CENTRO PARA EL DESARROLLO COLABORATIVO DE AMÉRICA DEL NORTE
Consortium for North American Higher Education Collaboration
Consorcio para la Colaboración de la Educación Superior en América del Norte
Consortium pour la collaboration dans l'enseignement supérieur en Amérique du Nord

EDUCACIÓN 4.0 en América del Norte
FORTALECIENDO LA COMPETITIVIDAD, INNOVACIÓN Y EMPRENDIMIENTO

Universidad Politécnica Metropolitana de Hidalgo
ORGANISMO DESCENTRALIZADO DE LA ADMINISTRACIÓN PÚBLICA ESTATAL

UNIVERSIDAD POLITÉCNICA DE SANTA ROSA JÁUREGUI
BILINGUAL INTERNATIONAL SUSTAINABLE

Information Technologies and Data Networks Aimed at the Development of New Solutions and Applications for Smart Cities

Instructors:

Dr. Marco Antonio González Silva
Universidad Politécnica Metropolitana de Hidalgo

M. Eloina Lugo del Real
Universidad Politécnica de Santa Rosa Jáuregui

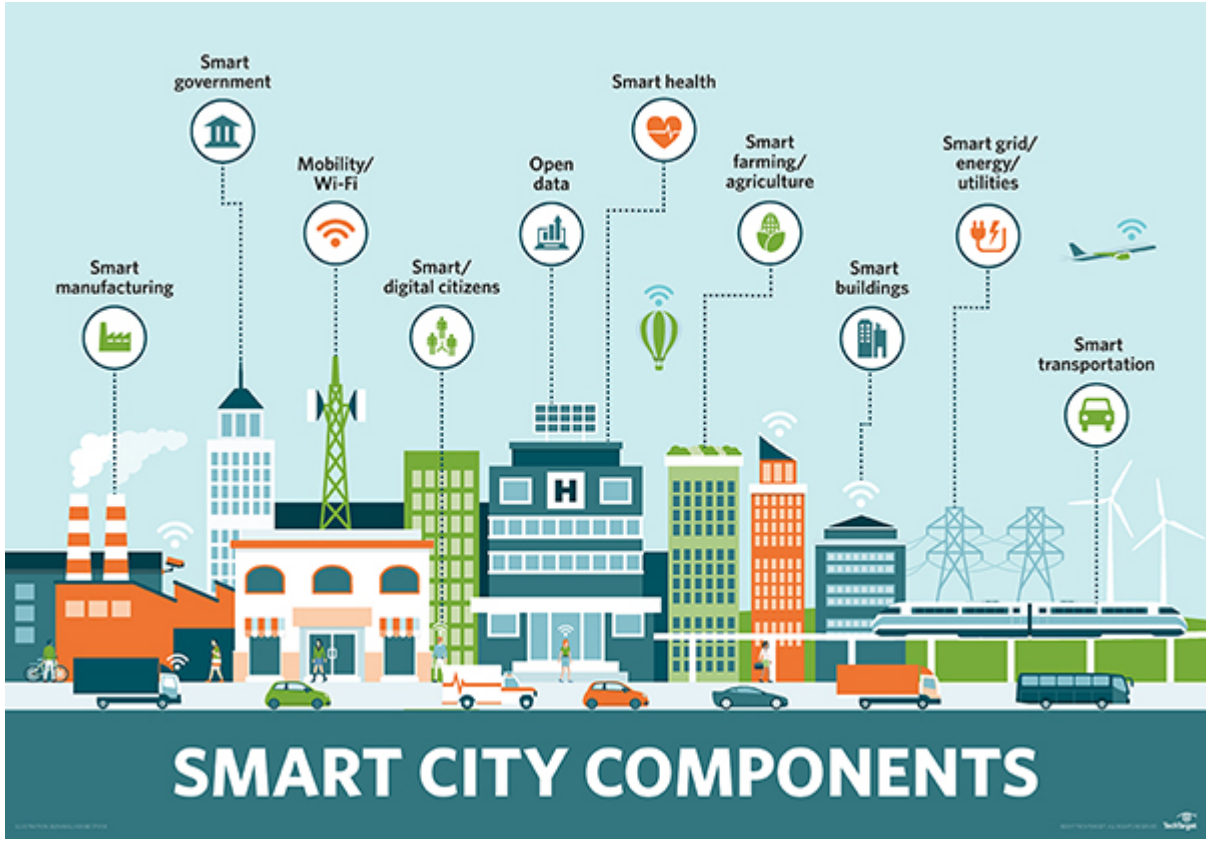
M. Juan José Franco Moreno
Universidad Politécnica Metropolitana de Hidalgo

