usage products. This problem is further exacerbated when a building manager is in charge of multiple buildings.

[0006] While some products are known that can determine “abnormal” water usage behaviour and instigate a shut off of water flow, the definition and determination of “abnormal” behaviour can lead to a poor confidence in the decisions made by the known products. For example, some devices might consider a large amount of water being used for a bath at night to be unusual and trigger a shut-off, when the usage was intended by the user. Thus, a problem with known devices is that they cannot differentiate between unusual and unintended usage of water usage products.

[0007] Monitoring numerous water usage products on a building scale may also preclude the ability to manage the water usage products on an individual basis. For example, urinals require a minimum flow rate of about 18 L min^{-1} to ensure that waste is flushed through an S-bend included in most commercially available urinals. If the water flow rate is lower than the minimum flow rate, urine salts would form and build up in the S-bend, decreasing performance of the urinal, or ultimately leading to blockages.

[0008] Similarly, the water flow rate to a shower head is typically limited using a water flow rate restrictor to limit the water flow rate through the shower head to comply with water use reduction regulations. However, the indiscriminate reduction of flow rate may lead to lower than necessary water pressure, or indeed lower than necessary water flow rate at the shower head.

Summary of Invention

[0009] It is an object of the present invention to at least substantially overcome one or more of the above disadvantages, or at least provide a useful alternative to the above described arrangements.

[00010] In a first aspect the present invention provides a water management system including a valve ~~assembly~~ , the valve being adapted to communicate with at least one water flow detector and a set of water usage products,

wherein the water flow detector is for detecting water flow to the set of water usage products,

wherein the valve assembly includes a processor that is arranged to determine:

an operational status of the set of water usage products,

a water flow status of the water flow detector, and

whether, on the basis of the operational status and the water flow status, the water flow to the set of water usage products requires alteration, wherein the operational status includes an indication that a first water usage product was operated recently, and wherein the alteration includes an increase in water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product, and

wherein the processor is adapted to operate the valve ~~assembly~~ to effect the required alteration.

[0011] Preferably, the alteration is a stop of the water flow in response to a leak occurring, wherein the processor determines whether a water leak is occurring, based upon a determination that the water flow status indicates a water flow through the water flow detector and the operational status indicates that water is not currently being used by the set of water usage products.

[0012] Preferably, the alteration is an increase in the pressure of the water flow to the set of water usage products.

[0013] Preferably, the alteration is a decrease in the pressure of the water flow to the set of water usage products

[0014] Preferably, the alteration is a control of the water flow to the set of water usage to a predetermined water flow rate.

[0015] Preferably, the predetermined water flow rate is a minimum flow rate to a urinal.

[0016] Preferably, the predetermined water flow rate is a maximum flow rate to a shower

[0017] Preferably, the valve assembly includes a communication module adapted to communicate with the processor and a user device, such that the processor is able to send a performance signal confirming a performance of the set of water usage products to a user device.

[0018] Preferably, the performance signal is an alarm signal based on the operational status and the water flow status.

[0019] Preferably, the performance signal includes a confirmation that a water usage product is correctly installed.

[0020] Preferably, the water flow detector is a component of the valve assembly.

[0021] Preferably, the water flow detector is a water flow smart meter.

[0022] Preferably, the set of water usage products comprise at least one water usage product that is a bathroom product.

[0023] Preferably, the bathroom product comprises a faucet, a toilet, a urinal, a shower, a bath, and/or a bidet.

[0024] Preferably, the set of water usage products are arranged in a defined area to provide water services to the defined area

[0025] ~~Preferably, the operational status is an indication that a first water usage product was operated recently, and wherein the alteration is an increase in water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product.~~ A second aspect of the present invention provides a method for managing water flow to a set of water usage products, the method comprising the steps of:

determining a water flow status to the set of water usage products using a water flow detector;

determining an operational status of the set of water usage products using information from electronic controllers associated with respective water usage products in the set of water usage products, wherein the operational status includes an indication that a first water usage product was operated recently;

determining, on the basis of the operational status and the water flow status, whether the water flow to the set of water usage products requires alteration;

altering the water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product, wherein the alteration includes an increase in water flow to the second water usage product; and

operating a valve to effect the alteration.

Brief Description of Drawings

[0026] Preferred embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings:

[0027] Figs. 1A and 1B collectively form a schematic block diagram representation of an embedded electronic device upon which described arrangements can be practice.

[0028] Fig. 2 is a schematic block diagram of an embodiment of the water flow management system according to the present invention in use with a set of water usage products.

[0029] Fig. 3 is a schematic flow chart of operation of the water flow management system of Fig. 2.

Description of Embodiments

CLAIMS

1. A water flow management system including a valve, the valve being adapted to communicate with at least one water flow detector and a set of water usage products,

wherein the water flow detector is for detecting water flow to the set of water usage products,

wherein the valve includes a processor that is arranged to determine:

an operational status of the set of water usage products,

a water flow status of the water flow detector, and

whether, on the basis of the operational status and the water flow status, the water flow to the set of water usage products requires alteration, wherein the operational status includes an indication that a first water usage product was operated recently, and wherein the alteration includes an increase in water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product, and

wherein the processor is adapted to operate the valve to effect the required alteration.

