Evaluation of 655 Patent Applications Related to Digital Pathology

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Digital pathology is reshaping the practice of pathology

Development of applications for telepathology and image analysis will play a major role in the future adoption of digital pathology

Major technological advances over the last two decades

Patents protect the intellectual property
“Patent War” places future of innovation at risk

- Mayo Clinic vs. Prometheus Laboratories, Inc.
- Myriad Genetics
Possible infringement
Relation of companies
Market research
Technology gap
Technology development trend
New patent application direction
Objective

- Systematically evaluate patents related to digital pathology and telepathology
Technology

- Google Patents (Google Inc., Mountain View, California, USA)
- Papers software (Mekentosj BV, Aalsmeer, Netherlands)
Keywords used to query USPTO database:

- “computer assisted diagnosis and pathology”
- “digital image analysis and pathology”
- “digital imaging and pathology”
- “digital imaging and pathology and data security”
- “digital microscopy”
- “digital pathology”
- “telemicroscopy”
- “telepathology”
- “telepathology and data security”
- “videomicroscopy”
- “virtual microscopy”
- “virtual pathology”
- “whole slide imaging”
- “whole slide scanner and pathology”
Google search engine facilitated download of data into the Papers application
Design

Google search engine was used to facilitate the download of data into the Papers application.
Design

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Design

Telepathology diagnostic network

Abstract

A system is disclosed for providing pathology diagnostic opinions to physicians at sites remote from where the consulting pathologist is physically located. The system includes a robotically controlled microscope at the remote site equipped with a video camera means for collecting video signals from the microscope. The system also uses a bidirectional communication means to link the microscope with a pathologist's workstation. The workstation includes a monitor for viewing images received from the video camera means and control means for generating control signals which are sent over the bidirectional communication means to thereby remotely control the microscope. Preferably, the system also includes means for electronically storing the X, Y, and Z microscope stage coordinates for particular points of the specimen viewed by the pathologist together with means for storing electronically and reproducing photographically the images viewed.

Inventors: Weinstein; Ronald S. (Wilmette, IL)
Assignee: Corabi International Telemetrics, Inc. (Alexandria, VA)
Appl. No.: 07/462,591
Filed: January 5, 1990

United States Patent
Weinstein

5,216,596
June 1, 1993

USPTO Patent Full-Text and Image Database

Related U.S. Patent Documents

Application Number
Filing Date
Patent Number
Issue Date
44907
Apr. 1987

Current U.S. Class:
Current International Class:
Field of Search:

References Cited

U.S. Patent Documents

385928
April 1974
Morton

383376
September 1974
Fetter et al.

4054782
October 1977
Weibel

4122518
October 1978
Castellan et al.
Google search engine was used to facilitate the download of data into the Papers application.
Results

655 applications related to digital pathology

- 413 (63%) specific to pathology
- 242 (37%) usable beyond pathology
Results

413 applications specific to pathology

- 297 (72%) patents granted
- 52 (12.6%) abandoned
- 63 (15.25%) pending

234 patents active

63 patents expired
Results

Applications for patents specific to digital pathology

- Patents granted
- Patents pending
Applications for patents related to image analysis

Number of patent applications

Year of application

- Image Analysis Patents Awarded
- Image Analysis Patents Pending
Initial telepathology patents - television (28)

- Corabi International Telemetrics Inc., *Telepathology Diagnostic Network* - 1990

Results

- Patents related to Whole Slide Imaging:
  - 58 awarded
  - 15 pending

- Patents related to Image Analysis:
  - 98 awarded
  - 21 pending

- The most number of patents - Aperio:
  - 35 awarded
  - 8 pending
Conclusions

- Many patent applications related to digital pathology filed in the last two decades
- The number of patents specific to use in pathology almost quadrupled in the last decade
- 2/3 patents applications - telepathology
- 1/3 patents applications - image analysis
Future Directions

- Technological advances related to digital pathology, especially tools for image analysis are expected to increase in the future.

- US versus International patents.
Acknowledgements

- Ronald S. Weinstein, MD
- Liron Pantanowitz, MD
- Anil V. Parwani, MD, PhD
- Jonhan Ho, MD