RZV International IP Transactions

Delta Electronics
Smart Thermostat Portfolio

1 Patent Family – 8 Active Assets

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Executive Summary

- RZV has been exclusively retained by Delta Electronics to support the monetization of an extensively-cited portfolio relevant to the global smart thermostat market, estimated at approximately $5 billion and projected to reach $6 billion by 2030.(1)
- With a 2014 priority date, the offered portfolio protects broadly-commercialized core smart-thermostat and intelligent HVAC control inventions, including connected thermostat control, distributed sensing and zone-based comfort management, and adaptive comfort and energy-saving algorithms, among other related technologies.
- Companies that may have an interest in the portfolio include [redacted].

Active Granted Patents:
4 US, 1 TW, 2 JP, 1CN
Encumbrances & EOU Information:
Available under NDA
Price Expectations:
Consistent with current market
Deal Structure:
We will consider all proposals
Deadlines:
Offers will be considered in the order received

(1) https://www.grandviewresearch.com/industry-analysis/us-smart-thermostat-market-report

Portfolio (US Granted Patents)

Application	Patent Number	Title	Anticipated Exp.
US14825938	US9968877B2	Intelligent air-conditioning controlling system and intelligent controlling method for the same	Jul 5, 2036
US14826414	US10086322B2	Intelligent control method for air condition device	Aug 25, 2036
US14825885	US10343097B2	Ventilation apparatus and method for filter dirt detection	May 11, 2037
US14825916	US10625193B2	Intelligent air-conditioning controlling system and intelligent controlling method for the same	Aug 6, 2036

- The portfolio claims priority provisional application No. 62/038,076, filed Aug. 15, 2014.
- Active international assets include JP6122076B2, JP6025936B2, CN105363298B, and TWI607191B.

US 9,968,877 B2

Title:	Intelligent air-conditioning controlling system and intelligent controlling method for the same
Priority:	Aug 15, 2014
Est. Expiry:	July 5, 2036
Number of forward citations:	144
Number of backward citations:	102

10. An intelligent controlling method applied by an intelligent air-conditioning controlling system, the intelligent air-conditioning controlling system arranged in a space and comprising an intelligent controlling device, an air-conditioning, a plurality of sensing devices for respectively sensing environment information and user information, and a cloud server, and the intelligent controlling method comprising:

a) obtaining the environment information and the user information respectively from the plurality of sensing devices by the intelligent controlling device;

b) calculating a target comfort characteristic according to the environment information;

c) uploading the environment information and the user information to the cloud server;

d) obtaining a usage recorded temperature corresponding to the user information by the cloud server;

e) calculating a historical record and recommended environment comfort characteristic, wherein the historical record and recommended environment comfort characteristic is a best comfort characteristic applied for the space in current time and current environment found out by the cloud server after executing a big data analysis based on the environment information;

f) transmitting the usage recorded temperature, the historical record and recommended environment comfort characteristic, and a control parameter to the intelligent controlling device, wherein the control parameter records weights of the target comfort characteristic, the usage recorded temperature, and the historical record and recommended environment comfort characteristic respectively occupied in the control command;

g) calculating a control command in accordance with the target comfort characteristic, the usage recorded temperature, the historical record and recommended environment comfort characteristic, and the control parameter by the intelligent controlling device; and

h) controlling the air-conditioning to operate according to the control command.

US 10,625,193 B2

Title:	Intelligent air-conditioning controlling system and intelligent controlling method for the same
Priority:	Aug 15, 2014
Est. Expiry:	Aug 6, 2036
Number of forward citations:	144
Number of backward citations:	102

10. An intelligent controlling method applied by an intelligent air-conditioner controlling system, the intelligent air-conditioner controlling system arranged in a space including a plurality of zones and comprising an intelligent controlling device, an air-conditioner and a plurality of sensing devices, each sensing device being arranged respectively in each one of the plurality of zones for respectively sensing environment information, wherein the air-conditioner serves all of the plurality of zones of the space, and the intelligent controlling method comprising:

a) obtaining the environment information corresponding to each zone from the plurality of sensing devices respectively by the intelligent controlling device;

a1) controlling an indoor environment sensing unit of the intelligent controlling device to sense the environment information around the intelligent controlling device;

b) determining whether the environment of the space is a comfortable environment according to the environment information;

c) determining whether the current environment temperature of the entire space is well distributed but the environment of the entire space is an uncomfortable environment or whether the current environment temperature of the entire space is unaveraged where only the environment of a specific zone of the plurality of zones is the uncomfortable environment, after determining that the environment of the space is not the comfortable environment, wherein the intelligent controlling device determines that the environment of the specific zone is the uncomfortable environment when a temperature difference between a first indoor temperature sensed by the indoor environment sensing unit and a second indoor temperature of the specific zone is higher than a threshold;

d) operating normally to control the air-conditioner to adjust a target temperature to within comfortable range through a control command when determining the entire space is the uncomfortable environment;

e) determining a position of the specific zone when determining only the environment of the specific zone of the plurality of zones is the uncomfortable environment; and

f) operating economically to control the air-conditioner to adjust a fan direction toward the position of the specific zone for serving only the specific zone without increasing the loading of a compressor of the air-conditioner through the control command after the step e, wherein the fan direction of the air-conditioner is separated into multiple parts corresponding to different directions, each direction is distributed with one of a plurality of time percentages, the intelligent controlling device controls the air-conditioner to increase one of the plurality of time percentages corresponding to the direction toward to the specific zone and decrease other time percentages corresponding to other directions, and the sum of the plurality of time percentages kept at 100%.

For diligence materials or questions, contact Gustavo Aray

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