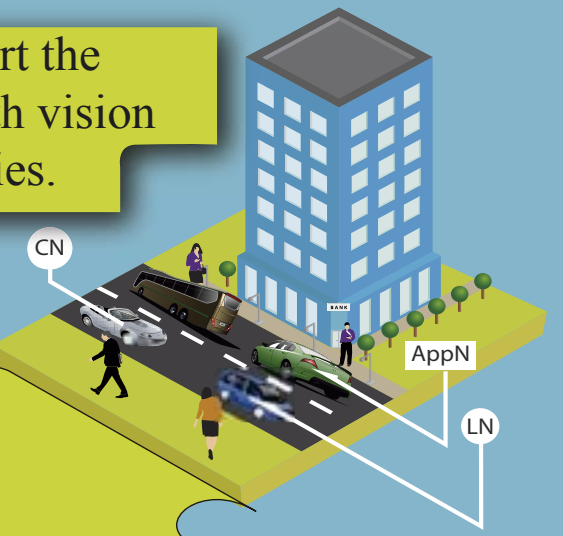
MULTI-LEVEL MECHANISMS TO SUPPORT SPORADIC CLOUD COMPUTING MOBILE SERVICES BY RESOURCE-SHARING IN VANET

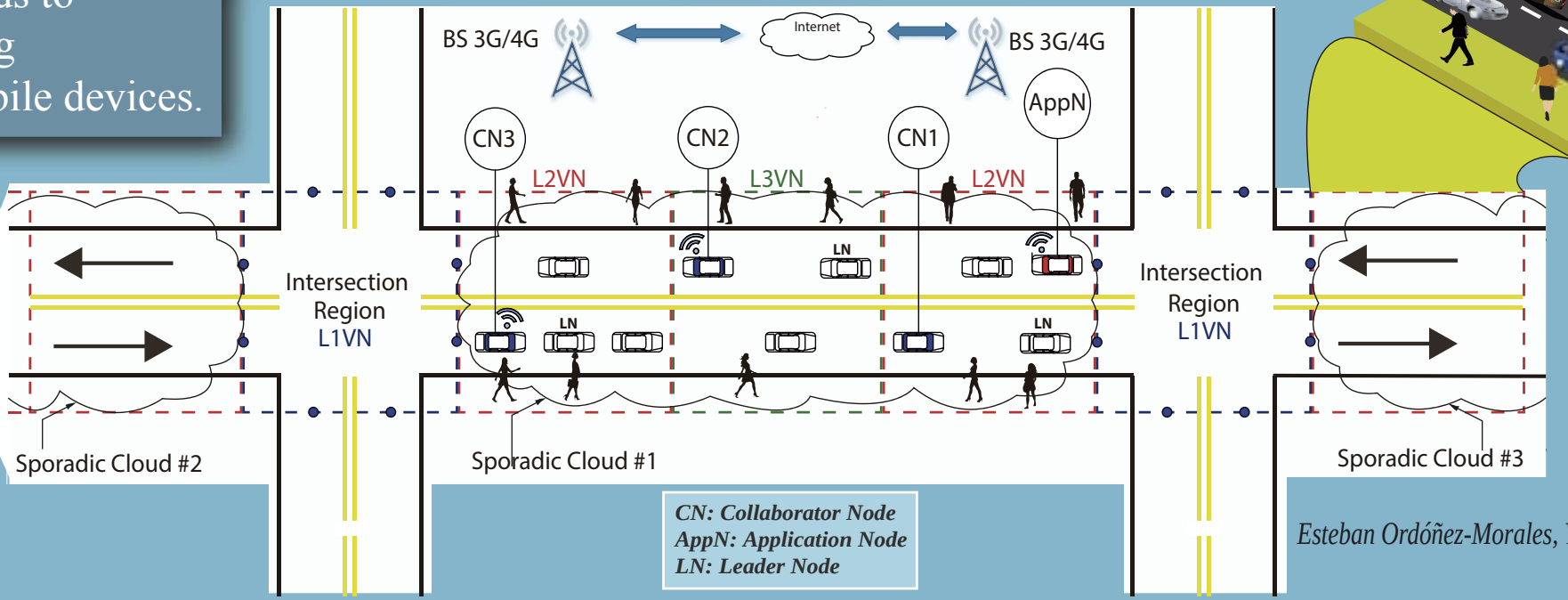
MOTIVATION

- Intelligent Transport Systems (***ITS***):
  - Traffic accidents
  - Traffic management
  - Infotainment
- Cloud Mobile Augmentation (CMA): CMA is a model that employs resource-rich clouds to enhance computing capabilities of mobile devices.