Outline

- Introduction to Smart Cities and Digitalization
- Proyect “Dynamic Schedule in Sensor Networks”
- Proyect “Providing real time dynamic data”.
- Conclusions

Smart cities

Application of information technologies for social welfare and improving the quality of life in a sustainable way



Digitalization

Process of converting information into a digital format.

Connectivity

Ability of a device to connect with others and establishes communication

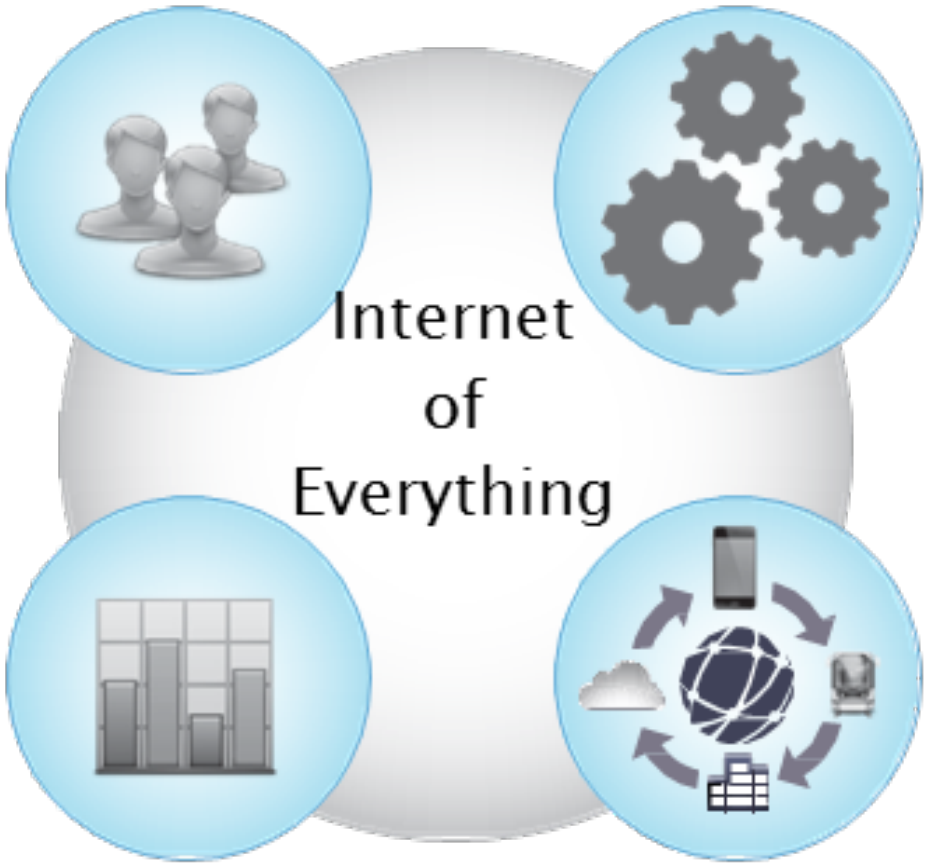
Networked Connection of People, Process, Data, Things

