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LIQUID DROPLET EJECTION APPARATUS, HEAD CLEANING METHOD, AND STORAGE MEDIUM

Abstract

A liquid droplet ejection apparatus includes an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon, a head cleaning device that cleans a nozzle face of the liquid droplet ejection head, and a hardware processor that controls a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The entire disclosure of Japanese Patent Application No. 2024-019920 filed on Feb. 14, 2024, is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

Technical Field

[0002] The present invention relates to a liquid droplet ejection apparatus, a head cleaning method, and a storage medium.

Description of Related Art

[0003] A liquid droplet ejection apparatus has been known that performs an image forming operation by ejecting liquid droplets from nozzles of a liquid droplet ejection head onto a recording surface of a recording medium. The liquid droplet ejection apparatus ejects liquid droplets from the nozzles at appropriate timings on the basis of image data.

[0004] In such a liquid droplet ejection apparatus, when an image forming operation is performed with mist adhered to the nozzle face left as it is, image quality decreases due to ejection deflection or ejection failure of liquid droplets. Therefore, it is necessary to clean the nozzle face of the liquid droplet ejection apparatus.

[0005] Therefore, for example, Japanese Unexamined Patent Publication No. 2009-101630 describes an inkjet recording apparatus that controls cleaning of the nozzle face by estimating the state of the nozzle face on the basis of various conditions.

SUMMARY OF THE INVENTION

[0006] However, the invention of Japanese Unexamined Patent Publication No. 2009-101630 does not take the amount of charge on a recording medium into controlling cleaning of the nozzle face. FIG. **4**A is a graph showing a relationship between the amount of charge on a recording medium, the amount of mist that adheres to the nozzle face, and the amount of satellite that lands on the recording medium. FIG. **4**B is a diagram showing the state of mist that adheres to the nozzle face and the state of satellite that adheres to a recording medium for each amount of charge on a recording medium. In FIG. **4**A, the horizontal axis represents the amount of charge on a recording medium, and the vertical axis represents the number of particles of mist that adhere to the nozzle face or the number of particles of satellite that land on a recording medium. As illustrated in FIGS. **4**A and **4**B, as the amount of charge on the recording medium increases, the amount of mist that adheres to the nozzle face dramatically increases. In the invention of Japanese Unexamined Patent Publication No. 2009-101630, the nozzle face is not cleaned in accordance with the amount of charge, and thus the quality of an image to be formed may deteriorate.

[0007] In addition, if the frequency of cleaning of the nozzle face or the intensity of cleaning thereof is idly increased, the productivity of image recording decreases due to increase in downtime, and the liquid droplet ejection head deteriorates due to wearing of the nozzle face.

[0008] The present invention has been made in view of such circumstances. An object of the present invention is to provide a liquid droplet ejection apparatus, a head cleaning method and a non-transitory computer-readable storage medium storing a program that can reduce a decrease in quality of an image to be formed by more appropriately removing mist adhered to a nozzle face.

[0009] To achieve at least one of the abovementioned objects, according to an aspect of the present invention, a liquid droplet ejection apparatus reflecting one aspect of the present invention includes: [0010] an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon; [0011] a head cleaning device that cleans a nozzle face of the liquid droplet ejection head; and [0012] a hardware processor that controls a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.

[0013] According to an aspect of the present invention, a head cleaning method reflecting one aspect of the present invention is performed by a liquid droplet ejection apparatus including an