- We want to develop a new concept of sporadic CMA to deploy contex-aware services in VANET.

Allowing to support the concept of ITS with vision towards Smart Cities.





CN: Collaborator Node
AppN: Application Node
LN: Leader Node

Esteban Ordóñez-Morales, Yolanda Blanco-Fernández and Martín López-Nores

Universidade Vigo

School of Telecommunications Engineering

Information and Communications Technology

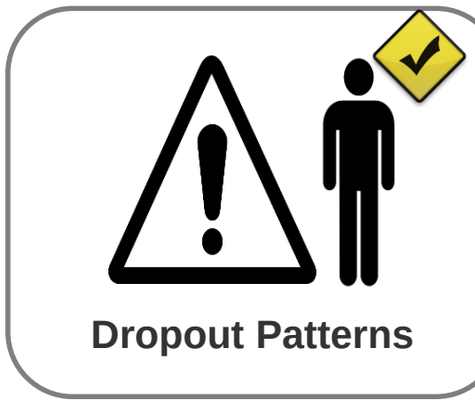
Enhance learners' experience in MOOC-based scenarios using Intelligent Tutoring Systems and Learning Analytics

Author: *Ricardo Manuel Meira Ferrão Luis*

Thesis Advisors: *Martín Llamas Nistal & Manuel J. Fernández Iglesias*

Motivation

3nd Year



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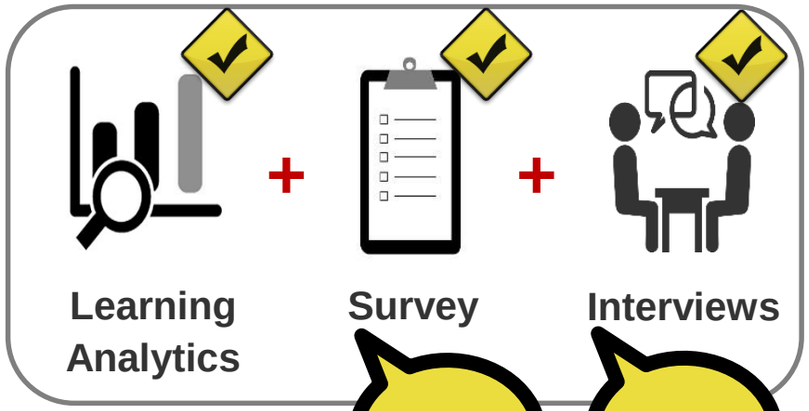
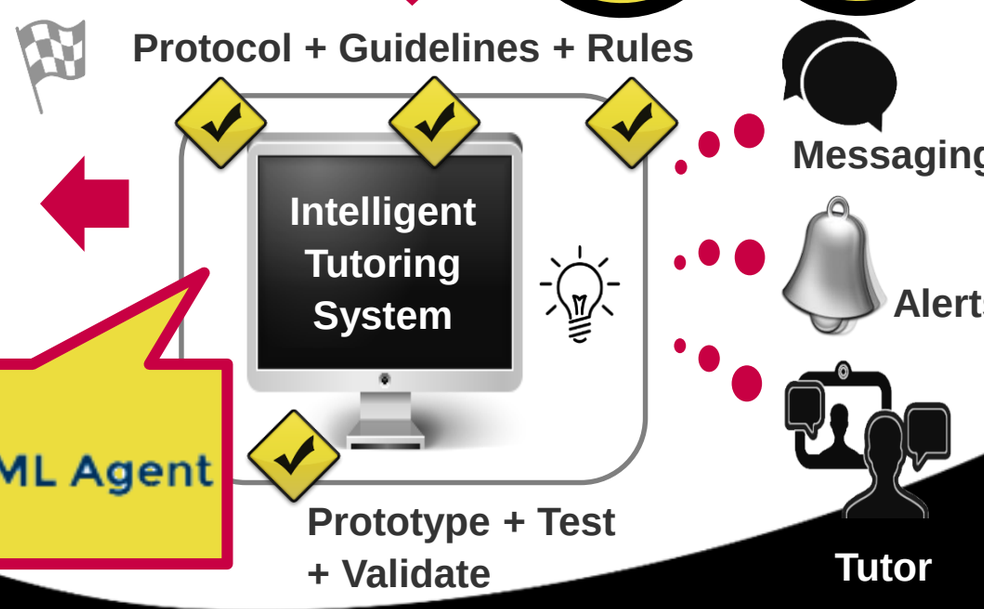
Detect Motives and Behaviors





