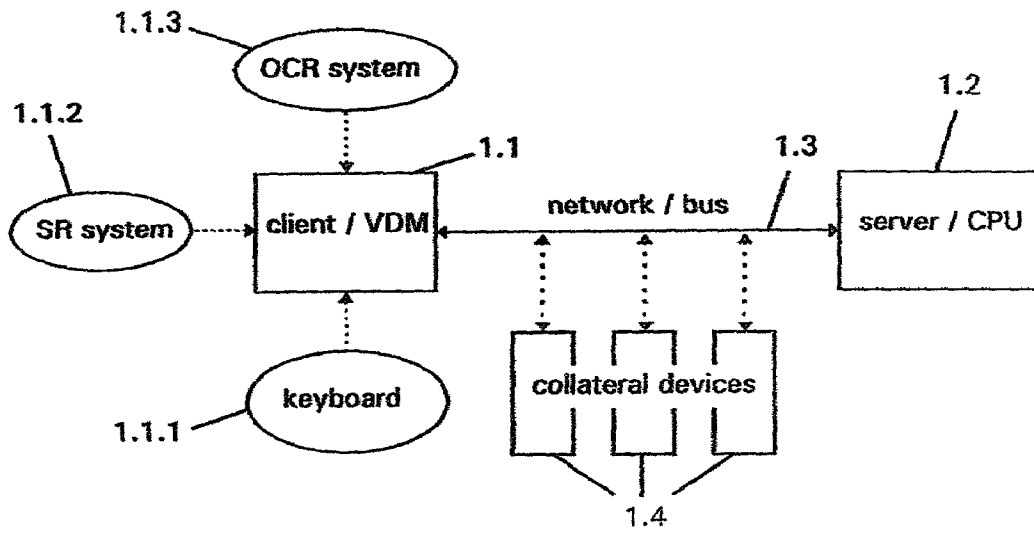


Figure 1: Computer System Architecture

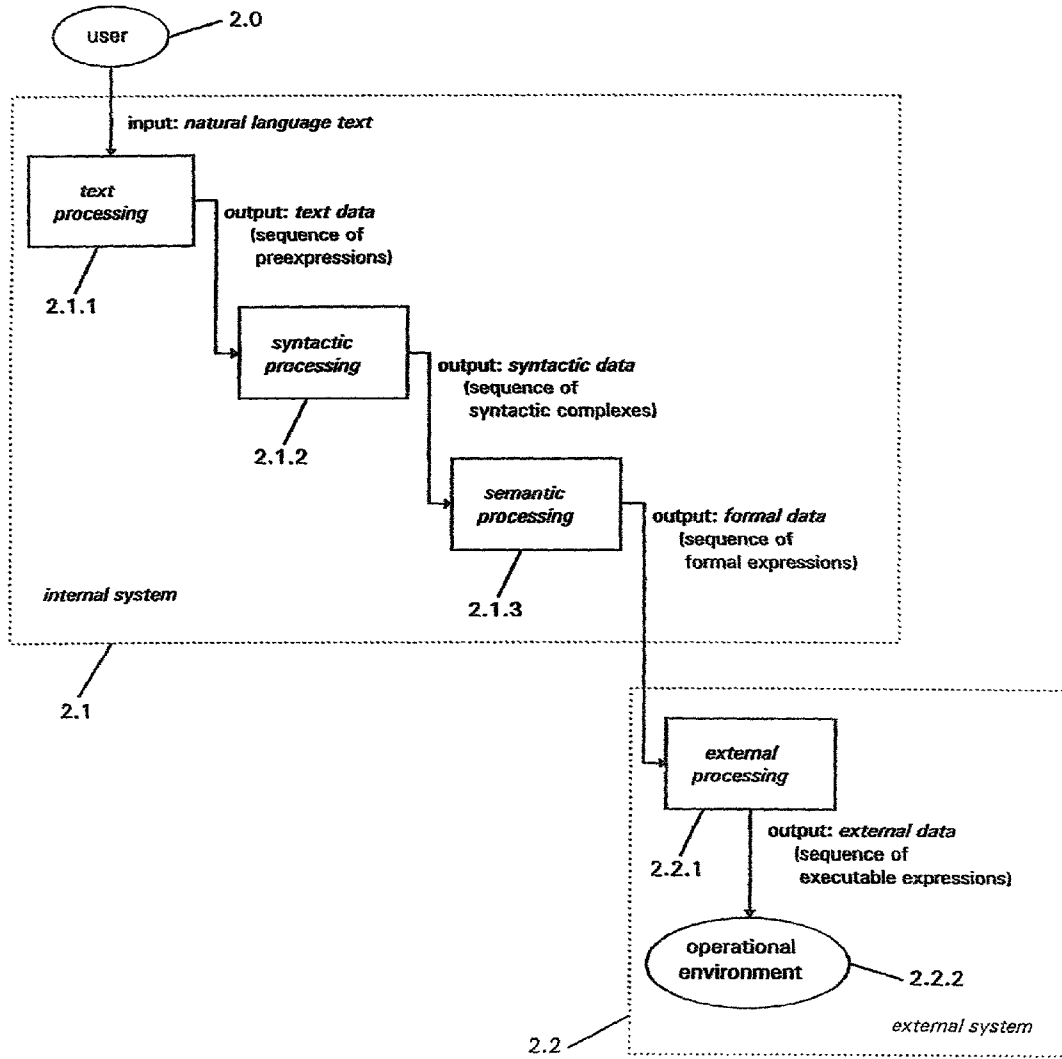


Figure 2: General System Process and Data Flow

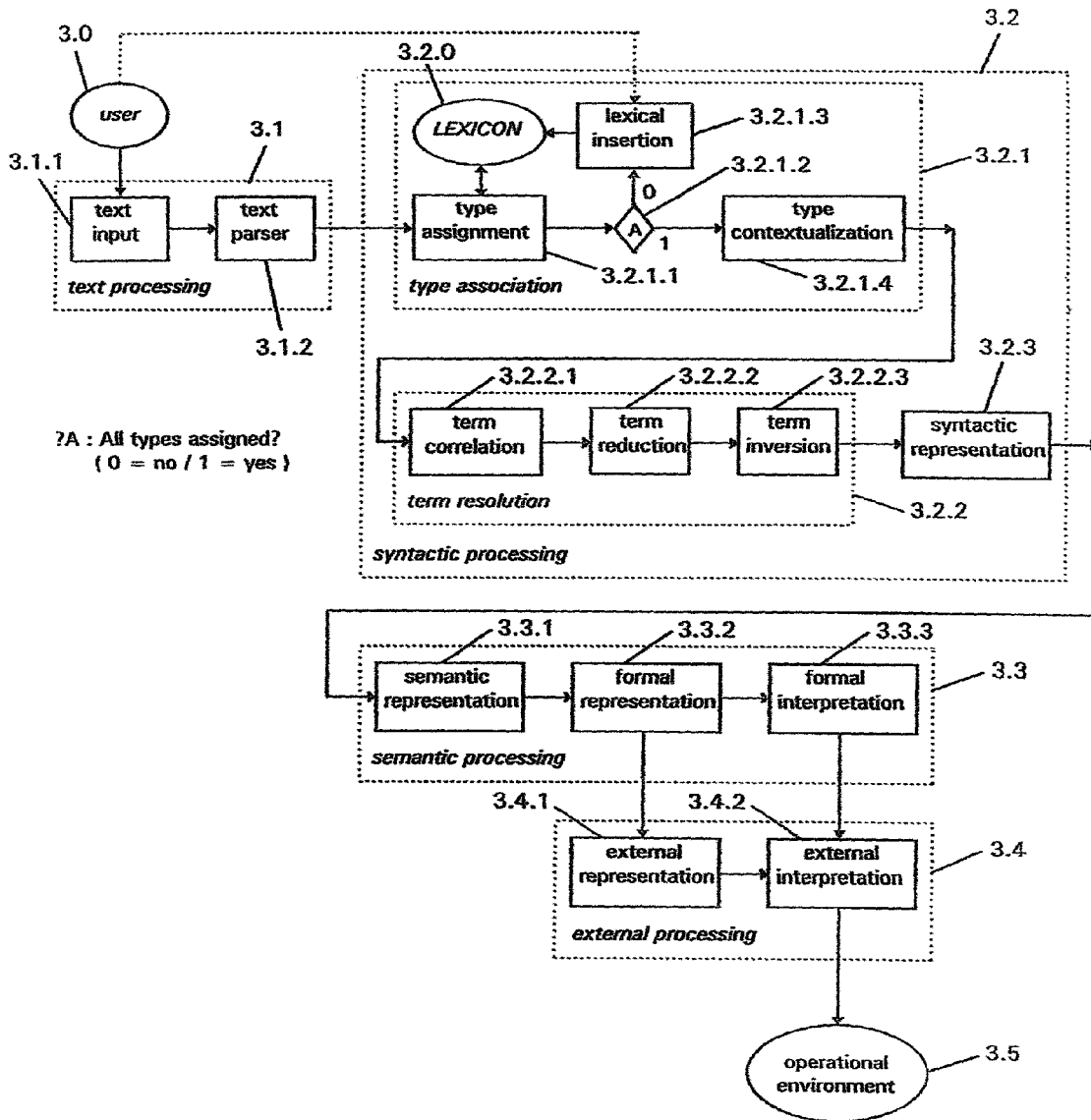


Figure 3: Detailed System Process and Data Flow

0) {send,act} = {send,lextyp(0,send)};	act = action
1) {Bob,pnm} = {Bob,lextyp(0,Bob)};	pnm = proper name/male
2) {an,adj} = {an,lextyp(0,an)};	adj = adjective
3) {email,xao} = {email,lextyp(0,email)};	xao = ambiguous action/object
4) {asking,ing} = {asking,lextyp(0,asking)};	ing = ambiguous participle/gerund
5) {him,ppm} = {him,lextyp(0,him)};	ppm = personal pronoun/male
6) {if,xdc} = {if,lextyp(0,if)};	xdc = ambiguous delimiter/conditional
7) {he,ppm} = {he,lextyp(0,he)};	ppm = personal pronoun/male
8) {is,sob} = {is,lextyp(0,is)};	sob = state-of-being verb
9) {going,ing} = {going,lextyp(0,going)};	ing = ambiguous participle/gerund