image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon and a head cleaning device that cleans a nozzle face of the liquid droplet ejection head; and includes: [0014] controlling a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.
[0015] According to an aspect of the present invention, a non-transitory computer readable storage medium reflecting one aspect of the present invention stores a program causing, of a liquid droplet ejection apparatus including an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon and a head cleaning device that cleans a nozzle face of the liquid droplet ejection head, a computer to:
[0016] control a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0017] The advantages and features provided by one or more embodiments of the invention will become more fully understood from the detailed description given hereinafter and the appended drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the present invention, and wherein:
[0018] FIG. **1** is a sectional side view of a liquid droplet ejection apparatus;
[0019] FIG. **2** is a block diagram of the liquid droplet ejection apparatus;
[0020] FIG. **3** is a flowchart of a nozzle face cleaning process;
[0021] FIG. **4**A is a graph summarizing a relationship between satellite that lands on a recording medium and mist that adheres to a nozzle face of the liquid droplet ejection apparatus according to the amount of charge on the recording medium; and
[0022] FIG. **4**B is a schematic view of the nozzle face of the liquid droplet ejection apparatus and the recording medium in accordance with the amount of charge on the recording medium.
DETAILED DESCRIPTION
[0023] Hereinafter, a liquid droplet ejection apparatus according to one or more embodiments of the present invention will be described in detail with reference to the drawings. However, the scope of the invention is not limited to the embodiments or illustrated examples. Hereinafter, components having the same function and configuration are denoted by the same reference sign, and the same description will be omitted.
[0024] [Overall Configuration of Liquid Droplet Ejection Apparatus] FIG. **1** is a sectional side view illustrating a schematic configuration of an inkjet recording apparatus **1** that is an embodiment of a liquid droplet ejection apparatus of the present invention. FIG. **2** is a block diagram illustrating a functional configuration of the inkjet recording apparatus **1**. The inkjet recording apparatus **1** includes a sheet feed device **10**, an image forming apparatus **20**, a sheet ejection device **30**, a head cleaning device **40**, and a control device **50** (hardware processor). The inkjet recording apparatus **1** forms an image by ejecting ink droplets from the image forming apparatus **20** onto a recording medium M conveyed from the sheet feed device **10**, and ejects the recording medium M to the sheet ejection device **30**.
Sheet Feed Device
[0025] The sheet feed device **10** includes a sheet feed tray **11** and a sheet feed section **12**. The sheet feed tray **11** stores recording media M. The sheet feed section **12** conveys a recording medium(s) M to the image forming apparatus **20** under the control of the control device **50**.
[0026] Note that the recording media M are not limited to paper such as plain paper or coated paper. As the recording medium M, various types of media can be used as far as ink droplets landed

on the surface thereof can be fixed, such as cloth or sheet-like resin. In FIG. **1**, the sheet feed device **10** includes one sheet feed tray **11**, but the present invention is not limited thereto. The sheet feed device **10** may include two or more sheet feed trays **11** that store multiple types of recording media M.

Image Forming Apparatus

{Drum}

[0027] The image forming apparatus **20** includes multiple types of drums **21** for conveying the recording medium M. In the present embodiment, the multiple types of drums **21** include an A drum **21***a*, A drum press rollers **21***b*, a recording medium press roller **21***c*, and a triple-sized drum **21***d*. The drums **21** convey the recording medium M in a conveyance direction by nipping/holding the recording medium M.

[0028] The image forming apparatus **20** further includes a static elimination device **22**, a surface electrometer **23**, an image forming section **24** (image former), a fixing section **25**, an image reading section **26** (image reader), and a conveyance roller **27**.

{Static Elimination Device}

[0029] The static elimination device **22** is provided on the upstream of the image forming section **24** in the conveyance direction. The static elimination device **22** is a static eliminator that eliminates a voltage applied to the recording medium M. For example, the static elimination device **22** eliminates charge by holding the recording medium M with a conductive roller connected to the ground (GND).

[0030] The static elimination device **22** further includes a static elimination performance measurement device **22***a* that measures static elimination performance of the static elimination device **22** by obtaining, for example, current values of the recording medium M on the upstream side and the downstream side of the static elimination device **22** in the conveyance direction.

{Surface Electrometer}

[0031] The surface electrometer **23** is provided on the upstream side of the image forming section **24** in the conveyance direction and in the vicinity of the image forming section **24**. The surface electrometer **23** detects surface potential on the recording medium M. The surface potential on the recording medium M detected by the surface electrometer **23** is transmitted to the control device **50**.

{Image Forming Section}

[0032] The image forming section **24** forms an image on the recording medium M conveyed by the drum(s) **21** (triple-sized drum **21***d*). In the present embodiment, as illustrated in FIG. **1**, the image forming section **24** includes a plurality of head units each including a plurality of inkjet heads. Each head unit forms an image by ejecting ink of a color from nozzle openings facing the conveyance face of the triple-sized drum **21***d* at appropriate timing corresponding to rotation of the triple-sized drum **21***d* holding the recording medium M. The colors of ink ejected by the head units are, for example, four colors of Y (yellow), M (magenta), C (cyan) and K (black), but not limited thereto.

