



US 20190087638A1

(19) **United States**

(12) **Patent Application Publication**  
**El-Zehiry et al.**

(10) **Pub. No.: US 2019/0087638 A1**

(43) **Pub. Date: Mar. 21, 2019**

(54) **ANALYZING DIGITAL HOLOGRAPHIC  
MICROSCOPY DATA FOR HEMATOLOGY  
APPLICATIONS**

(71) Applicant: **Siemens Healthcare Diagnostics Inc.**,  
Tarrytown, NY (US)

(72) Inventors: **Noha El-Zehiry**, Plainsboro, NJ (US);  
**Shanhui Sun**, Princeton, NJ (US);  
**Bogdan Georgescu**, Plainsboro, NJ  
(US); **Lance Ladic**, Robbinsville, NJ  
(US); **Ali Kamen**, Skillman, NJ (US)

(21) Appl. No.: **16/193,587**

(22) Filed: **Nov. 16, 2018**

**Related U.S. Application Data**

(63) Continuation of application No. 15/318,831, filed on  
Dec. 14, 2016, now Pat. No. 10,176,363, filed as  
application No. PCT/US2015/035945 on Jun. 16,  
2015.

(60) Provisional application No. 62/012,636, filed on Jun.  
16, 2014.

**Publication Classification**

(51) **Int. Cl.**  
**G06K 9/00** (2006.01)  
**G06K 9/46** (2006.01)  
**G06K 9/62** (2006.01)  
**G01N 33/49** (2006.01)  
**G01N 15/14** (2006.01)

**G03H 1/04** (2006.01)

**G06T 7/136** (2017.01)

**G06T 7/00** (2017.01)

**G01N 15/00** (2006.01)

**G03H 1/00** (2006.01)

**G01N 15/10** (2006.01)

(52) **U.S. Cl.**

CPC ..... **G06K 9/00147** (2013.01); **G06K 9/4604**  
(2013.01); **G06K 9/6269** (2013.01); **G01N**  
**33/49** (2013.01); **G06K 9/00127** (2013.01);  
**G01N 15/1463** (2013.01); **G01N 2015/1006**  
(2013.01); **G03H 1/0443** (2013.01); **G06T**  
**7/136** (2017.01); **G06T 7/0012** (2013.01);  
**G06T 2207/30104** (2013.01); **G01N 2015/008**  
(2013.01); **G03H 2001/005** (2013.01); **G06K**  
**9/6268** (2013.01)

(57)

**ABSTRACT**

A method for analyzing digital holographic microscopy (DHM) data for hematology applications includes receiving a plurality of DHM images acquired using a digital holographic microscopy system. One or more connected components are identified in each of the plurality of DHM images and one or more training white blood cell images are generated from the one or more connected components. A classifier is trained to identify a plurality of white blood cell types using the one or more training white blood cell images. The classifier may be applied to a new white blood cell image to determine a plurality of probability values, each respective probability value corresponding to one of the plurality of white blood cell types. The new white blood cell image and the plurality of probability values may then be presented in a graphical user interface.

100