People

Connecting people in more relevant, valuable ways

Data

Converting data into intelligence to make better decisions



Process

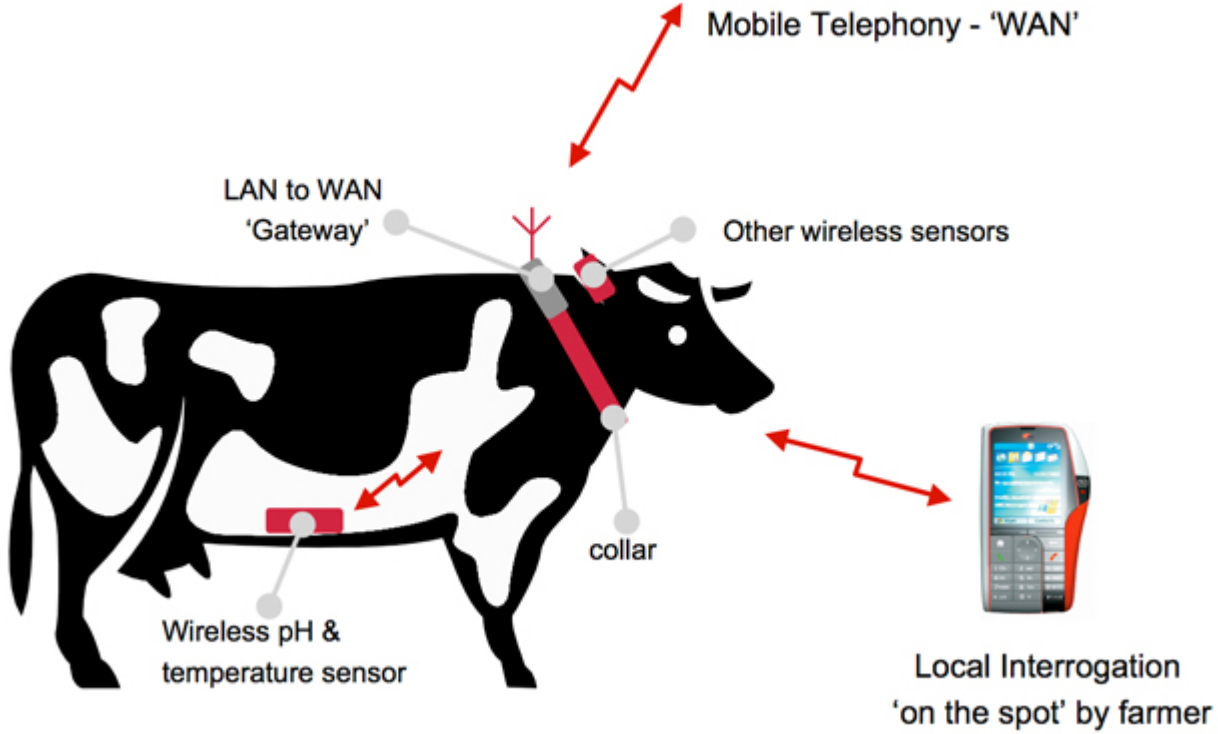
Delivering the right information to the right person (or machine) at the right time

Things

Physical devices and objects connected to the Internet and each other for intelligent decision making; often called Internet of Things (IoT)

Examples:

a) Sensor in animals



Sensor technology that monitors the dietary health of cattle has moved a step closer to commercialization.

by implanting the device in selected cows farmers can gain a valuable overall picture of the herd's health

Dynamic Sechedule in WSN on demand

Sensors demand assistance and dynamic trajectory planning is necessary to meet current demand.

Some solutions do not consider the current demand:

VRP (Vehicular Routing Problem)