[0033] The head units are arranged such that their nozzle openings are separated from the conveyance face of the triple-sized drum **21***d* by a predetermined distance. Further, under the control of the control device **50**, the head units each move to a position where their nozzle faces face the head cleaning device **40** in a nozzle face cleaning process, which will be described later, or the like.

{Fixing Section}

[0034] The fixing section **25** is provided on the downstream side of the image forming section **24** in the conveyance direction. The fixing section **25** fixes the image formed on the recording medium M by the image forming section **24**. The fixing section **25** is, for example, an energy ray irradiator. To be specific, the fixing section **25** includes a light emitter arranged over the width of the conveyance face of the triple-sized drum **21***d* in the orthogonal direction. The light emitter emits

energy rays, such as ultraviolet rays, onto the conveyed recording medium M under the control of the control device **50**. This cures the ink on the recording medium M, thereby fixing the ink thereto.

{Image Reading Section}

[0035] The image reading section **26** is provided on the downstream side of the fixing section **25** in the conveyance direction so as to be able to read the image forming face that is the surface of the recording medium M. The image reading section **26** is, for example, a line sensor or the like. The image reading section **26** reads the image forming face of the recording medium M in a predetermined reading area, and transmits image data to the control device **50**.

{Conveyance Roller}

[0036] The conveyance roller **27** is provided on the downstream side of the image reading section **26** in the conveyance direction. The conveyance roller **27** conveys the recording medium M delivered from the triple-sized drum **21***d*, the recording medium M having passed through the image forming section **24** and the fixing section **25**, to the sheet ejection device **30**.

Sheet Ejection Device

[0037] The sheet ejection device **30** stores recording medium M ejected from the image forming apparatus **20** until a user collects it. The sheet ejection device **30** includes a sheet ejection tray **31** having a plate shape. Note that the sheet ejection device **30** may include a plurality of sheet ejection trays **31**, similarly to the sheet feed device **10**. In the configuration, the sheet ejection device **30** appropriately controls the storage destination of the recording medium M in accordance with an instruction from the control device **50** corresponding to an image forming condition(s) of the image forming apparatus **20**.

Head Cleaning Device

[0038] The head cleaning device **40** removes ink mist adhered to the nozzle face of the inkjet heads. The head cleaning device **40** includes, for example, multiple types of head cleaners **41**.

[0039] For example, the head cleaners **41** included in the head cleaning device **40** include a cleaning blade. The cleaning blade is a metal member that is made of, for example, stainless steel or the like to have a property of not being eroded by ink, and has a shape of a rectangular plate bent so as to protrude toward the nozzle face. When the head units move, the cleaning blade contacts only the ink mist on their nozzle faces in a non-contact state with respect to the nozzle faces, thereby scraping off relatively large particles of ink mist.

[0040] As another example, the head cleaners **41** included in the head cleaning device **40** include a cleaning wipe. The cleaning wipe is, for example, an absorbent sheet bridged over a roller pair including a plurality of rollers. Every time the sheet or the like comes into contact with the nozzle face to wipe the ink, the wiping face is wound by the roller pair, and the other face forms the wiping face.

[0041] As another example, the head cleaners **41** included in the head cleaning device **40** include a cleaning roller. The cleaning roller is, for example, a web roller or a sponge roller in which a web layer or an elastic layer is formed on a cored bar made of metal. The cleaning roller wipes the ink by rotating in contact with the nozzle face under the control of the control device **50**.

[0042] The head cleaning device **40** may include, for example, a liquid ejector that softens the ink by ejecting liquid such as water or cleaning liquid. Alternatively, the above-described cleaning blade, cleaning wipe and cleaning roller may be appropriately immersed in the above-described liquid as necessary.

[0043] The head cleaners **41** included in the head cleaning device **40** are not limited to any one or more of the above examples, and appropriate known components can be adopted.

Control Device

[0044] The control device **50** controls operation of each device/apparatus constituting the inkjet recording apparatus **1**. The control device **50** includes a central processing unit (CPU), a random access memory (RAM), and a read only memory (ROM).

[0045] The CPU executes various kinds of arithmetic processing. The CPU comprehensively

controls the overall operation of the inkjet recording apparatus **1**. The RAM provides a working memory space for the CPU and stores temporary data. The ROM stores various control programs to be executed by the CPU, setting data, and the like. Note that instead of the ROM, a rewritable nonvolatile memory such as an electrically erasable programmable read only memory (EEPROM) or a flash memory may be used.

