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United States Patent [19]

Hill et al.

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[54] **ADAPTIVE SYSTEM AND METHOD FOR RESPONDING TO COMPUTER NETWORK SECURITY ATTACKS**

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[51] **Int. Cl.**[7] **G06F 11/30**; H04L 9/00

[52] **U.S. Cl.** **713/201**; 713/200; 713/201

[58] **Field of Search** 713/201, 200; 714/38, 47, 48, 57; 380/4

[56] **References Cited**

U.S. PATENT DOCUMENTS

5,062,147	10/1991	Pickett et al.	714/57
5,237,677	8/1993	Hirosawa et al.	714/57
5,414,833	5/1995	Heshey et al.	713/201
5,440,723	8/1995	Arnold et al.	714/2
5,452,442	9/1995	Kephart	380/4
5,491,791	2/1996	Glowny et al.	714/47
5,511,163	4/1996	Lerche et al.	714/39

FOREIGN PATENT DOCUMENTS

WO 93/22723	3/1993	WIPO .

OTHER PUBLICATIONS

Doumas et al. Design of a Neural Network for Recognition and Classification of Computer Virsul. pp. 435–448, 1995.

Tesauro et al. Neural networks for computer virusl recognition. pp. 5–6, Aug. 1996.

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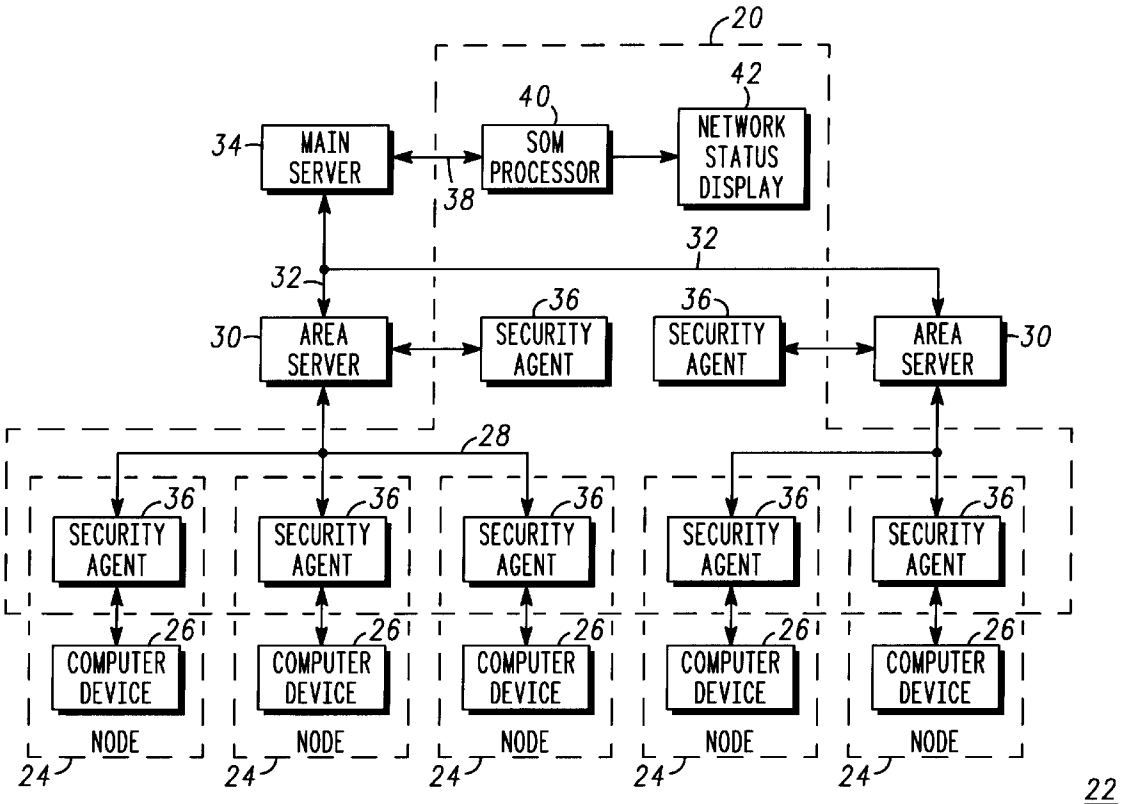
[57] **ABSTRACT**

