US007908343B2

(54) **OPTIMIZED IMAGE DELIVERY OVER LIMITED BANDWIDTH COMMUNICATION CHANNELS**

(75) Inventors: **Isaac Levanon**, Ramat Hasharn (IL); **Yoni Lavi**, Raanana (IL)

(73) Assignee: **Inovo Limited**, The Valley Anguilla (VG)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **12/619,643**

(22) Filed: **Nov. 16, 2009**

(65) **Prior Publication Data**

US 2010/0064002 A1 Mar. 11, 2010

Related U.S. Application Data

(63) Continuation of application No. 10/035,987, filed on Dec. 24, 2001, now Pat. No. 7,644,131.

(60) Provisional application No. 60/258,488, filed on Dec. 27, 2000, provisional application No. 60/258,489, filed on Dec. 27, 2000, provisional application No. 60/258,465, filed on Dec. 27, 2000, provisional application No. 60/258,468, filed on Dec. 27, 2000, provisional application No. 60/258,466, filed on Dec. 27, 2000, provisional application No. 60/258,467, filed on Dec. 27, 2000.

(51) **Int. Cl.**
G06F 15/16 (2006.01)

(52) **U.S. Cl.** **709/217**; 709/230; 345/625; 382/232; 382/305

(58) **Field of Classification Search** 709/202, 709/203, 217, 230, 246, 247; 345/625; 382/232, 382/305

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,929,860 A	7/1999	Hoppe	
6,182,114 B1	1/2001	Yap et al.	
6,212,301 B1	4/2001	Warner et al.	
6,314,452 B1	11/2001	Dekel et al.	
6,326,965 B1	12/2001	Castelli et al.	
6,345,279 B1	2/2002	Li et al.	
6,346,938 B1	2/2002	Chan et al.	
6,397,259 B1	5/2002	Lincke et al.	
6,608,933 B1	8/2003	Dowell et al.	
6,704,024 B2	3/2004	Robotham et al.	
6,711,297 B1	3/2004	Chang et al.	
6,801,665 B1	10/2004	Atsumi et al.	
7,644,131 B2 *	1/2010	Levanon et al.	709/217

OTHER PUBLICATIONS

Hoppe, H. "Progressive Meshes", SIGGRAPH '96: Proceedings of the 23rd annual conference on Computer graphics and interactive techniques, 1996, pp. 99-108.
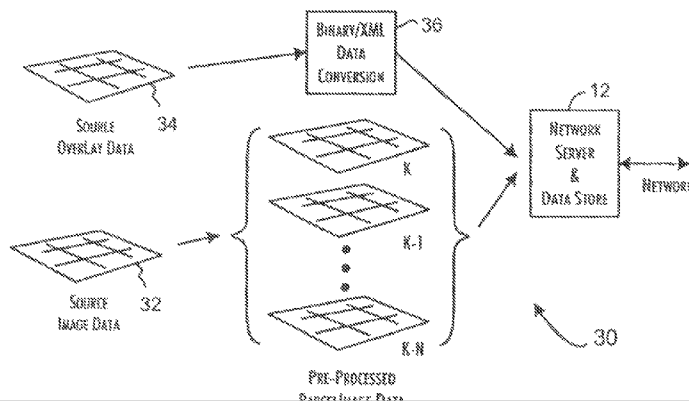
* cited by examiner