MOOC

+ Intelligent Tutoring Systems
+ Learning Analytics

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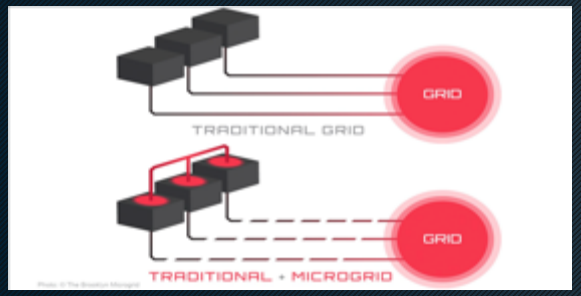
Coordinating Human and Agent Behavior in Collective-Risk Scenarios

Elias Fernández Domingos, Juan Carlos Burguillo, Ann Nowé and Tom Lenaerts

Climate Change

P2P micro-grids



Cloud computing

Sharing economies

Universidad de Vigo
Escola de Enxeñaría de Telecomunicación
AtlantTIC

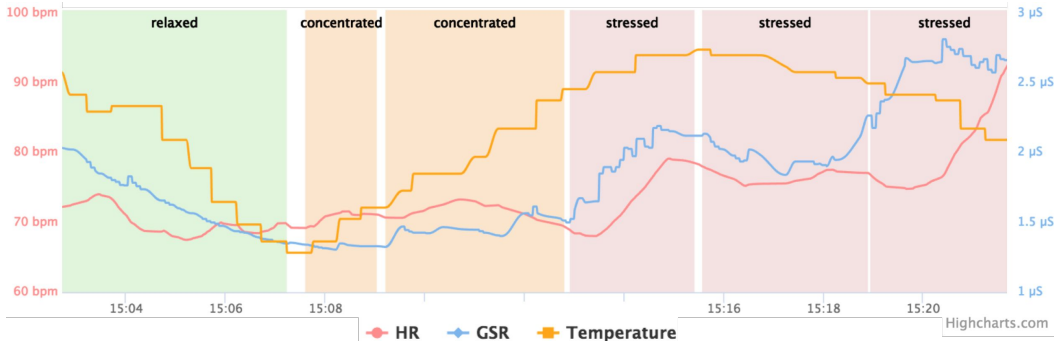
Knowledge extraction from usage data of mobile devices with educational purposes

Author: Francisco de Arriba Pérez
Advisors: Manuel Caeiro Rodríguez, Juan Manuel Santos Gago