Universidad Politécnica Metropolitana de Hidalgo

CONAHEC

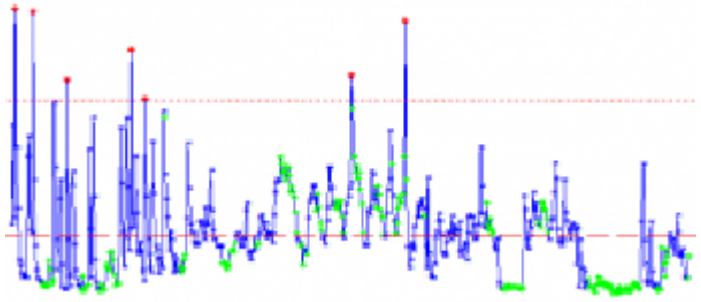
Dynamic Sechedule in WSN over demand

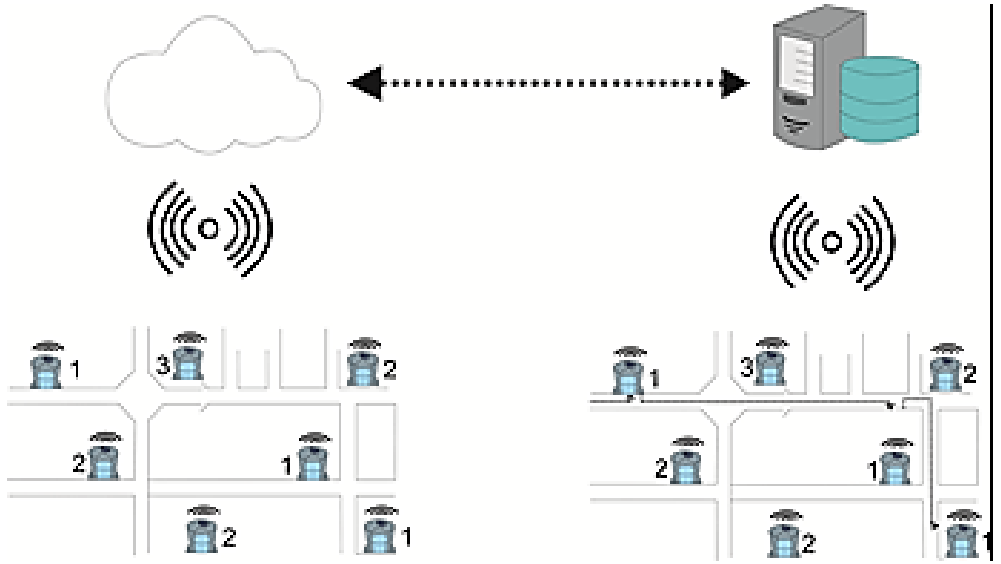
Solution requires:

Sensors

Communication

Demand monitoring



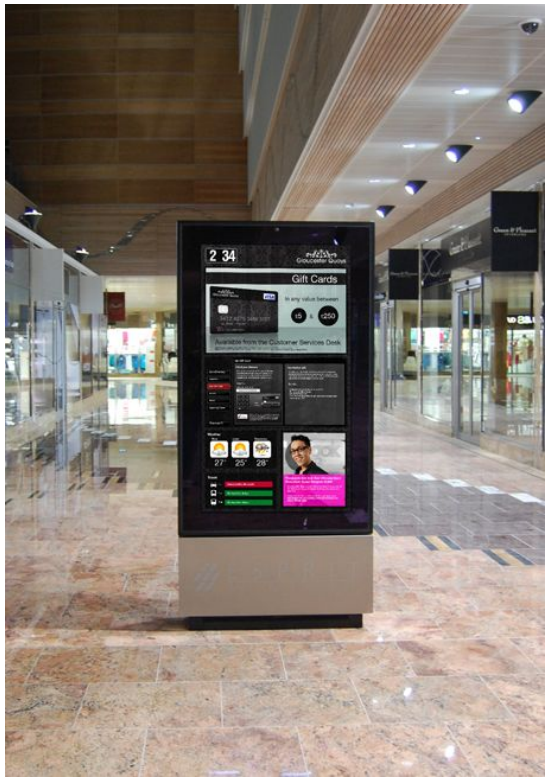


Dr. Marco Antonio González Silva

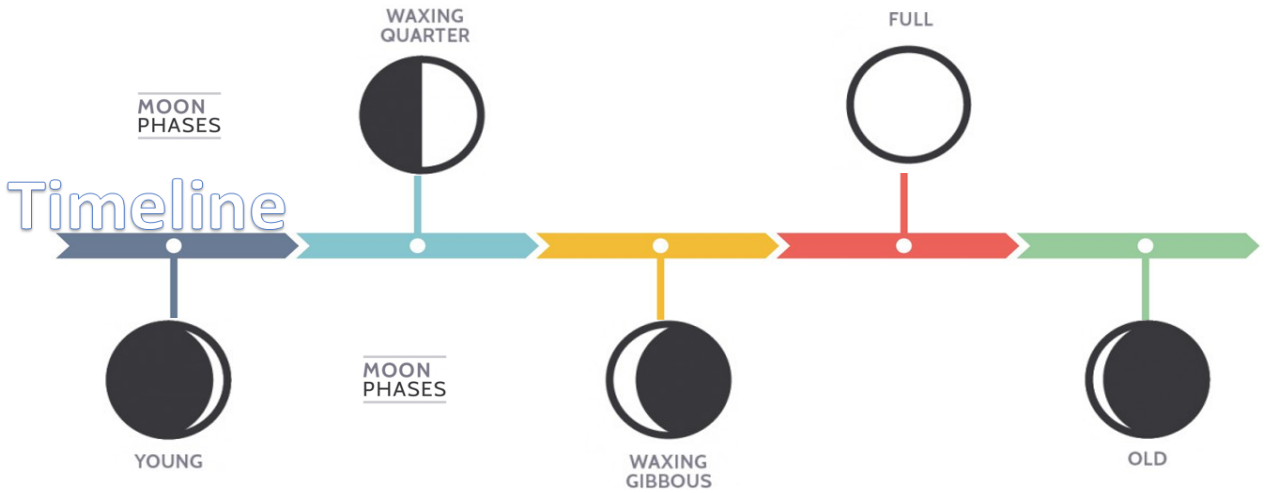
When a person views an object or a place, non-perceptible information about it could potentially be useful to the viewer, depending on his/her purpose at that moment.