Primary Examiner — David Lazaro

(57) **ABSTRACT**

Large-scale images are retrieved over network communications channels for display on a client device by selecting an update image parcel relative to an operator controlled image viewpoint to display via the client device. A request is prepared for the update image parcel and associated with a request queue for subsequent issuance over a communications channel. The update image parcel is received from the communications channel and displayed as a discrete portion of the predetermined image. The update image parcel optimally has a fixed pixel array size, is received in a single and or plurality of network data packets, and is constrained to a resolution less than or equal to the resolution of the client device display.
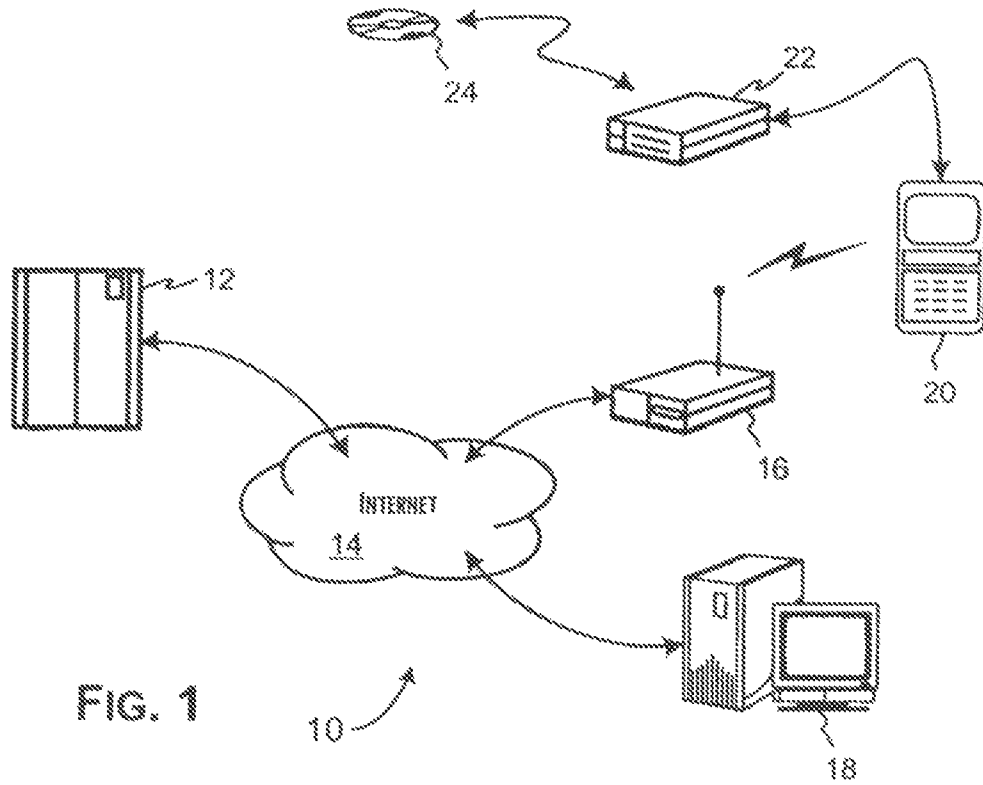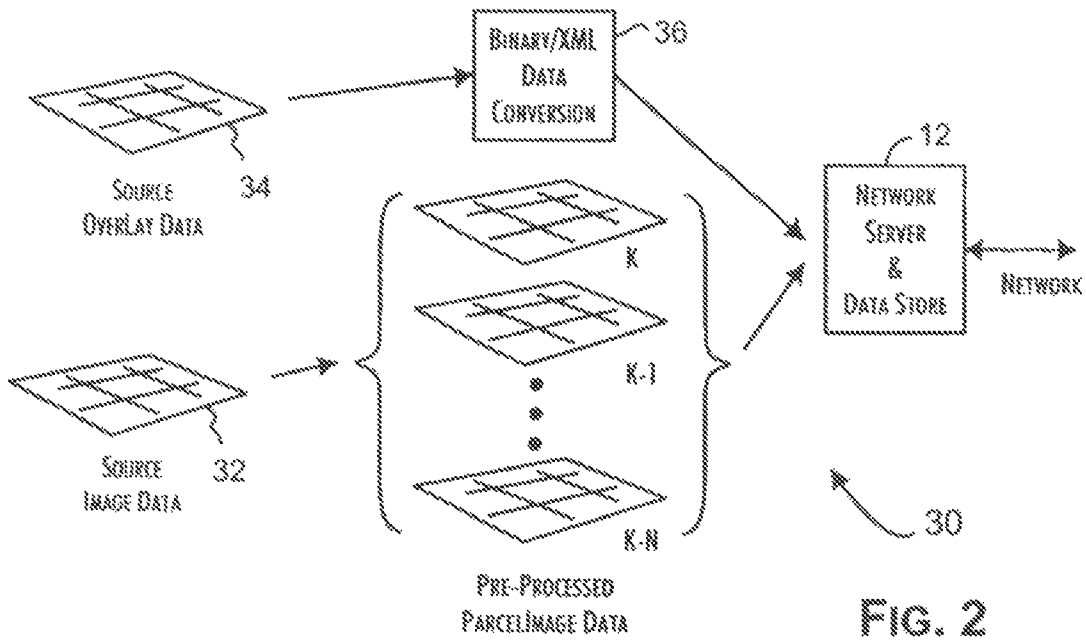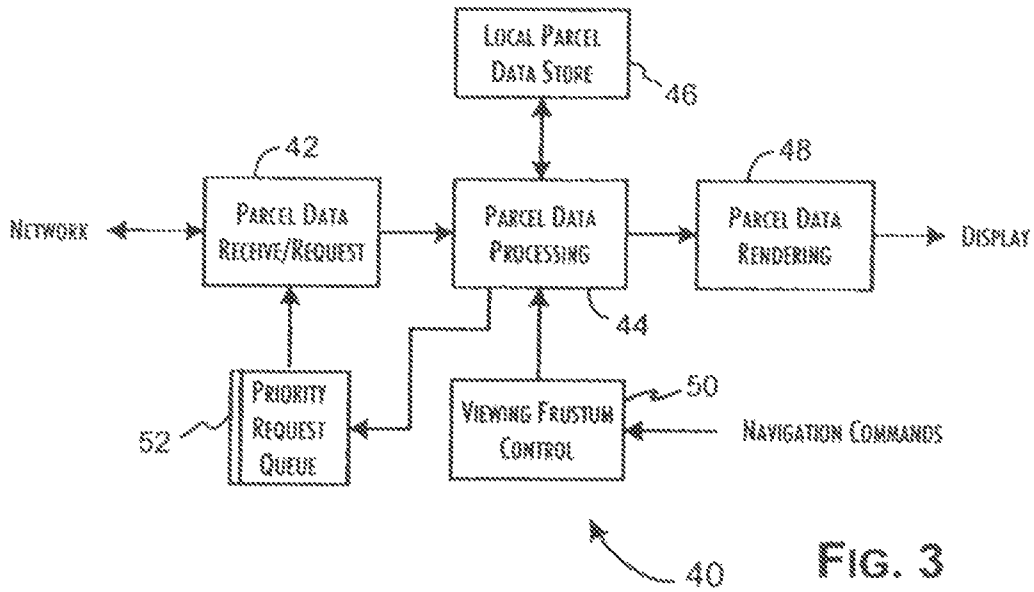
20 Claims, 5 Drawing Sheets