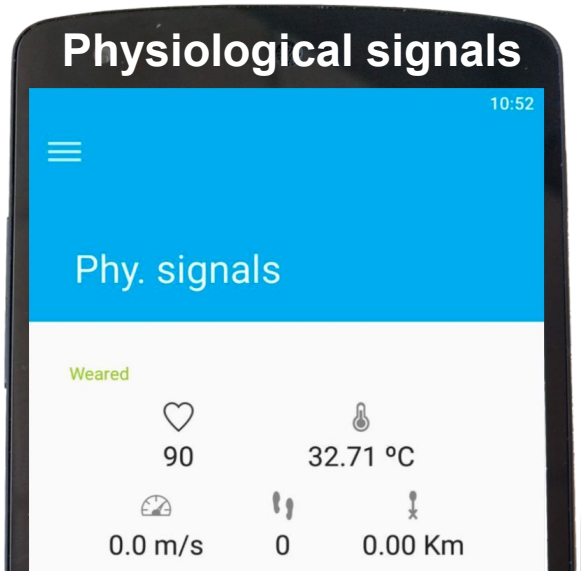
Dept. of Telematics Engineering, GIST

Wearables

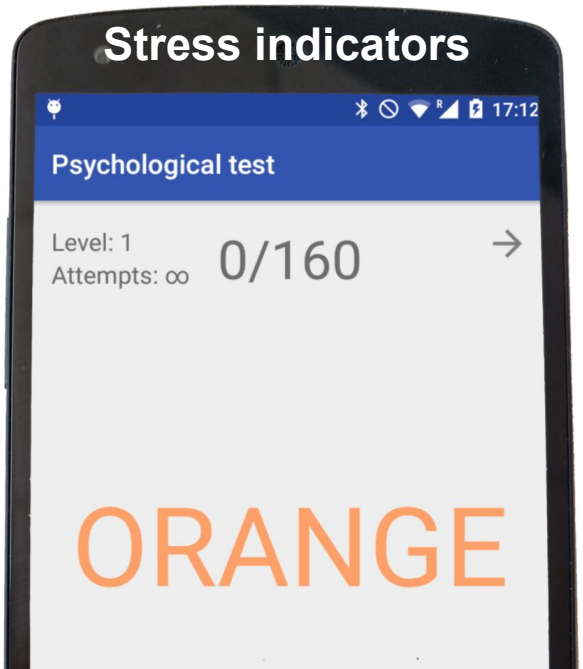
Dashboard



Physiological signals



Stress indicators

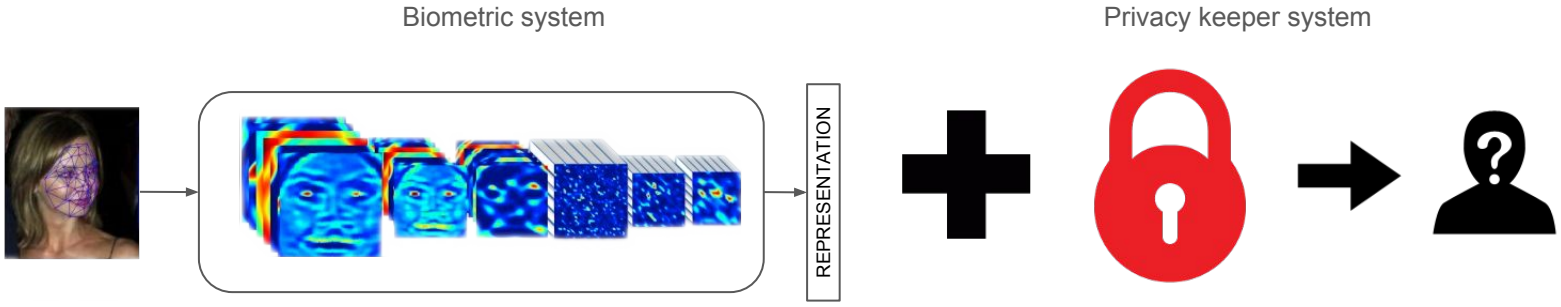


Sleep indicators

PRIVACY AND DATA PROTECTION IN BIOMETRICS

Preserving users' privacy:

A challenge for biometric recognition systems



Directive Millimeter-wave Cellular Networks: A Scheduling, Coexistence and Network Slicing Perspective

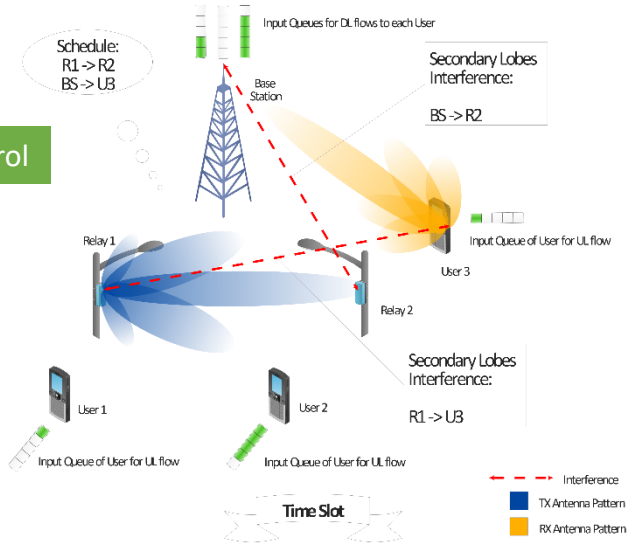
Juan García Rois, Francisco Javier González Castaño, Beatriz Lorenzo Veiga

