3D VIRTUAL IMMERSIVE INTERACTIVE AUGMENTED REALITY – 3D VIIAR

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ABSTRACT: New Virtual Augmented Reality Developments are presented: "3D VITUAL IMMERSIVE INTERACTIVE AUGMENTED REALITY – 3D VIIAR". It is shown how Objects can be represented in 3D digital form with very high resolution and with data detected by many sensors attached to them. Very small and internal parts of the Objects can be detected and observed trough the 3D VIIAR. In particular very efficient Tools have been developed for Maintainance Purposes. In the Cultural Area a Museum can show its Art-Works (Paintings, Sculptures, Archaeological Objects, etc….) in 3D VIIAR in any place of the world, promoting the Museum Content (also with remote training) and attracting Visitors to come to see the real art-Works.

SUMMARY

In the last years 3D Technologies have been developed on many different important Lines for the "Manifacturing Sector", but also for "Culture Applications".

One of the new increasing impact Lines is represented by "Virtual Augmented Reality".
"3D Virtual Immersive Interactive Augmented Reality Systems" (3D VIIARS) are developed by Department of Information Engineering

(DINFO) of University of Florence in a strict Cooperation with T.T. TECNOSISTEMI. Indeed T.T. TECNOSISTEMI, who is a medium-large Firm in Prato - Tuscany, developing many new Products in the Information Area, has realized a set of new 3D VIIARS, by using mainly "Hardware Solutions" available on the Market and by creating advanced "Software Tools", which give very efficient Augmented Reality
Developments for the "Manufacturing Sector" and also for "Culture Applications".

Among the new Developments (mainly in the Software area), there are the following ones:
to represent "directly" on the Objects data detected by several "Sensors" enclosed in the "Working Environments";

to permit to Expert Remote Users to receive any useful knowledge and help, by qualified Central Experts;
through the received knowledge, Expert Remote Users can perform photos of parts of the analysed Machines and acquire other useful data (enclosing also audio – text data), which are attached in "augmented modality" on the Objects;
to reproduce in 3D digital form with very high efficiency Objects and Machines, interacting with them like they could be "real";
the above Technologies are very important for Maintainance purposes. For instance Groups of Workers in different places can be inter-connected to develope the same Activities in particular of Maintainance.
By recent international Studies, the result was emerging that Groups of Workers who are developing the same Activity of Maintainance with the use of "Augmented Reality" are more efficient - of about 50% - with respect to the Workers not using "Augmented Reality", with also reduction of working times and connected costs.
It is outlined how the above Innovative Developments can be very useful locally for Objects Knowledge in all external and internal (also very small!) parts and details as well for their Presentation, also at any remote place.
For example in the Industrial Area, an Organization with multiple Operative Locations can use the above 3D VIIARS in all its Activity Locations, under the Supervision of a Central Control System.

In the Culture Area a Museum can show its Art Works in 3D VIIARS in any place, with the possibility of promoting its Culture Objects (Paintings, Sculptures, Archaeological Items, etc.), with the possibility of Attraction of new Visitors from all the World.

The above 3D VIIARS are also very interesting for the "Learning Area". Indeed in local or remote Sites, 3D VIIARS can be used by Training Operators in an "Interactive reative Approach" with Students (Schools or Training Organizations).

Finally several practically examples are shown for the Industrial Sector and Culture Sector, outlining how the involved Users are very satisfied by the "efficiency" of the Developed Systems for many different Application Lines.

All the above "Innovative Developments" are in Agreement with the Indications by European Commission, in particular for ENTERPRISE 4.0, CYBERSECURITY and

INNOVATION PROGRAMS in Europe and in cooperation with other Nations in the World.

These "Innovative Developments" are also very important on the Lines of next future Plan HORIZON EUROPE 2021-2027.