FIG. 1

SOURCE OVERLAY DATA   34

SOURCE IMAGE DATA   32

BINARY/XML DATA CONVERSION   36

NETWORK SERVER & DATA STORE   12

NETWORK

PRE-PROCESSED PARCEL IMAGE DATA

FIG. 2

FIG. 3

FIG. 4

FIG. 5

80

NAVIGATION EVENTS → DETERMINE VIEWABLE PARCELS FOR UPDATE (82)

EXAMINE QUADTREES

REQUEST PARCEL DOWNLOADS (84)

ISSUE PRIORITY REQUESTS (88)

NETWORK

TRIM QUADTREE NODES (94)

RECEIVE PARCEL (90)

STORE PARCEL TO QUADTREE NODE (92)

FIG. 6

100

REQUEST WAITING? (102)

WAIT FOR REQUEST THREAD FREE (104)

SELECT HIGHEST PRIORITY REQUEST WAITING (108)

ISSUE REQUEST (110)
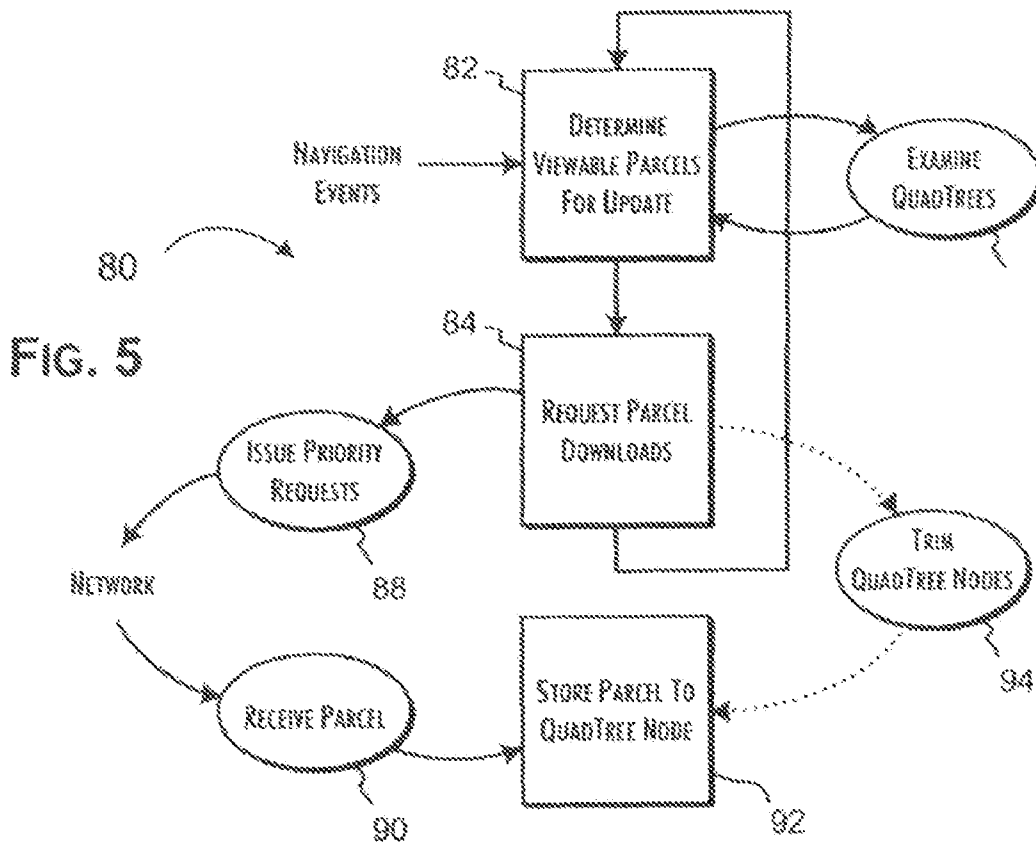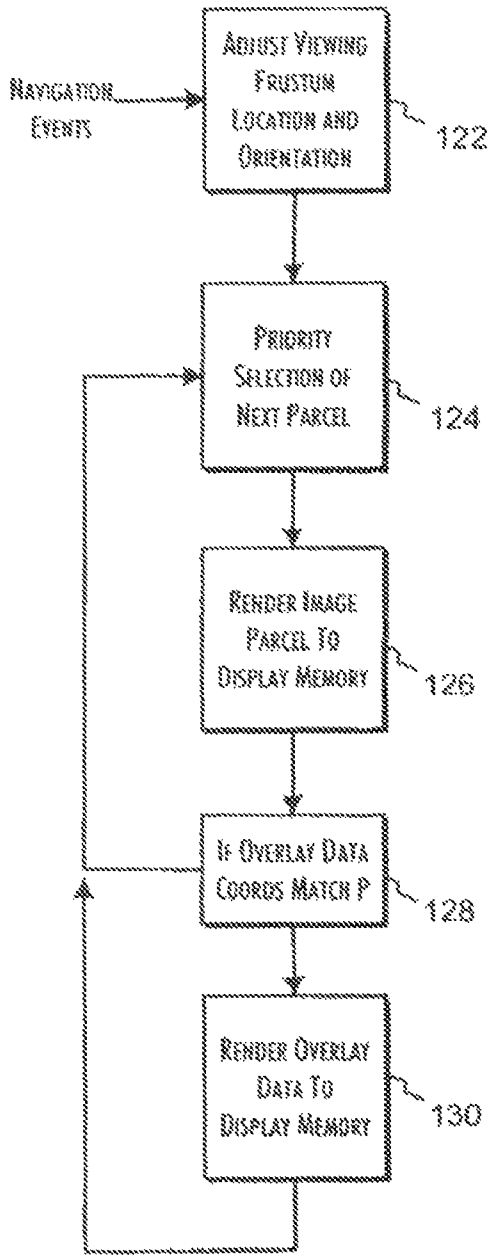
EXAMINE PRIORITY QUEUE (106)

