SENSE SQUARE
air quality analytics

SafeBreath

High environmental monitoring technologies for the benefit of:

PUBLIC ADMINISTRATIONS

ENTITIES AND PARKS

CITIZENS

ENTERPRISES

air quality analytics

SAFE BREATH

Air quality monitoring networks with high spatial and temporal resolution in the SMART CITIES of the future

Who we are

Sense Square srl is an innovative start-up that intends to provide products and services in the field of environmental monitoring through smart technologies, ICT, IoT. The aim of the start-up is to make air quality monitoring a right of all citizens, so as to make them aware of the air they breathe, thus allowing them to behave and take action to limit the negative impacts on own health.

Reasons

Running in the park, at work, walking, and in every moment of life we are immersed in an environment of which we know little or nothing. Whenever we take a deep breath, we do not know what our body actually takes.

In urban areas it is more and more common to find in the atmosphere a series of substances capable of causing direct damage to human health. They are constantly produced by human activities and are mainly concentrated in metropolitan areas.

Any alteration of the composition of the air can be defined as atmospheric pollution. In particular, substances that cause direct damage to human health are fine particles (particulate with a diameter of less than 10 millionths of a meter, PM10, and less than 2.5 µm, PM2.5). These substances are constantly produced by human activities, they are concentrated mainly in metropolitan areas. Traffic, industrial plants and the heating of buildings are just some of the causes of the constant overruns of the limits imposed.

Directive 2008/50 / EC implemented with Legislative Decree 155/2010 constitutes the current regulatory reference on environmental monitoring. The ARPA (regional agency for environmental protection) in implementation of this decree began the development of monitoring networks.

The development of air quality monitoring networks is, however, hampered by the huge costs per node (monitoring stations) and by the considerable size of the nodes that make it impossible to install in particularly critical places (such as densely populated urban centers).). Moreover, the reduced number of data makes

the general forecasting models for a large territory, losing, in fact, the peculiarity of atmospheric pollution linked to a single and restricted area.

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The solution of Sense Square

Our technology allows anyone to know what we breathe in every moment. We create air quality monitoring networks with high spatial and temporal resolution. Monitoring data is available online and with a 24 / 24h app.

The monitored parameters are the PM10 and PM2.5 fine dust concentrations, ozone, CO, NOx, temperature, humidity, atmospheric pressure, wind direction and intensity. The accuracy of the sensors is around ± 2 μg / m3 (the maximum limit is 50 μg / m3 for PM10 and 25 μg / m3 for PM2.5). The sampling time can be set up to 1 sending data every 3 minutes, thus obtaining a high temporal resolution of the data.

The solution is protected by a patent entitled "Mapping of sources of atmospheric pollution and tracing of pollutants through the use of air quality monitoring networks with high spatio-temporal resolution".

Moreover, in order to make the monitoring data available to citizens 24 / 24h, the development of a "userfriendly" IT platform and a mobile application that can simplify the use of data is expected.

Impact

A widespread distribution of these sensors on the territory would create a constant flow of data, micro mapping the territory and allowing the user to have information about the surrounding environment. The data, once processed and stored in a database, could be visualized with our platform, able to return in real time the simplified representation of the monitoring data. Users, therefore, would have various possibilities to access this data, from the web portal to the smartphone application.

The use of this data is twofold. On the one hand, citizens will be informed about the levels of air pollution 24 / 24h, on the other hand studies and in-depth assessments can be carried out to try to solve the problem at the source of pollution. Public administrations will be able to use the huge amount of monitoring data to develop interventions to benefit the air quality that citizens breathe every day.

Our solution is not an alternative to environmental monitoring networks set up by the responsible bodies, as our idea focuses on the timely and real-time "knowledge" of the environment in which we live.

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Beneficiaries

The key beneficiaries of our "SAFE BREATH" solution are:

- public administrations that aim to optimize the management of urban pollution. Through the implementation of air quality monitoring networks with high spatial and temporal resolution, they will be able to verify the pollution data processed by "Sense Square" in order to identify the true sources of pollution (traffic, industries, domestic heating, etc.) thus being able to search for solutions to mitigate the phenomenon (traffic blocks, assessments on industrial sites, pollution abatement technologies);

- companies that have industrial plants polluted as pollutants and subject to the NIMBY Syndrome (Not In My BackYard). The aim is to install the monitoring networks of "Sense Square" in order to ensure transparency towards citizens and committees, showing that their plant does not have negative effects on the quality of the air they breathe;

- all citizens who, through an APP, can verify in real time and 24 / 24h the levels of air pollutants that breathe in every moment (a concept similar to the labels of nutritional values on food). In addition, useful information will be provided on the appropriate behavior to be able to limit the damage pollution on their health (where it is better to jog or paths, when wearing masks, where to go to live);

Municipalities and territories that make the health a brand (mountain or hilly areas, bathing areas). They will be able to install monitoring networks in order to encourage tourists to go to those places to breathe some pure air!

Elements of innovation

The solution proposed by Sense Square is based on intelligent monitoring networks that identify the concentrations of air pollutants, collect data and process them in real time. Such equipment allows a high definition regarding information on air quality (PM 10, PM 2.5, Ozone, NOx, CO, SOx, temperature, atmospheric pressure, humidity, wind direction, wind intensity).

The hardware infrastructure consists of a relatively large number of monitoring stations (one every 1-4 square km), where each station is small (about 50x30x20 cm) and is totally independent of continuous maintenance and management.

The hardware is associated with a software that sends data in real time, continuously and 24 / 24h. The software processes the data and makes it available through a mobile application and a web portal.

The solution developed by "Sense Square" combines the latest sensor technologies with the emerging "Internet of Things" technologies in order to obtain a low cost of the equipment for installation in the form of high spatial resolution air quality monitoring networks.

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Awards and recognitions

Sense Square received the following prizes and awards:

December 2015 - Victory of the Power2Innovate award promoted by The European House - Ambrosetti of Milan and € 10,000 in cash and € 30,000 in services;

October 2016 - Victory participation in SMAU Milano 2016;

December 2016 - Best Practices Prize Winners - Best Web Startup selected;

January 2017 - ASSITECA CROWD STARTUP SHOWCASE prize victory;

February 2017 - victory of the Marco Polo award (MISE, H-FARM);

March 2017 - Finalist of the ERG RE-GENERATION award;

March 2017 - WE START CHALLENGE prize win;

April 2017 - NEXT-ENERGY prize win promoted by Terna spa and € 20,000 in cash;

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Sense Square team

Daniele Sofia - *PhD in Industrial Engineering - Director of the company Sense Square srl - Hardware Development and commercial prototypes realization*

Aristide Giuliano - *Ph.D. in Chemical Engineering - Founding partner of Sense Square srl - business development and sales manager*

Ivan Stammelluti - *Degree in Business Administration - Development of Economic-Financial Strategy and Marketing*

Filomena Gioiella - *Ph.D. in Materials Engineering - Design of monitoring stations*

Nicoletta Lotrecchiano - *Chemical Engineer - Quality control and sensor calibration*

Giovanni Cascone - *PhD in Industrial Engineering - Big Data Management*

Pietro De Nicolais - *Electronic Engineer - Hardware Development*

Hamid Salehi - *PhD in Industrial Engineering - Export Manager*

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Sense Square S.r.l.

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