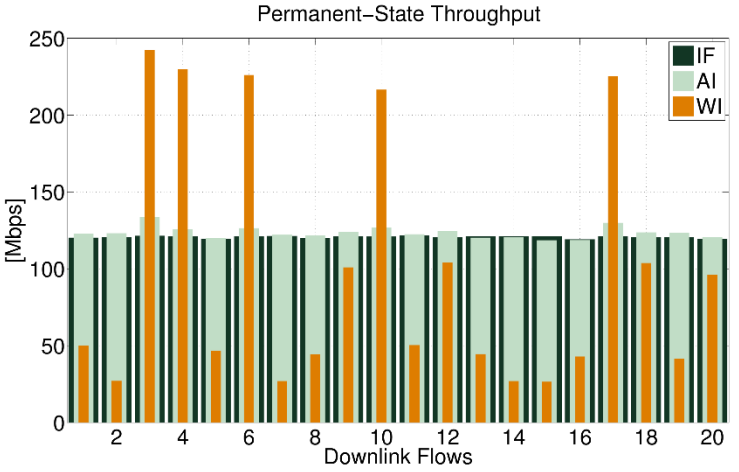
Link-Scheduling

Routing

Congestion Control

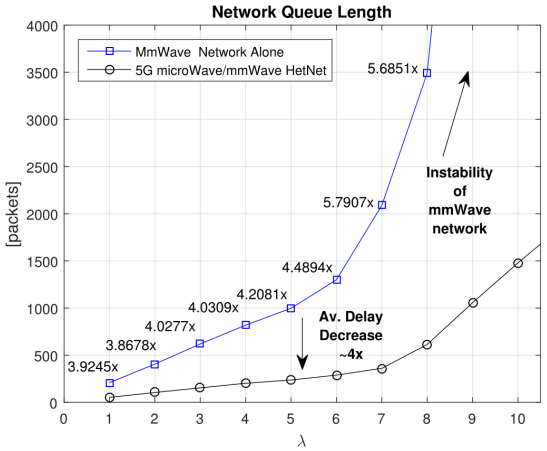
Interference





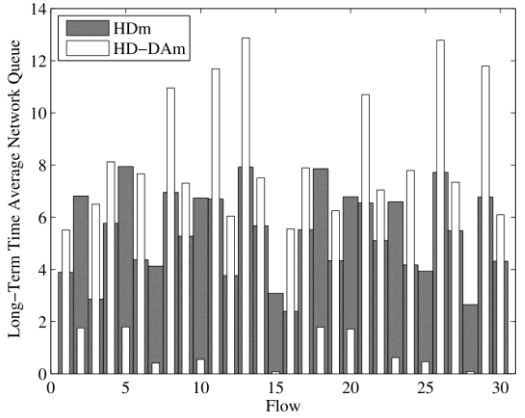
Throughput-Optimal Algorithms [1]

Exploring Coexistence of microWave and mmWave



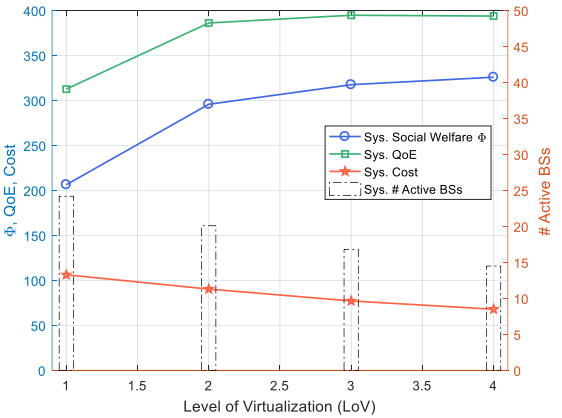
Heterogeneous Network [3]

Proportional Delay Differenciation



Queue-Delay Minimization Algorithms [2]

Maximizing Utility of Infrastructure Between Operators



Network Slicing [4]

[1] Garcia-Rois, J. and Gomez-Cuba, F. and Akdeniz, M. and Gonzalez-Castano, F. and Burguillo-Rial, J. and Rangan, S. and Lorenzo, B., "On the Analysis of Scheduling in Dynamic Duplex Multi-Hop mmWave Cellular Systems," *Wireless Communications, IEEE Transactions on*, vol. PP, no. 99, pp. 1-1, June, 2015