10) {to,xpi} = {to,lextyp(0,to)};	xpi = ambiguous preposition/infinitive
11) {go,act} = {go,lextyp(0,go)};	act = action
12) {to,xpi} = {to,lextyp(0,to)};	xpi = ambiguous preposition/infinitive
13) {his,psm} = {his,lextyp(0,his)};	psm = personal possessive/male
14) {appointment,xom} = {appointment,lextyp(0,appointment)};	xom = ambiguous object/modifier
15) {by,prp} = {by,lextyp(0,by)};	prp = preposition
16) {himself,prm} = {himself,lextyp(0,himself)};	prm = personal reflexive/male
17) {.,trm} = {.,lextyp(0,.)};	trm = termination

Figure 4a: Virtual Type Assignment

0) {send,act} = {send,lextyp(0,send)};	act = action
1) {Bob,pnm} = {Bob,lextyp(0,Bob)};	pnm = proper name/male
2) {an,adj} = {an,lextyp(0,an)};	adj = adjective
3) {email,obj} = {email,lextyp(1,email)};	obj = object
4) {asking,ptc} = {asking,lextyp(1,asking)};	ptc = participle
5) {him,ppm} = {him,lextyp(0,him)};	ppm = personal pronoun/male
6) {if,dlp} = {if,lextyp(0,if)};	dlp = phrase delimiter
7) {he,ppm} = {he,lextyp(0,he)};	ppm = personal pronoun/male
8) {is,sob} = {is,lextyp(0,is)};	sob = state-of-being verb
9) {going,ptc} = {going,lextyp(1,going)};	ptc = participle
10) {to,inf} = {to,lextyp(2,to)};	inf = infinitive
11) {go,act} = {go,lextyp(0,go)};	act = action
12) {to,prp} = {to,lextyp(1,to)};	prp = preposition
13) {his,psm} = {his,lextyp(0,his)};	psm = personal possessive/male
14) {appointment,obj} = {appointment,lextyp(1,appointment)};	obj = object
15) {by,prp} = {by,lextyp(0,by)};	prp = preposition
16) {himself,prm} = {himself,lextyp(0,himself)};	prm = personal reflexive/male
17) {.,trm} = {.,lextyp(0,.)};	trm = termination

Figure 4b: Actual Type Assignment

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