2. The water flow management system of claim 1, wherein the processor is further adapted to operate a second valve to effect the required alteration, the second valve controlling water flow to one of the set of water usage products.

3. The water flow management system of claim 1 or 2, wherein ~~the alteration includes a stop of~~ the water flow is stopped in response to a water leak occurring, wherein the processor determines whether the water leak is occurring, based upon a determination that the water flow status indicates a water flow through the water flow detector and the operational status indicates that water is not currently being used by the set of water usage products.

4. The water flow management system of any one of claims 1 to 3, wherein the alteration includes an increase in the pressure of the water flow to the set of water usage products.

5. The water flow management system of any one of claims 1 to 4, wherein the alteration includes a decrease in the pressure of the water flow to the set of water usage products.

6. The water flow management system of any one of claims 1 to 5, wherein the alteration includes a control of the water flow to the set of water usage products to a predetermined water flow rate.

7. The water flow management system of claim 6, wherein the predetermined water flow rate includes a minimum flow rate to a urinal.

8. The water flow management system of claim 6 or 7, wherein the predetermined water flow rate includes a maximum flow rate to a shower.

9. The water flow management system of any one of claims 1 to 8, wherein the valve includes:

a communication module adapted to communicate with the processor, the water usage products, and a user device;

such that the processor is able to send a performance signal based on a performance of the set of water usage products to the user device.

10. The water flow management system of claim 9, wherein the performance signal includes an alarm signal based on the operational status and the water flow status.

11. The water flow management system of claim 9 or 10, wherein the performance signal includes a confirmation that a water usage product is operating correctly.

12. The water flow management system of any one of claims 1 to 11, wherein the water flow detector and the valve are integrated into a single component.

13. The water flow management system of any one of claims 1 to 12, wherein the water flow detector includes a water flow smart meter.

14. The water flow management system of any one of claims 1 to 13, wherein the set of water usage products comprises at least one water usage product that is a bathroom product.

15. The water flow management system of claim 14, wherein the bathroom product comprises a faucet, a toilet, a urinal, a shower, a bath, and/or a bidet.

16. The water flow management system of any one of claims 1 to 15, wherein the set of water usage products are arranged in a defined area to provide water services to the defined area.

~~17. The water flow management system of any one of claims 1 to 16, wherein the operational status includes an indication that a first water usage product was operated recently, and wherein the alteration includes an increase in water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product.~~

~~18.~~17. A method for managing water flow to a set of water usage products, the method comprising the steps of:

determining a water flow status to the set of water usage products using a water flow detector;

determining an operational status of the set of water usage products using ~~an~~ information from electronic controllers associated with respective water usage products in the set of water usage products, wherein the operational status includes an indication that a first water usage product was operated recently;

determining, on the basis of the operational status and the water flow status, whether the water flow to the set of water usage products requires alteration;

altering the water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product, wherein the alteration includes an increase in water flow to the second water usage product; and

operating a valve to effect the alteration.

~~19.~~18. The method of claim ~~18~~17, wherein the method further comprises the step of:

determining whether a water leak is occurring, based upon a determination that the water flow status indicates a water flow through the water flow detector and the operational status indicates that water is not currently being used by the set of water usage products; and

wherein ~~the alteration includes a stop of~~ the water flow is stopped in response to the water leak occurring.

~~20.~~19. The method of claim ~~18~~ 17 or ~~19~~18, wherein the alteration includes an increase in the pressure of the water flow to the set of water usage products.

~~21.~~20. The method of any one of claims ~~18~~ 17 to ~~20~~19, wherein the alteration includes a decrease in the pressure of the water flow to the set of water usage products.

~~22.~~21. The method of any one of claims ~~18~~ 17 to ~~21~~20, wherein the alteration includes a control of the water flow to the set of water usage products to a predetermined water flow rate.

~~23.~~22. The method of claim ~~22~~21, wherein the predetermined water flow rate includes a minimum flow rate to a urinal.

~~24.~~23. The method of claim ~~22~~ 21 or ~~23~~22, wherein the predetermined water flow rate includes a maximum flow rate to a shower.

~~25.~~24. The method of any one of claims ~~18~~ 17 to ~~24~~23, wherein the method further comprises the step of:

sending a performance signal based on a performance of the set of water usage products to a user device.

~~26.~~25. The method of claim ~~25~~24, wherein the performance signal includes an alarm signal based on the operational status and the water flow status.

~~27.~~26. The method of claim ~~25~~ 24 or ~~26~~25, wherein the performance signal includes a confirmation that a water usage product is operating correctly.

~~28.~~27. The method of any one of claims ~~18~~ 17 to ~~27~~26, wherein the set of water usage products comprises at least one water usage product that is a bathroom product.

~~29.~~28. The method of claim ~~28~~27, wherein the bathroom product comprises a faucet, a toilet, a urinal, a shower, a bath, and/or a bidet.

~~30. The method of any one of claims 18 to 29, wherein the operational status includes an indication that a first water usage product was operated recently, and the step further comprises the step of:~~

~~altering the water flow to a second water usage product that is known to be operated subsequent to operation of the first water usage product,~~

~~wherein the alteration includes an increase in the pressure of the water flow to the second water usage product.~~