Technology offer

A non invasive procedure for the assessment of the cleaning state of a conditioning/heating system of a building

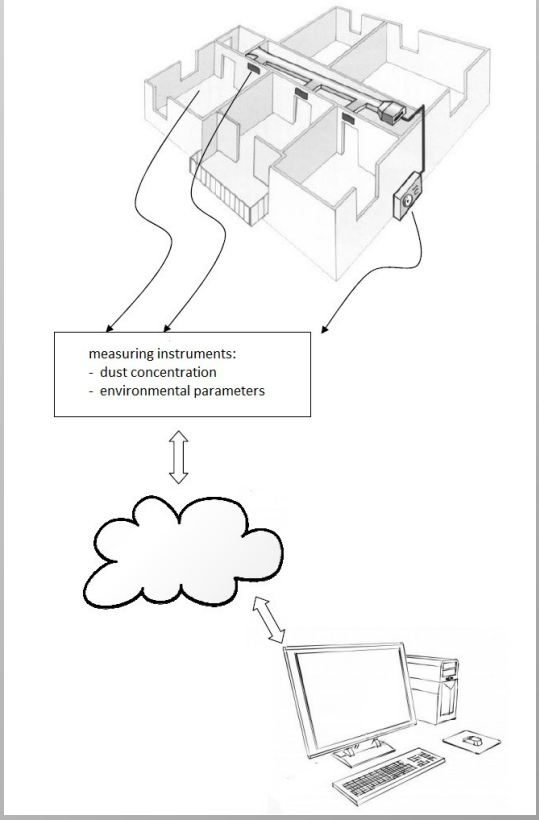

Fig. 1. Schematic diagram of the proposed technology.

Summary

The patent concerns a methodology for assessing, monitoring and predicting the cleaning state of an air conditioning/heating system of a building, seen as the set of filter (or filters) and air ducts. The methodology consists of a non-invasive method for measuring the amount of PM10 in the ventilation system. In particular, the method defines the minimum amount of measurements, the conditions for their acquisition, the time table and the acquisition sites.

Background

At the present, there only exist methodologies related to the optimal temporal substitution of the filter, neglecting the ventilation ducts. On the contrary, the ventilation ducts, as also confirmed by the measurements acquired in the experimental phase, are crucial for a good indoor air quality. In addition, existing methods for the diagnosis of the cleaning state of an air conditioning system require invasive operations. These latter can alter the standard operation mode of the system or are constrained to a limited time window since requiring a temporal halt of the system. On the contrary, the proposed method does not require any invasive intervention on the ventilation system.

Advantages:

- Global diagnosis of the system: filters and ducts
- Non invasive diagnosis
- Continuous monitoring ability

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The patent concerns a system able to estimate actual and (predicted) future concentration of indoor pollutants on the basis of some characteristic parameters of the building, of heating system and of actual measurements of pollutant concentrations. The system does not require an invasive intervention on the air conditioning system and it is also able to account for measures previously acquired. In particular, PM10 concentration at specific points of the building along with the measurement of physical quantities outside the building itself, at precise time periods, allow us to acquire information that provides an estimate of the goodness of indoor air, once properly processed. To make the methodology easy marketable and user friendly, a web platform/software has been specifically developed with a 'traffic light interface' which clearly depicts the building healthy state (green light for healthy air, yellow light if air is becoming dangerous and red light for critical conditions – see Fig. 2).

Customers	Check Date	Cleaning state	Planned cleaning/check
Name1	08/04/2013	🟢	10/04/2014
Name2	08/04/2013	🟢	10/04/2014
Name3	08/04/2013	🟡	10/10/2013
Name4	21/03/2013	🔴	10/04/2013
Name5	17/04/2013	🟢	10/04/2014
Name6	09/04/2013	🟢	10/04/2014
Name7	21/03/2013	🟡	10/10/2013
Name8	21/03/2013	🔴	10/04/2013
Name9	11/04/2013	🟢	10/04/2014
Name10	10/04/2013	🟢	10/04/2014

Fig. 2. Output of the proposed methodology for different customers.

Stage of Development

The proposed methodology is ready for market. Project proposals have been submitted in order to optimize the patent in a product-service as "assessment solution" easier to embed in actual commercial systems.

Trends

Recent medical research has definitely established the link between smog (PM10) and cancer. There also are various legislative actions at worldwide level focusing on 'air quality' as well as European calls for proposal (Horizon 2020) oriented to design legislative rules for indoor environment (similar to existing outdoor ones). Moreover, heating and cooling systems usually have a lot of energy consumption that can be drastically reduced if correctly maintained - as the proposed methodology allows.
Finally, some private entities have also provided some invasive solutions for dealing with either spread of disease across air ducts (e.g. supermarkets) or degradation of works of art (e.g. museums).

Applications:

- immediate commercial fallout for companies that work in the field of ventilation systems
- Possible extension to (military and civil) naval and aerial vehicles
- Additional app for Web service Companies

Offer:

- International patent and technology license
- International patent sale
- Simulations
- Know-how