Claims

1. A method of extracting pedestrian path from one of a plurality of images captured from a side of a road comprising:

receiving said image;

filtering predetermined type of pixels in said image to form a first image;

filtering edge lines in said image to form a second image;

combining said first image and said second image to form a third image, said third image having a first side, a second side, a top side, and a bottom side;

drawing a line for each of N sample points distributed ~~on~~along said first side of said third image;

determining a number of white pixel counts for each of said line of said N sample points;

storing said number of white pixel counts for each of said lines of said N sample points in a register;

plotting a histogram based on said number of white pixel counts stored in said register against said N sample points; and

determining a position of a pedestrian path in said image based upon a peak above a predetermined threshold line of said histogram and closest to a sample point that is half of said N sample points.

2. The method according to claim 1 wherein said step of filtering predetermined type of pixels comprises:

converting said received image from Red-Green-Blue (RGB) colour space to Hue-Saturation-Value (HSV) colour space; and

determining and converting said predetermined type of pixels to white colour.

3. The method according to claim 2 wherein said predetermined type of pixels are green in colour.

4. The method according to claim 2 wherein said predetermined type of pixels is pixel that has Hue values from 0.15 to 0.3.

5. The method according to claim 1 wherein said step of filtering edge lines from said received image to form said second image comprises:

detecting edge lines in said received image; and

extracting determined edge lines in said received image.

6. The method according to claim 5 wherein said step of filtering edge lines from said received image to form said second image further comprises:

dilating said image after extracting determined edge lines; and

eroding said dilated image to form said second image.

7. The method according to claim 5 wherein said steps of detecting and extracting edge lines is Sobel edge detection and extraction algorithm.

8. The method according to claim 1 wherein said step of combining said first image and said second image to form a third image comprises:

adding said first image to said second image to form an added image;

inverting said added image to form an inverted image;

detecting each object in said inverted image;

determining a pixel count of each said object; and

removing each said object from said inverted image which has a pixel count that is less than a predetermined pixel count.

9. The method according to claim 8 wherein said predetermined pixel count is 5000.

10. The method according to claim 1 wherein said step of drawing said line for each of said N sample points distributed alongon said first side of said third image comprises:

selecting a one of N sample points on said first side of said third image;

drawing a line from said selected sample point to said second side, said line being parallel to said top side of said third image; and

repeating said step of selecting and drawing for each of said N sample points.

11. The method according to claim 10 said step of drawing a line from said selected sample point to said second side further comprising:

drawing a subsequent line at a predetermined angle with respect to said line from said selected one of said N sample points.

12. The method according to claim 11 wherein said step of determining said number of white pixel counts for each of said line of said N sample points comprises:

obtaining a number of white pixel counts on said subsequent line; and

determining a highest number of white pixel counts among said subsequent line and said line.

13. The method according to claim 12 wherein said step of storing said number of white pixel counts comprises storing said highest number of pixel counts.

~~14. The method according to claim 1 wherein said N sample points is distributed from an intersection between said first side and said bottom side towards an intersection between said first side and said top side, and wherein N is more than 1.~~

~~15. The method according to claim 14 wherein said step of determining said position of said pedestrian path comprises:~~

~~determining a peak closest to a sample point that is half of said N sample points.~~

1~~4~~6. The method according to claim 1~~5~~ further comprising:

determining a width of said pedestrian path based on intersections of said threshold line by said determined peak.

157. A system for extracting pedestrian path from one of a plurality of images captured from a side of a road comprising:

instructions for directing a processing unit in a computer system to:

receive said image;

filter predetermined type of pixels in said image to form a first image;

filter edge lines in said image to form a second image;

combine said first image and said second image to form a third image, said third image having a first side, a second side, a top side, and a bottom side;

draw a line for each of N sample points distributed alongon said first side of said third image;

determine a number of white pixel counts for each of said line of said N sample points;

store said number of white pixel counts for each of said lines of said N sample points in a register;

plot a histogram based on said number of white pixel counts stored in said register against said N sample points;

determine a position of a pedestrian path in said image based upon a peak above a predetermined threshold line of said histogram and closest to a sample point that is half of said N sample points; and

a media readable by said processing unit in said computer system that stores said instructions for directing said processing unit in said computer system.