[2] Garcia-Rois, J. and Gonzalez-Castano, F. and Lorenzo, B. and Burguillo-Rial, J., "Delay-Aware Optimization Framework for Proportional Flow Delay Differentiation in Multi-Hop Wireless Networks," submmitted to *IEEE Transactions on Communications*

[3] Garcia-Rois, J. and Gonzalez-Castano, F. and Lorenzo, B. and Burguillo-Rial, J., "Heterogeneous Millimeter-wave/Micro-wave Architecture for 5G Wireless Access and Backhauling," accepted by *2016 European Conference on Networks and Communications (EuCNC)*

[4] Garcia-Rois, J. and Lorenzo, B., and Gonzalez-Castano, F. and Jinsong Wu, "Millimeter-Wave Network Infrastructure Slicing for Multiple Virtual Service Providers A User Association Perspective with Heterogeneous QoE," ongoing.

CONTRIBUTION TO THE VIRTUALIZATION AND ROUTING MECHANISMS FOR AUTONOMOUS DRIVING APPLICATIONS IN MOBILE AND VEHICULAR AD-HOC NETWORKS

Author: José Víctor Saiáns-Vázquez
Thesis Advisors: Martín López-Nores and Yolanda Blanco-Fernández

MOTIVATION

► VANETs are expected to become an **extension of the wired Internet**, providing innovative communication and information services to the drivers and passengers.

► **Virtualization** is a good way to tackle the problem of the high mobility:

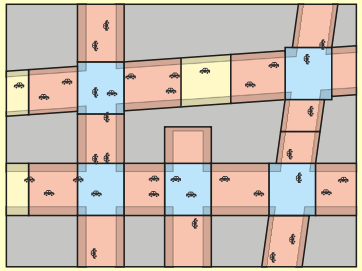
► Cluster-based approach to handle communications.

► Abstraction of fixed geographical regions served by **virtual nodes** as a mean to tackle the mobility of the real nodes.

► The virtualization mechanisms can be polished to work efficiently in a **wide variety of scenarios**.

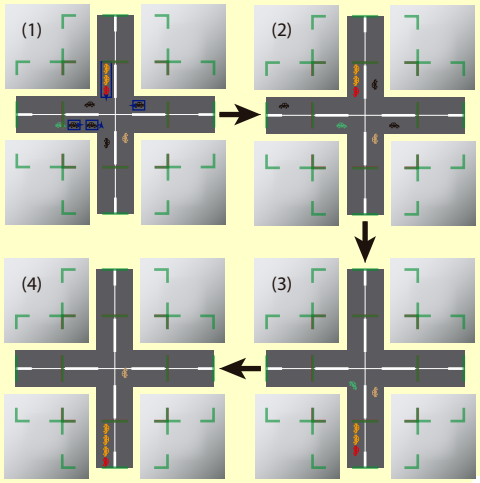
► **Autonomous driving** is one of the most promising application of the VANETs.

VANET's problem → **Solution**
High mobility → Virtualization



THESIS OBJECTIVES

Application layer	To test the performance of the developed infraestructure with VANET's applications of interest.
Routing layer	To propose new routing algorithms adapted for operating in virtual networks.
Virtualization layer	To propose contributions at the virtualization layer in order to provide a reliable communication environment in an urban scenario.
MAC/PHY layer	



ADVANCES IN ROBUST TECHNIQUES FOR THE IDENTIFICATION OF PEOPLE IN AUDIOVISUAL CONTENTS

Author: Eduardo Ramos Muguerza Advisors: José Luis Alba Castro, Laura Docío Fernández