For example, when a person goes to a place like a school, office building, or a mall, for that person, supplementary information could be convenient to know, such as the office location of a particular person, availability of a person in the office, or where to find particular product brands in the mall. Having similar types of information helps the person to complete the task at hand efficiently.

The uses or applications extend to innumerable places, the malls have implemented some functional solutions although very expensive in terms of implementation and maintenance and even then they are not able to inform if a certain place is open, if there are offers or if there is a loss be it fire, theft, etc.

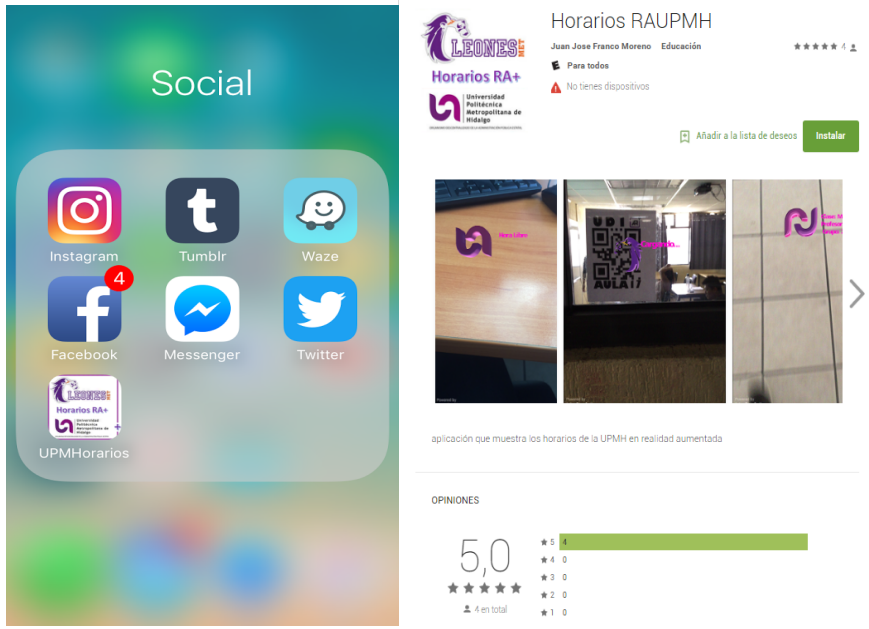


Information shown through augmented reality is often static and does not change, contrary to environmental variables like availability or location which change over time. To be considered useful, the information should be dynamic, as the environment is.



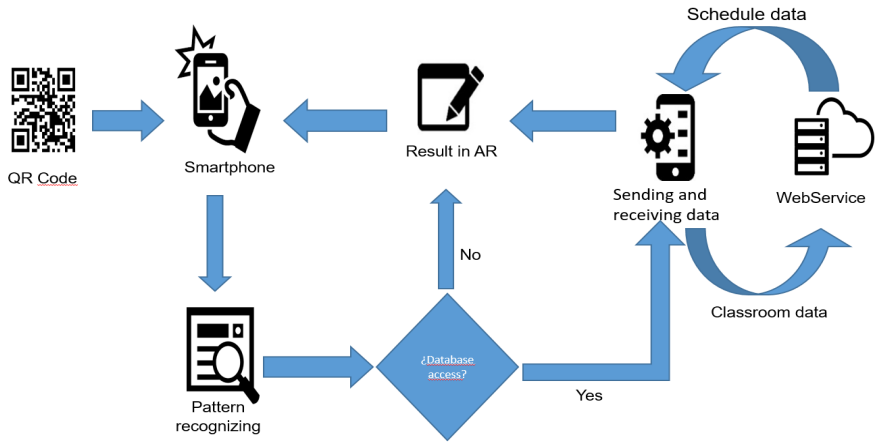
Moon phases represents that in real life information is changing continuously, so in order to make AR something real it must change over time.

