

Supporting the Design of Intelligent Railway Stations

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Today Railway Stations

- Railway stations are a primary point of aggregation in every urban centre, but traditionally they are isolated from the urban context.
- They have a private energy distribution and communication system, mainly for preventing black-outs and unauthorized intrusions.
 - no integration with the Smart City.
 - the station system is excluded from modern techniques of energy saving.



Today Railway Services

The services offered to end-up users are limited to:

- informations about railway traffic (i.e. timetable of departures and arrivals and vocal announcements, Viaggiatreno)
- booking and printing on-line tickets (for example SMS tickets).

From the Station to =====> the SMART CITY

Smart services could be offered to gather informations from timetable of trains, availability of bike-sharing, car-sharing, taxi, hotels, in order to offer aggregate booking services to end-up users.



SMARTRAIL



SMARTBUS



SMARTTRANSIT

Smart Stations

- An opportunity for a more efficient management of machineries and energetic resources.
- They represent a technological innovation, obtained without building new expensive infrastructures, because they relies on Powerlines.

With this technology, it is possible to implement strategies for managing the energy consumptions of a smart station and avoid waste of energy.



Smart Stations

Smart Station App



Lo "Smart Station Ticket" può includere tutti i servizi della Smart City

SMART MOBILITY

Stazioni di ricarica con vetture elettriche pronte da utilizzare in città, aeroporti e servizio prenotazione parcheggi

SMART CONNECTION

Wifi libero in stazione e in luoghi convenzionati Smart Station

SMART ADVERTISING

Totem interattivi, advertising su Smartphone con suggerimenti per itinerari e o info di pubblica utilità

SMART ENJOYMENT

Possibilità di convenzione con centri divertimento, partite di calcio, sport, musei, luoghi di culto

Smart Stations

The main advantages of a Smart Station are:

- an increased energetic efficiency;
- an integration with mobility informations offered by a Smart City.

Both result in a lower environmental impact. The first directly through a lower energy consumption, while the second indirectly by optimizing the modalities of transport inside a city.

Smart connectivity in smart stations: **powerline technology**

Different usages of powerline can be :

- the heating of the rail road switches,
- the enlightening of the station,
- wireless connections and many others.

A first result: The rail road switch heating system

- Managing the energy consumption of these devices is important in order to reduce the costs and minimise the environmental impact.
- It is also important to guarantee the reliability of the system.

Reliability and energy consumption indicators for a system of (remotely controlled) rail road switch heaters have been analysed by developing and solving stochastic models based on the Stochastic Activity Networks (SAN)

(SERENE 2015, LNCS 9274)



Conclusions and Expectations

- Sharing traffic informations from Smart City transports (i.e. bike-sharing, car-sharing) with traffic informations from railway stations is important in order to improve end-user services
- At the same time it is important to optimise the energy consumption
- These aspects result in a lower environmental impact
- Smart Stations represent an opportunity for a more efficient management of machineries and energetic resources
- A first result has been in studying strategies for managing the energy consumptions for the heating of rail road switches