168. The system according to claim 157 wherein said instructions to filter predetermined type of pixels comprises instructions for directing said processing unit in said computer system to:

convert said received image from Red-Green-Blue (RGB) colour space to Hue-Saturation-Value (HSV) colour space; and

determine and convert said predetermined type of pixels to white colour.

179. The system according to claim 168 wherein said predetermined type of pixels are green in colour.

1820. The system according to claim 168 wherein said predetermined type of pixel is pixel that has Hue values from 0.15 to 0.3.

1921. The system according to claim 157 wherein said instructions to filter edge lines from said received image to form said second image comprises instructions for directing said processing unit in said computer system to:

detect edge lines in said received image; and

extract determined edge lines in said received image.

202. The system according to claim 1921 wherein said instructions to filter edge lines from said received image to form said second image further comprises instructions for directing said processing unit in said computer system to:

dilate said image after extracting determined edge lines; and

erode said dilated image to form said second image.

213. The system according to claim 1921 wherein said instructions to detect and extract edge lines is Sobel edge detection and extraction algorithm.

224. The system according to claim 157 wherein said instructions to combine said first image and said second image to form a third image comprises instructions for directing said processing unit in said computer system to:

add said first image to said second image to form an added image;

invert said added image to form an inverted image;

detect each object in said inverted image;

determine a pixel count of each said object; and

remove each said object from said inverted image which has a pixel count that is less than a predetermined pixel count.

235. The system according to claim 224 wherein said predetermined pixel count is 5000.

246. The system according to claim 157 wherein said instructions to draw said line for each of said N sample points distributed alongon said first side of said third image comprises instructions for directing said processing unit in said computer system to:

select a one of N sample points on said first side of said third image;

draw a line from said selected sample point to said second side, said line being parallel to said top side of said third image; and

repeat said instructions to select and draw for each of said N sample points.

257. The system according to claim 246 said instructions to draw a line from said selected sample point to said second side further comprises instructions for directing said processing unit in said computer system to:

draw a subsequent line at a predetermined angle with respect to said line from said selected one of said N sample points.

268. The system according to claim 257 wherein said instructions to determine said number of white pixel counts for each of said line of said N sample points comprises instructions for directing said processing unit in said computer system to:

obtain a number of white pixel counts on said subsequent line; and

determine a highest number of white pixel counts among said subsequent line and said line.

279. The system according to claim 268 wherein said instructions to store said number of white pixel counts comprises instructions for directing said processing unit in said computer system to storing said highest number of pixel counts.

~~30. The system according to claim 17 wherein said N sample points is distributed from an intersection between said first side and said bottom side towards an intersection between said first side and said top side, and wherein N is more than 1.~~

~~31. The system according to claim 30 wherein said instructions to determine said position of said pedestrian path comprises instructions for directing said processing unit in said computer system to:~~

~~determine a peak closest to a sample point that is half of said N sample points.~~

2832. The system according to claim 1531 further comprising instructions for directing said processing unit in said computer system to:

determine a width of said pedestrian path based on intersections of said threshold line by said determined peak.

2933. A system for extracting pedestrian path from one of a plurality of images captured from a side of a road comprising:

circuitry in a computer system configured to receive said image;

circuitry in a computer system configured to filter predetermined type of pixels in said image to form a first image;

circuitry in a computer system configured to filter edge lines in said image to form a second image;

circuitry in a computer system configured to combine said first image and said second image to form a third image, said third image having a first side, a second side, a top side, and a bottom side;

circuitry in a computer system configured to draw a line for each of N sample points distributed on said first side of said third image;

circuitry in a computer system configured to determine a number of white pixel counts for each of said line of said N sample points;

circuitry in a computer system configured to store said number of white pixel counts for each of said lines of said N sample points in a register;

circuitry in a computer system configured to plot a histogram based on said number of white pixel counts stored in said register against said N sample points; and

circuitry in a computer system configured to determine a position of a pedestrian path in said image based upon a peak above a predetermined threshold line of said histogram and closest to a sample point that is half of said N sample points.