A dynamic network security system **(20)** responds to a security attack **(92)** on a computer network **(22)** having a multiplicity of computer nodes **(24)**. The security system **(20)** includes a plurality of security agents **(36)** that concurrently detect occurrences of security events **(50)** on associated computer nodes **(24)**. A processor **(40)** processes the security events **(50)** that are received from the security agents **(36)** to form an attack signature **(94)** of the attack **(92)**. A network status display **(42)** displays multi-dimensional attack status information representing the attack **(92)** in a two dimensional image to indicate the overall nature and severity of the attack **(92)**. The network status display **(42)** also includes a list of recommended actions **(112)** for mitigating the attack. The security system **(20)** is adapted to respond to a subsequent attack that has a subsequent signature most closely resembling the attack signature **(94)**.

19 Claims, 6 Drawing Sheets



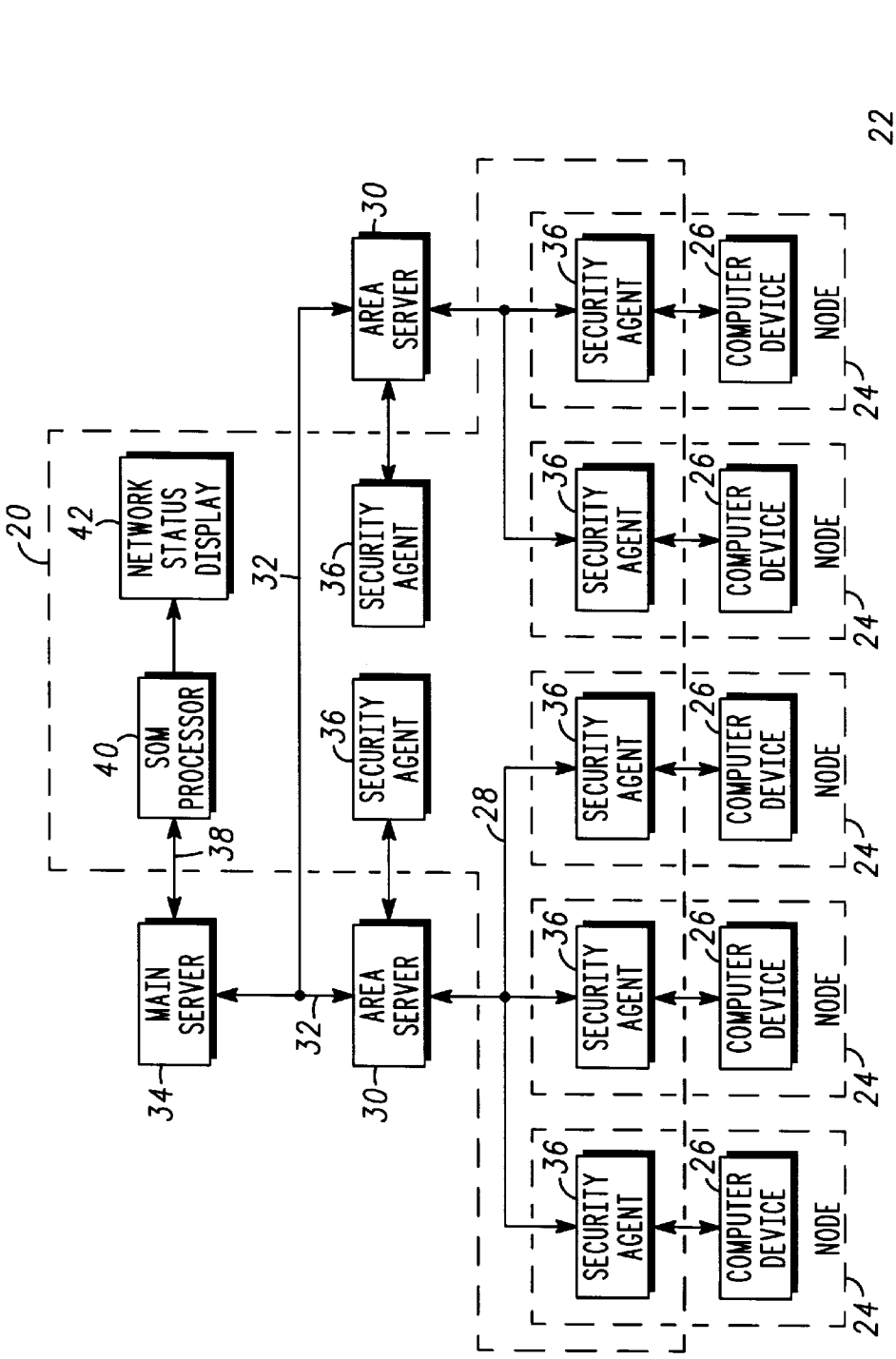


FIG. 1

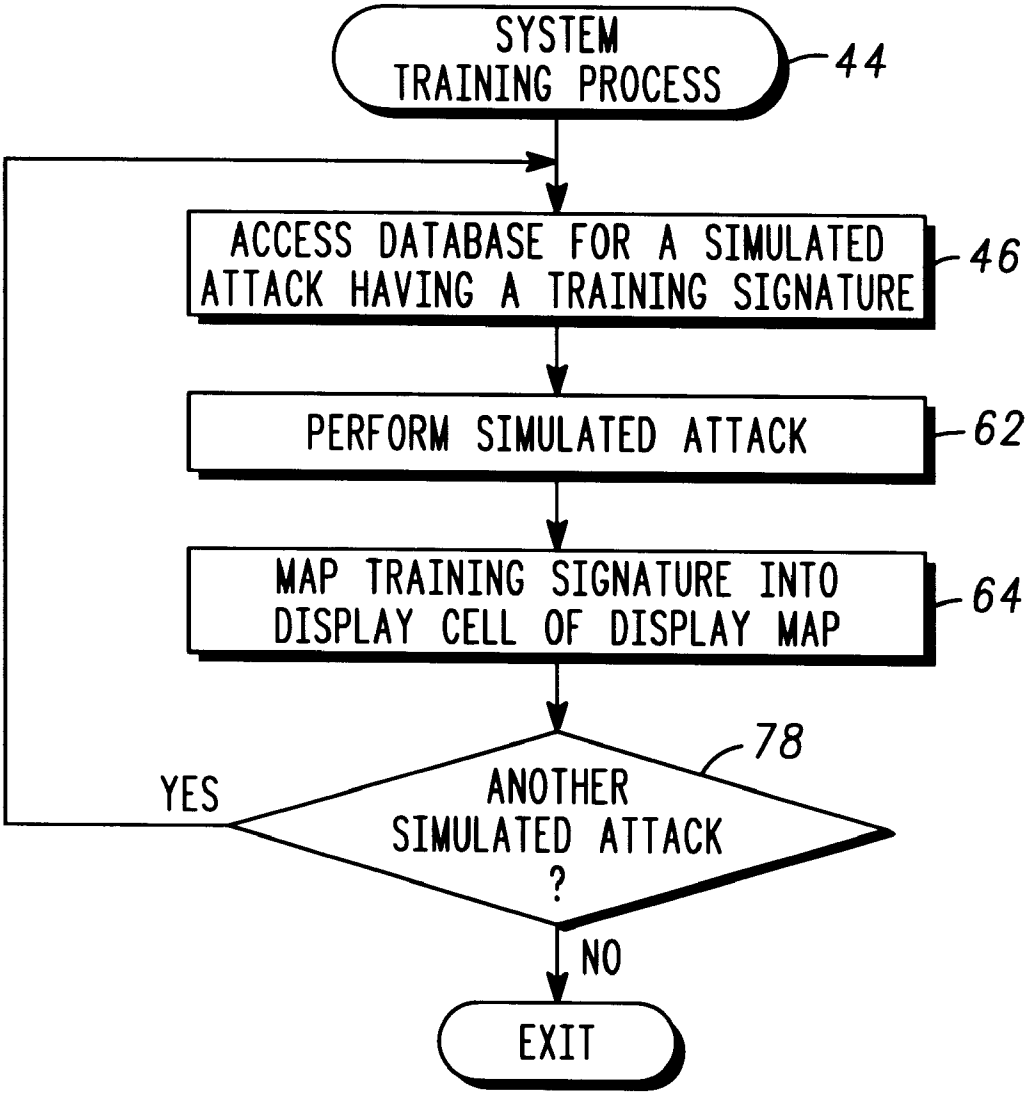


FIG. 2

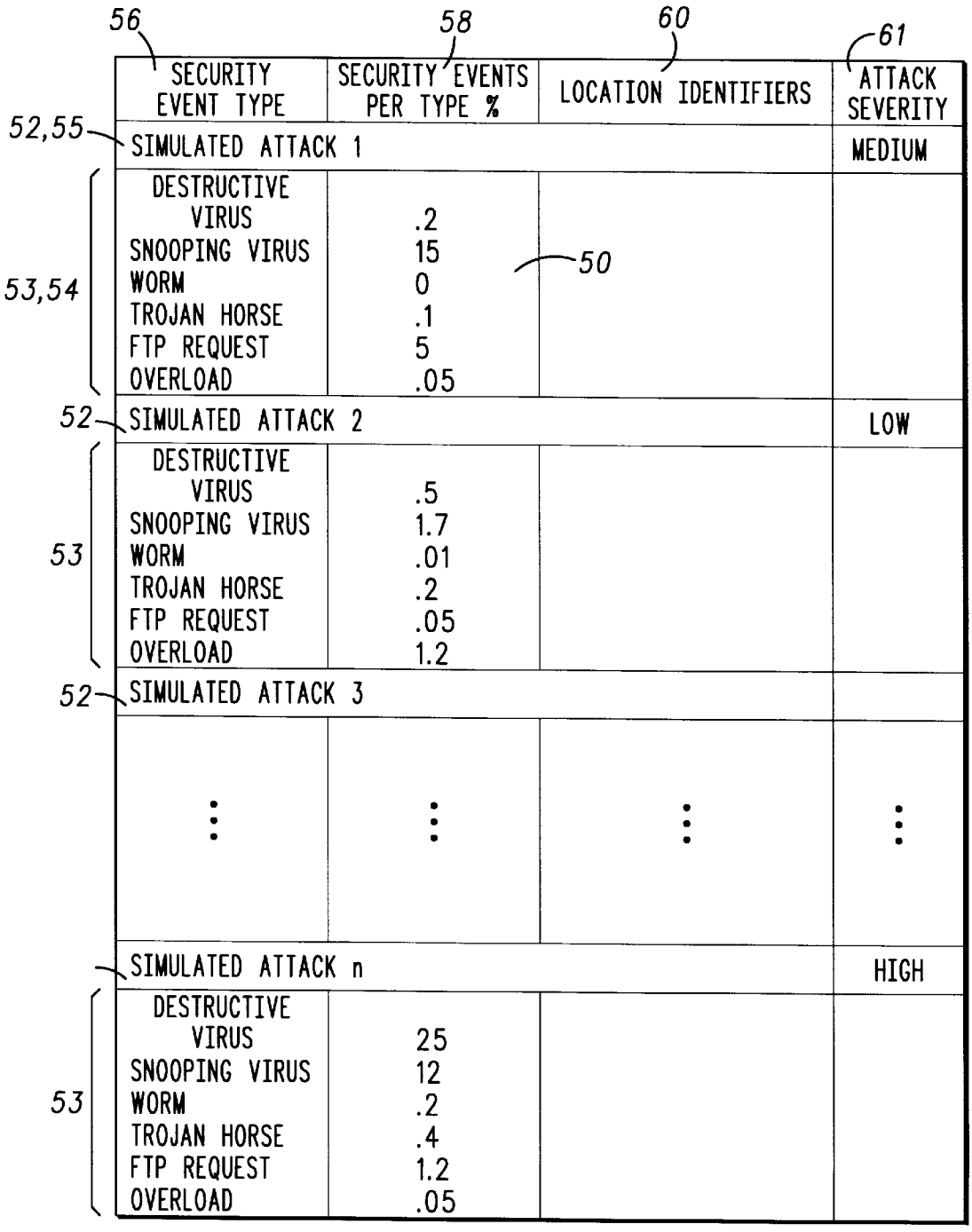


FIG. 3

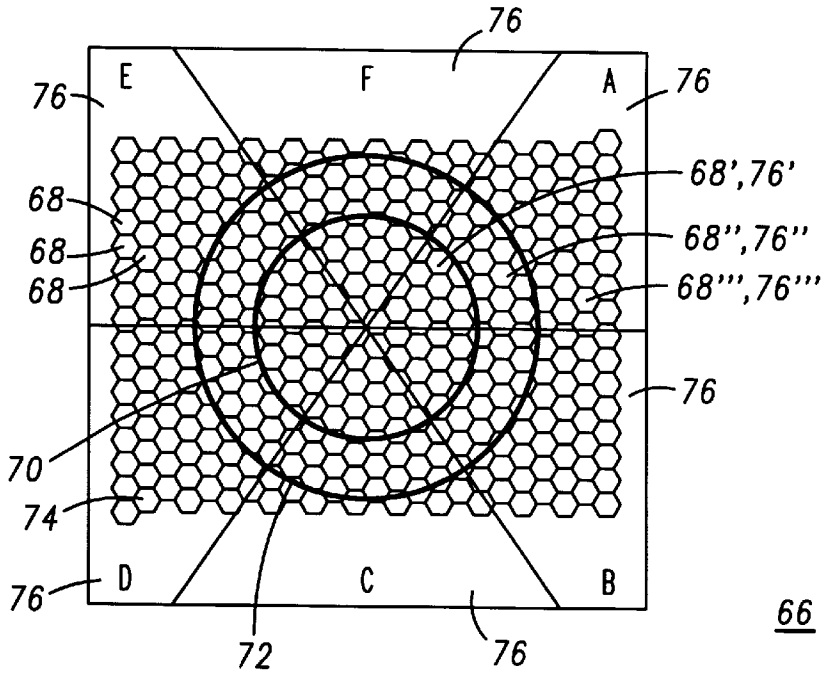


FIG. 4

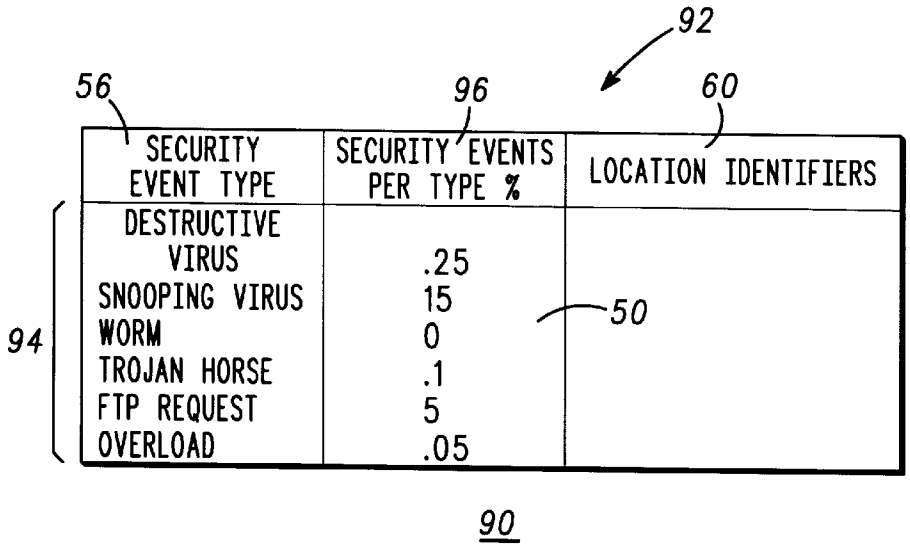


FIG. 6

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