MŰEGYETEM 1782

BME - VIK

DEPARTMENT OF TELECOMMUNICATIONS AND MEDIA INFORMATICS

ELECTRICAL ENGINEERING MSC

SMART CITY SECONDARY SPECIALIZATION

- WHAT IS THIS ABOUT?
- WHY TO CHOOSE US?
- PROJECT LABORATORY AND THESIS TOPICS
- SPECIALIZATION COURSES
- INDUSTRIAL PARTNERS
- RELATED PHD EDUCATION
- FURTHER INFORMATION ABOUT THE DEPARTMENT

DEPARTMENT OF TELECOMMUNICATIONS AND MEDIA INFORMATICS

What is this about?

What do we mean by „Smart City"? How can a city be smart? Mainly through the smart environment surrounding us, and the location-aware and context-aware personalized applications and services that are built on it. A few years ago we could only read in Sci-Fi novels about shopwindows that recognize people passing by, vehicles that communicate with each other, or touristic information that is displayed on our glasses.
Today this is reality already.

Why to choose us?

The Smart City secondary specialization **complements very well several main specializations!**

You are in the right spot, if you're interested in...

EMBEDDED SYSTEMS ...

Learn how to integrate different sensors in the complex architecture of a smart city, how to organize these sensors into a network, and make them cooperate efficiently.

MOBILE AND WIRELESS NETWORKS ...

Learn about the special requirements of networks of rapidly moving vehicles or wireless sensor networks with constrained resources.

ELECTRIC POWER SYSTEMS ...

Learn about how the smart grid and smart metering systems are connected to the other components of the smart city infrastructure.

SOFTWARE DEVELOPMENT ...

Find out, what kind of applications are needed in future smart cities, what are the requirements they should comply to, and what kind of new communication interfaces should they support.

The smart cities of the future are being built now, and there is a large need for engineers and experts in this domain. Our goal is to educate and train such experts.

Head of Specialization:

Rolland Vida, PhD

Associate Professor
BME-VIK-TMIT
vida.rolland@vik.bme.hu

We offer many project laboratory and diploma work topics related to smart cities, independently of the topic of your main specialization and its hosting department. Here are some potential areas:

Networks

Sensor networks, vehicular networks, Internet of Things, 5G networks, Wi-Fi offloading, cloud communications.

Applications and services

Artificial intelligence, deep learning, development of mobile apps (Android), outdoor and indoor localization, navigation, robot control, location-aware and context-aware services, crowdsourcing and crowdsensing applications, gamification.

Security and Reliability

Network security, service security, data security, reliability and privacy.

Speech- and media technologies, data mining

Speech processing, -synthesis and -recognition; graphic interface design, Augmented Reality applications, gesture recognition and –control, data- and text mining, big data, sport analytics.

HUMAN-COMPUTER INTERACTION

In the smart cities of the future, the communication between humans and computers (sensors, cars, smartphones) should be made as natural and as transparent as possible. In this course we will explain how can we manipulate our environment through voice- and gesture control, or how can the intelligent environment present us the most important and relevant information through a Google glass or on the display of a smartphone. We also present how should we ergonomically design and personalize these interfaces.

INTELLIGENT TRANSPORTATION SYSTEMS

One of the most important building blocks of smart cities is the intelligent transportation. During this course we will present how do rapidly moving cars communicate with each other and with the surrounding smart environment (e.g., traffic lights, traffic signs, pedestrians). We talk about self-driving cars, e-mobility, car hacking, car sharing, and ride sharing solutions.

SENSOR NETWORKS AND APPLICATIONS

The „intelligence" of our surrounding environment (city, workplace, home) is mainly due to the sensors embedded in streets, walls or smartphones around us. These sensors continuously monitor the physical world, gather lots of data, which is then shared through the network. During the lectures we will present the hardware and software architectures of the sensors, we will talk about resource-efficient data gathering, data processing and ad-hoc communication, security and privacy solutions. We will present several concrete systems, from design to implementation, focusing on applications that are related to smart cities.

SMART CITY LABORATORY

Laboratory works that are tightly related to the specialization courses, and thus to smart cities: programming of microcontroller modules, building of sensor networks, sensor data sending to the cloud, extraction and processing of vehicular sensor data, extension of vehicular Android apps, vehicular simulation tools, Augmented Reality applications, gesture control.

Industrial partners (TMIT)

vodafone

BKK KÖZÚT

INVENTURE AUTOMOTIVE ELECTRONICS

MTA SZTAKI

AITIA

IBM

MÁV-START Vasúti Személyszállító Zrt.

waze OUTSMARTING TRAFFIC, TOGETHER

ERICSSON

telenor

NiCT

invitech SOLUTIONS INVITEL CSOPORT

T··

it's possible! evopro

NOKIA

Related PhD program

DEVELOP YOURSELF FURTHER – DO NOT STOP WHERE OTHERS DO

If you would like to develop yourself further after obtaining your engineering MSc degree, and you are interested in research as well, think about joining our PhD program.

HSN Lab offers you an internationally competitive PhD program, with an outstanding success rate. Since the creation of the lab in 1992 **we have witnessed more than 100 PhD defenses**, with the majority of the employees of Ericsson Research Hungary having obtained their PhD in our lab.

The Future Internet Joint Research Group and the Network Softwarization Joint Research Group of **BME and the Hungarian Academy of Sciences** (MTA) are both operating at our department.

MORE INFORMATION ABOUT THE DEPARTMENT

Head of Department:

Pál Varga, PhD

Associate Professor
BME - VIK
DEPARTMENT OF TELECOMMUNICATIONS AND MEDIA INFORMATICS

FROM THE SCIENTIFIC APPROACH TO THE PRACTICAL APPLICATIONS

INTERNET ARCHITECTURE AND SERVICES

SMART CITY

DEEP LEARNING

Lendület MTA-BME

ARTIFICIAL INTELLIGENCE

5G

TMIT INTERNET OF THINGS CONTEST

YouTube

BIG DATA

DATA SCIENCE, DATA ANALYSIS

facebook.com/bmetmit

www.tmit.bme.hu

youtube.com/user/bmetmit

www.tmit.bme.hu/specializaciok

1117 Budapest, Magyar tudósok krt. 2. „I" Informatics Building, B.220