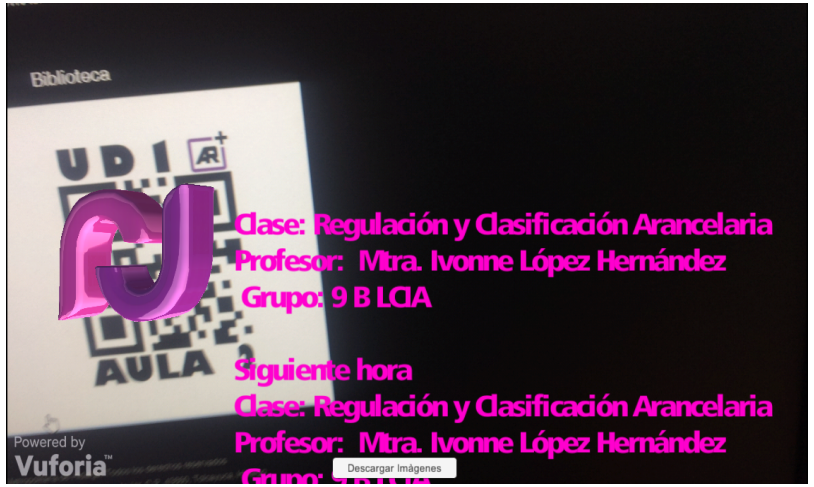
Providing real time dynamic data (RTDD) means giving the user of the AR application information in the precise moment they are using the camera to identify, for example, the administrative building of a University campus.



A prototype application was developed with the Unity framework to integrate functionality into the two most common operating systems for mobile devices, IOS and Android.

The result of scanning the QR of a classroom. It includes the name of the current class and the next class, as well as the name of the corresponding teachers. In this way the student can use the information to locate a class, a teacher or even a study area.



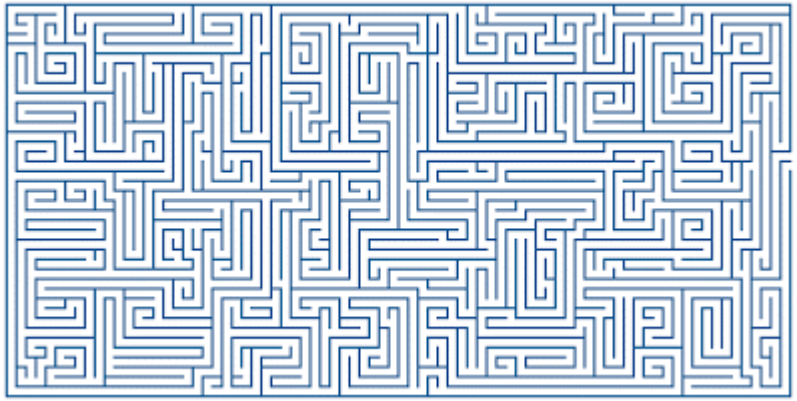


Process of scanning and recognition of QR code, analyzing, processing and sending dynamic information in real time.

the static scanning spots proved to be the best option to rely on counting with the best possible alignment with the information about the interior of the building, therefore users still needed to tilt their mobile devices to get the best match for the reality world and AR.

The returned information on the mobile device where the employee's status is displayed in red if is absent from his associated location and in green if he is available.

Although the application is still in its prototype phase it is expected to be able to provide all kinds of relevant information according to the place where it is implemented, facilitating the daily activities of human beings, at a very low cost, with extraordinary functionality.



With precise instructions, there is no impossible maze.

J. Franco, 2018