Nozzle Face Cleaning Process

[0046] The nozzle face cleaning process by the head cleaning device **40** in the inkjet recording apparatus **1** described above will be described with reference to the flowchart of FIG. **3**. In the nozzle face cleaning process, the control device **50** controls the operation of the head cleaning device **40** in accordance with information on the amount of charge on a recording medium M. More specifically, the control device **50** determines whether the nozzle face is to be cleaned by the head cleaning device **40** in accordance with the information on the amount of charge on a recording medium M, and if so, determines the mode thereof.

[0047] The control device **50** obtains information on the amount of charge on a recording medium M (Step S**101**). The information on the amount of charge includes a measured value or an estimated value of the amount of charge on the recording medium M and information for correcting the estimated value. In the present embodiment, the control device **50** obtains, from the surface electrometer **23**, a measured value of the amount of charge on the recording medium M before the image forming section **24** ejects ink droplets onto the recording medium M. Then, the control device **50** calculates a cumulative value of measured values of the amount of charge on recording media M, and controls the cleaning operation of the head cleaning device **40** on the basis of the cumulative value. Thus, the control device **50** functions as an obtaining section that obtains the amount of charge from the surface potential measured by the surface electrometer **23**.

[0048] To begin with, recording media M are charged by their contact with, rubbing against and separation from one another, and their contact with, rubbing against and separation from the conveyance members including the drums **21**. Therefore, in the present embodiment, the aforementioned "before the image forming section **24** ejects ink droplets onto the recording medium M" is any time between placement of the recording medium M on the triple-sized drum **21***d* and image formation by the image forming section **24**. With this configuration, it is possible, for example, to clean the nozzle face more appropriately as compared with a case where the amount of charge on a recording medium M in the sheet feed device **10** is referred to. In particular, it is further preferable that "before the image forming section **24** ejects ink droplets onto the recording medium M" is immediately before the image forming section **24** ejects ink droplets onto the recording medium M.

[0049] The control device **50** determines whether the nozzle face needs to be cleaned by the head cleaning device **40** on the basis of the information on the amount of charge on the recording medium M obtained in Step S**101** (Step S**102**). If the control device **50** determines that the nozzle face does not need to be cleaned (Step S**102**; No), the control device **50** ends the nozzle face cleaning process.

[0050] If the control device **50** determines that the nozzle face needs to be cleaned (Step S**102**; Yes), the control device **50** determines, on the basis of the information on the amount of charge on the recording medium M, a mode of the cleaning operation of the head cleaning device **40** on the nozzle face (Step S**103**).

[0051] The mode of the cleaning operation determined by the control device **50** includes the timing, the strength, the number of times and/or the like of the cleaning operation. In the case where the head cleaning device **40** includes multiple types of head cleaners **41**, the mode includes information on which of the head cleaners **41** is used to clean the nozzle face. Specifically, for example, when the amount of charge on the recording medium M is large, it is assumed that a large amount of ink mist adheres to the nozzle face. Therefore, the control device **50** determines a mode of the cleaning operation of the head cleaning device **40** in which a relatively large ink mist can be

scraped off with the blade.
[0052] The control device **50** controls and causes the head cleaning device **40** in accordance with the determined mode to clean the nozzle face (Step S**104**). After the nozzle face is cleaned, the control device **50** ends the nozzle face cleaning process.

Effects of Embodiment

[0053] As described above, the inkjet recording apparatus **1** according to the present embodiment includes the image forming section **24** that records an image by ejecting liquid droplets from the nozzles of the liquid droplet ejection heads onto a recording medium M conveyed thereto. The inkjet recording apparatus **1** further includes the head cleaning device **40** that cleans the liquid droplet ejection heads, and the control device **50**. The control device **50** controls the cleaning operation of the head cleaning device **40** in accordance with the information on the amount of charge on the recording medium M.
[0054] According to this configuration, it is possible to reduce the decrease in the quality of an image to be formed by appropriately removing mist adhered to the nozzle face according to the amount of charge on the recording medium M. Further, according to the configuration, it is possible to predict stain/damage on the nozzle face of the inkjet heads according to the information on the amount of charge on the recording medium M, the information obtainable in advance. Therefore, as compared with, for example, a configuration in which the state of the nozzle face is detected for cleaning, the decrease in the quality of an image to be formed on a recording medium M can be prevented, and the decrease in productivity can be reduced.