BIOMETRIC SIGNATURE

POSE ESTIMATION

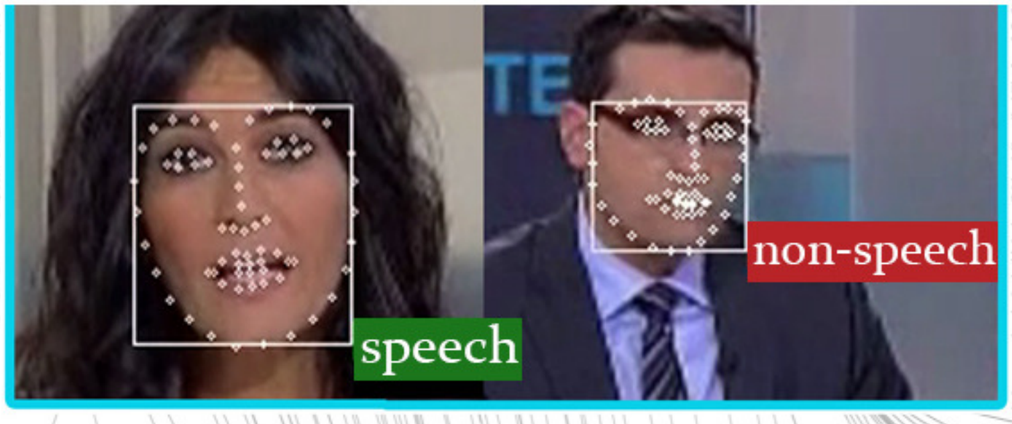
FACE DETECTION

Characterization of people: Study of efficient classical and deep learning algorithmic techniques

Identification of transmitters and receivers

Detection of people interacting

SPEECH DETECTION. SPEAKER DIARIZATION



SIGNAL PROCESSING FOR ANONYMOUS COMMUNICATIONS

Simon Oya, Carmela Troncoso, and Fernando Pérez-González

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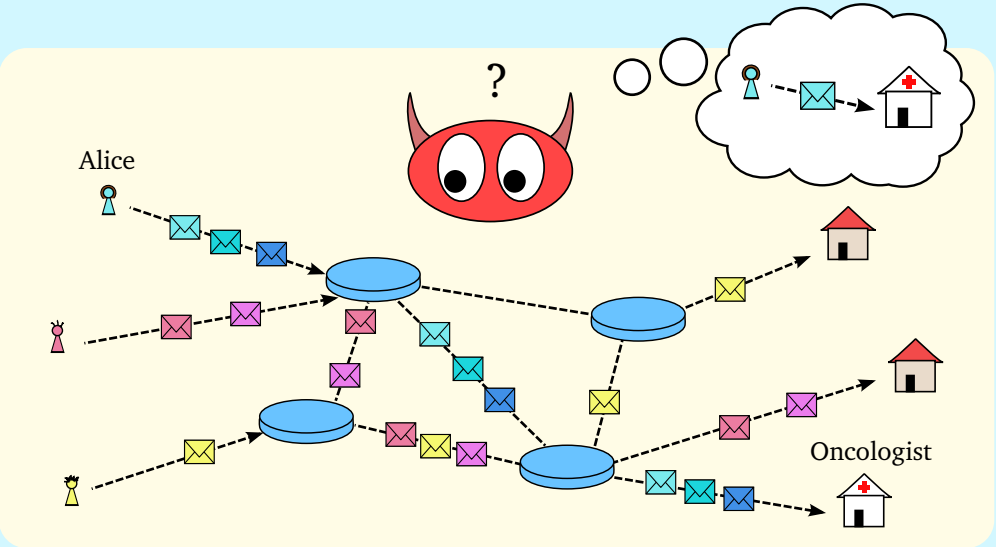
Universidad de Vigo
GPSC
Signal Processing in Communications Group

MOTIVATION OF THE WORK



- Privacy in the communications:
  - Protect data (cryptography)
  - Protect meta-data!!!

THESIS OBJECTIVES

- Apply signal processing tools to anonymous communications.

Analyze

Develop

Optimize

- How? In the poster :)