304. The system according to claim 2933 wherein said circuitry in a computer system configured to filter predetermined type of pixels comprises:

circuitry in a computer system configured to convert said received image from Red-Green-Blue (RGB) colour space to Hue-Saturation-Value (HSV) colour space; and

circuitry in a computer system configured to determine and converting said predetermined type of pixels to white colour.

315. The system according to claim 304 wherein said predetermined type of pixels are green in colour.

326. The system according to claim 304 wherein said predetermined type of pixels is pixel that has Hue values from 0.15 to 0.3.

337. The system according to claim 2933 wherein said circuitry in a computer system configured to filter edge lines from said received image to form said second image comprises:

circuitry in a computer system configured to detect edge lines in said received image; and

circuitry in a computer system configured to extract determined edge lines in said received image.

348. The system according to claim 337 wherein said circuitry in a computer system configured to filter edge lines from said received image to form said second image further comprises:

circuitry in a computer system configured to dilate said image after extracting determined edge lines; and

circuitry in a computer system configured to erode said dilated image to form said second image.

359. The system according to claim 337 wherein said circuitry in a computer system configured to detect and said circuitry in a computer system configured to extract edge lines is Sobel edge detection and extraction algorithm.

3640. The system according to claim 2933 wherein said circuitry in a computer system configured to combine said first image and said second image to form a third image comprises:

circuitry in a computer system configured to add said first image to said second image to form an added image;

circuitry in a computer system configured to invert said added image to form an inverted image;

circuitry in a computer system configured to detect each object in said inverted image;

circuitry in a computer system configured to determine a pixel count of each said object; and

removing each said object from said inverted image which has a pixel count that is less than a predetermined pixel count.

3741. The system according to claim 3640 wherein said predetermined pixel count is 5000.

3842. The system according to claim 2933 wherein said circuitry in a computer system configured to draw said line for each of said N sample points distributed alongon said first side of said third image comprises:

circuitry in a computer system configured to select a one of N sample points on said first side of said third image;

circuitry in a computer system configured to draw a line from said selected sample point to said second side, said line being parallel to said top side of said third image; and

circuitry in a computer system configured to repeat said circuitry in a computer system configured to select and said circuitry in a computer system configured to draw for each of said N sample points.

3943. The system according to claim 3842 wherein said circuitry in a computer system configured to draw a line from said selected sample point to said second side further comprising:

circuitry in a computer system configured to draw a subsequent line at a predetermined angle with respect to said line from said selected one of said N sample points.

404. The system according to claim 3943 wherein said circuitry in a computer system configured to determine said number of white pixel counts for each of said line of said N sample points comprises:

circuitry in a computer system configured to obtain a number of white pixel counts on said subsequent line; and

circuitry in a computer system configured to determine a highest number of white pixel counts among said subsequent line and said line.

415. The system according to claim 4044 wherein said circuitry in a computer system configured to store said number of white pixel counts comprises storing said highest number of pixel counts.

~~46. The system according to claim 33 wherein said N sample points is distributed from an intersection between said first side and said bottom side towards an intersection between said first side and said top side, and wherein N is more than 1.~~

~~47. The system according to claim 46 wherein said circuitry in a computer system configured to determine said position of said pedestrian path comprises:~~

~~circuitry in a computer system configured to determine a peak closest to a sample point that is half of said N sample points.~~

428. The system according to claim 2947 further comprising:

circuitry in a computer system configured to determine a width of said pedestrian path based on intersections of said threshold line by said determined peak.