Other Configurations

[0055] Although one or more embodiments according to the present invention have been detailed above, the present invention is not limited to the above-described embodiments. Various modifications can be made within the scope of the invention described in claims and the scope of their equivalents.
[0056] For example, in the above, the control device **50** is configured to obtain the amount of charge itself on the recording medium M, but not limited thereto. For example, the control device **50** may obtain the type of the recording medium M as the information on the amount of charge. Specifically, a conversion table of the type of the recording medium M and the amount of charge thereon is obtained in advance by experiment and stored in the ROM. Then, the control device **50** calculates the cumulative amount of charge from the type of the recording medium M and the conversion table, and controls the operation of the head cleaning device **40**.
[0057] Note that the recording medium M is especially likely to be charged if it is of polyvinyl chloride (PVC) or plastic media. Therefore, in the above-described configuration, if the recording medium M is of plastic-based media as described above, the conversion table is set such that the amount of charge is greater than that of other media.
[0058] Further, the control device **50** may obtain a physical property of the recording medium M as the information on the amount of charge. Examples of the physical property of the recording medium M include resistance and permittivity. Specifically, a conversion table of the physical property of the recording medium M and the amount of charge thereon is obtained in advance by experiment and stored in the ROM. Further, a media sensor **11** that measures the physical property of the recording medium M is provided in the sheet feed device **10** or the like, and the measurement result is transmitted to the control device **50**. Then, the control device **50** calculates the cumulative amount of charge from the physical property of the recording medium M and the conversion table, and controls the operation of the head cleaning device **40**.
[0059] Further, if the static elimination performance of the static elimination device **22** is low, the amount of charge on the recording medium M remains relatively great. Therefore, the control device **50** may obtain the measurement result of the static elimination performance measurement device **22***a* as the information on the amount of charge.
[0060] In the above, the image forming apparatus **20** includes the static elimination device **22**, but

it is not preferable to enhance the static elimination effect on the recording medium M, for example, by providing many static elimination devices **22**. For example, in a case where the static elimination device **22** is an ionizer that blows ion wind toward the recording medium M, if the static elimination effect is too high, the ink may be thickened by ozone or a discharge product, and malfunction may occur in the inkjet heads.

[0061] Further, as illustrated in FIG. **4**A and FIG. **4**B, the amount (situation) of satellite adhering to the recording medium M also changes according to the amount of charge on the recording medium M. Further, the shape of dots also changes according to the amount of charge on the recording medium M. Specifically, if the amount of charge on the recording medium M is large, the shape of dots is distorted. These changes can be detected by the control device **50** from the reading result of the image reading section **26**. Therefore, the control device **50** may obtain the reading result of the image reading section **26** as the information on the amount of charge.

[0062] Further, for example, if it is winter and the temperature is low, the recording medium M is likely to be charged. Therefore, the control device **50** may obtain temperature information and/or humidity information measured by a measurer **28** as the information on the amount of charge. The temperature information and the humidity information are not limited to the state of the external environment, and may include the temperature and the humidity of the recording medium M.

[0063] Further, a detector **29** that detects mist adhered to the nozzle face may be provided in the vicinity of each head unit, and the control device **50** may use the detection result together with the information on the amount of charge on the recording medium M to control the cleaning operation of the head cleaning device **40**. Specifically, the detector **29** is a camera or a sensor. In the above-described configuration, the control device **50** calculates the adhesion amount of mist from the density on the nozzle face obtained from the detector **29**.

[0064] The control device **50** may use any one or more of the operating time, the number of image-formed sheets, the image forming condition and the ink consumption of the inkjet recording apparatus **1** together with the information on the amount of charge on the recording medium M to control the cleaning operation of the head cleaning device **40**. Note that examples of the image forming condition include the number of inkjet heads to be used, an image pattern, and the like.

[0065] Further, in the above, the liquid droplet ejection apparatus is the inkjet recording apparatus **1** that ejects ink, but not limited thereto. That is, the liquid ejected by the liquid droplet ejection apparatus is not limited to ink, and may be any appropriate liquid such as a pretreatment agent.

[0066] Further, in the above, the inkjet recording apparatus **1** is configured to include the head cleaning device **40**, but not limited thereto. The head cleaning device **40** may be a device separate from the inkjet recording apparatus **1** as long as it has the same function(s) and effect(s) as those described above. Similarly, in the above, the inkjet recording apparatus **1** includes the control device **50**, but not limited thereto. The control device **50** may be a device separate from the inkjet recording apparatus **1** as long as it has the same function(s) and effect(s) as those described above.