APPLICATION OF LEARNING ANALYTICS TECHNIQUES ON BLENDED LEARNING ENVIRONMENTS FOR UNIVERSITY STUDENTS

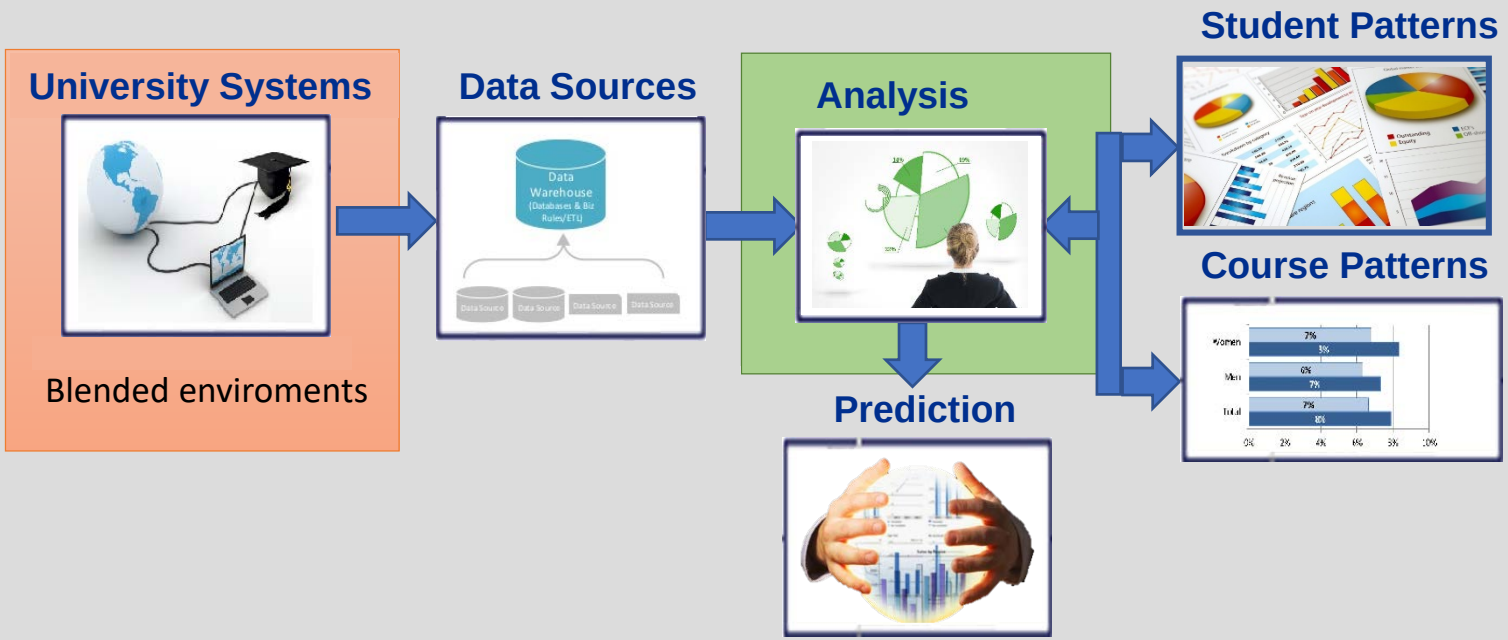
Sheila Lucero Sánchez López
Supervised by: Rebeca P. Díaz Redondo, Ana Fernández Vilas
Affiliation: ICLab Information & Computing Lab, Department of Telematics Engineering (University of Vigo)

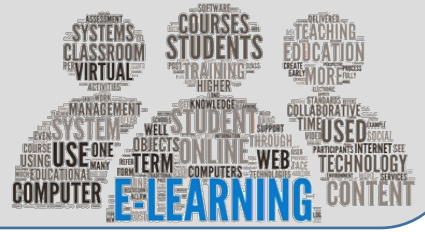
Will I pass the course?

Am I learning?

The main objective of this thesis is the research and application of learning analytics techniques for prediction and prevention of failure and dropout of students at university level under the blended-learning training model.

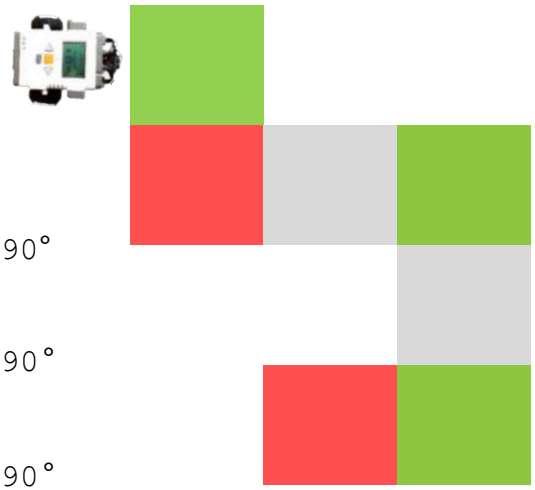
We propose:





BAD HABITS

```
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
if color green then turn right 90°
if color red then turn left 90°
forward 1
```



GOOD PRACTICES

```
repeat 8
forward 1
if color green then
    turn right 90°
else
    if color red then
        turn left 90°
end_repeat
```