FIG. 7

FIG. 8

DOCKET ALARM
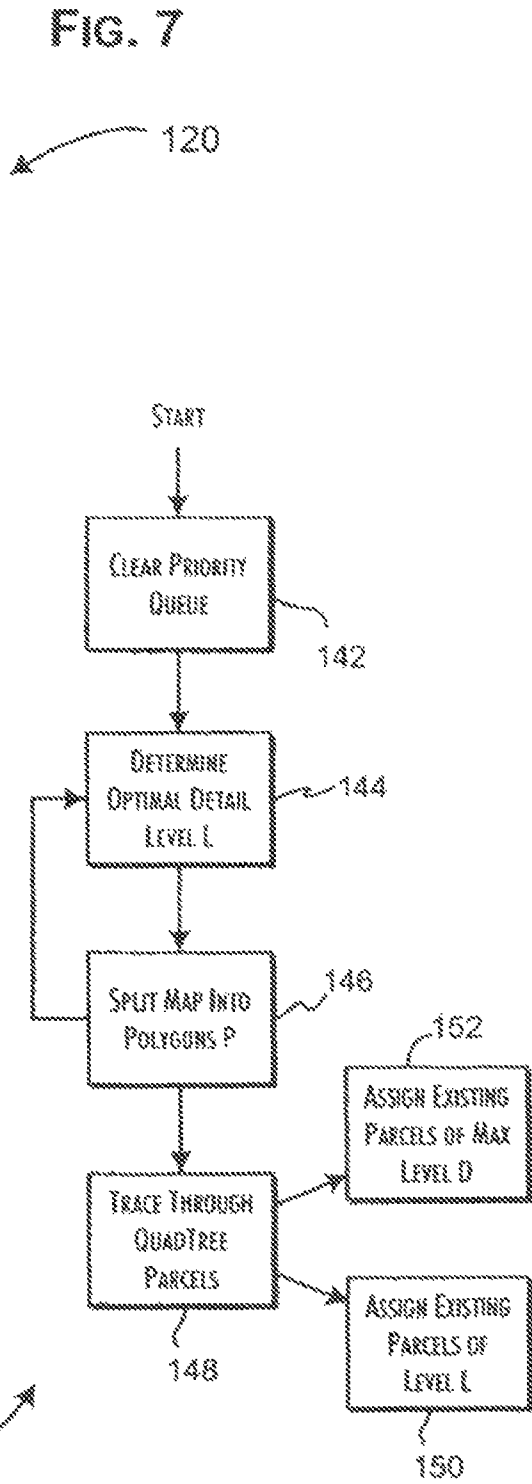
Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts

Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research

With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips

Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS
Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS
Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS
Sync your system to PACER to automate legal marketing.