[0067] Further, in the above, the head units are moved to the position where their nozzle faces face the head cleaning device **40** in the nozzle face cleaning process, but this is no limitation. That is, a configuration may be adopted in which the cleaner(s) **41** of the head cleaning device **40** is moved to a position where the cleaner **41** faces the nozzle face(s).

[0068] Further, in the above, as a computer-readable medium storing the program(s) according to the present invention, a hard disk, a semiconductor nonvolatile memory or the like is used as an example, but the present invention is not limited thereto. As the computer-readable medium, a portable storage medium, such as a CD-ROM, can also be used. Further, a carrier wave may be used as a medium that provides data of the program(s) according to the present invention via a communication line.

[0069] Although embodiments of the present invention have been described and illustrated in detail, the disclosed embodiments are made for purposes of illustration and example only and not limitation. The scope of the present invention should be interpreted by terms of the appended

claims.
[0070] The entire disclosure of Japanese Patent Application No. 2024-019920, filed on Feb. 14, 2024, including description, claims, drawings and abstract is incorporated herein by reference.

Claims

1. A liquid droplet ejection apparatus comprising: an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon; a head cleaning device that cleans a nozzle face of the liquid droplet ejection head; and a hardware processor that controls a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.
2. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the amount of charge on the recording medium before the image former ejects the liquid droplet onto the recording medium.
3. The liquid droplet ejection apparatus according to claim 2, comprising a surface electrometer on an upstream side of the image former in a conveyance direction, the surface electrometer measuring a surface potential on the recording medium, wherein the hardware processor obtains the amount of charge from the surface potential measured by the surface electrometer.
4. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge set for each type of the recording medium.
5. The liquid droplet ejection apparatus according to claim 1, comprising a media sensor that measures a physical property of the recording medium, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge corresponding to a measurement result of the measurement by the media sensor.
6. The liquid droplet ejection apparatus according to claim 1, comprising: a static elimination device that performs static elimination on the recording medium; and a static elimination performance measurement device that measures static elimination performance of the static elimination device, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge corresponding to a measurement result of the measurement by the static elimination performance measurement device.
7. The liquid droplet ejection apparatus according to claim 1, comprising an image reader that reads the image formed on the recording medium by the image former, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge corresponding to a reading result of the reading by the image reader.
8. The liquid droplet ejection apparatus according to claim 1, comprising a measurer that measures temperature information and/or humidity information, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge corresponding to a measurement result of the measurement by the measurer.
9. The liquid droplet ejection apparatus according to claim 1, comprising a detector that detects an amount of mist adhered to the nozzle face, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge and a detection result of the detection by the detector.
10. The liquid droplet ejection apparatus according to claim 9, wherein the detector is a camera or a sensor.
11. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls the cleaning operation of the head cleaning device in accordance with the information on the amount of charge and one or more of an operating time, a number of image-formed sheets, an image forming condition and a liquid consumption of the liquid droplet ejection apparatus.

12. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls, as the cleaning operation, a timing at which the head cleaning device cleans the nozzle face.

13. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls, as the cleaning operation, a strength with which the head cleaning device cleans the nozzle face.

14. The liquid droplet ejection apparatus according to claim 1, wherein the hardware processor controls, as the cleaning operation, a number of times the head cleaning device cleans the nozzle face.

15. The liquid droplet ejection apparatus according to claim 1, wherein the head cleaning device includes multiple types of head cleaners, and wherein the hardware processor controls, as the cleaning operation, which of the multiple types of head cleansers is used.

16. A head cleaning method that is performed by a liquid droplet ejection apparatus including an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon and a head cleaning device that cleans a nozzle face of the liquid droplet ejection head; the head cleaning method comprising: controlling a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.

17. A non-transitory computer-readable storage medium storing a program causing, of a liquid droplet ejection apparatus including an image former that ejects a liquid droplet from a nozzle of a liquid droplet ejection head onto a recording medium conveyed, thereby recording an image thereon and a head cleaning device that cleans a nozzle face of the liquid droplet ejection head, a computer to: control a cleaning operation of the head cleaning device in accordance with information on an amount of charge on the recording medium.