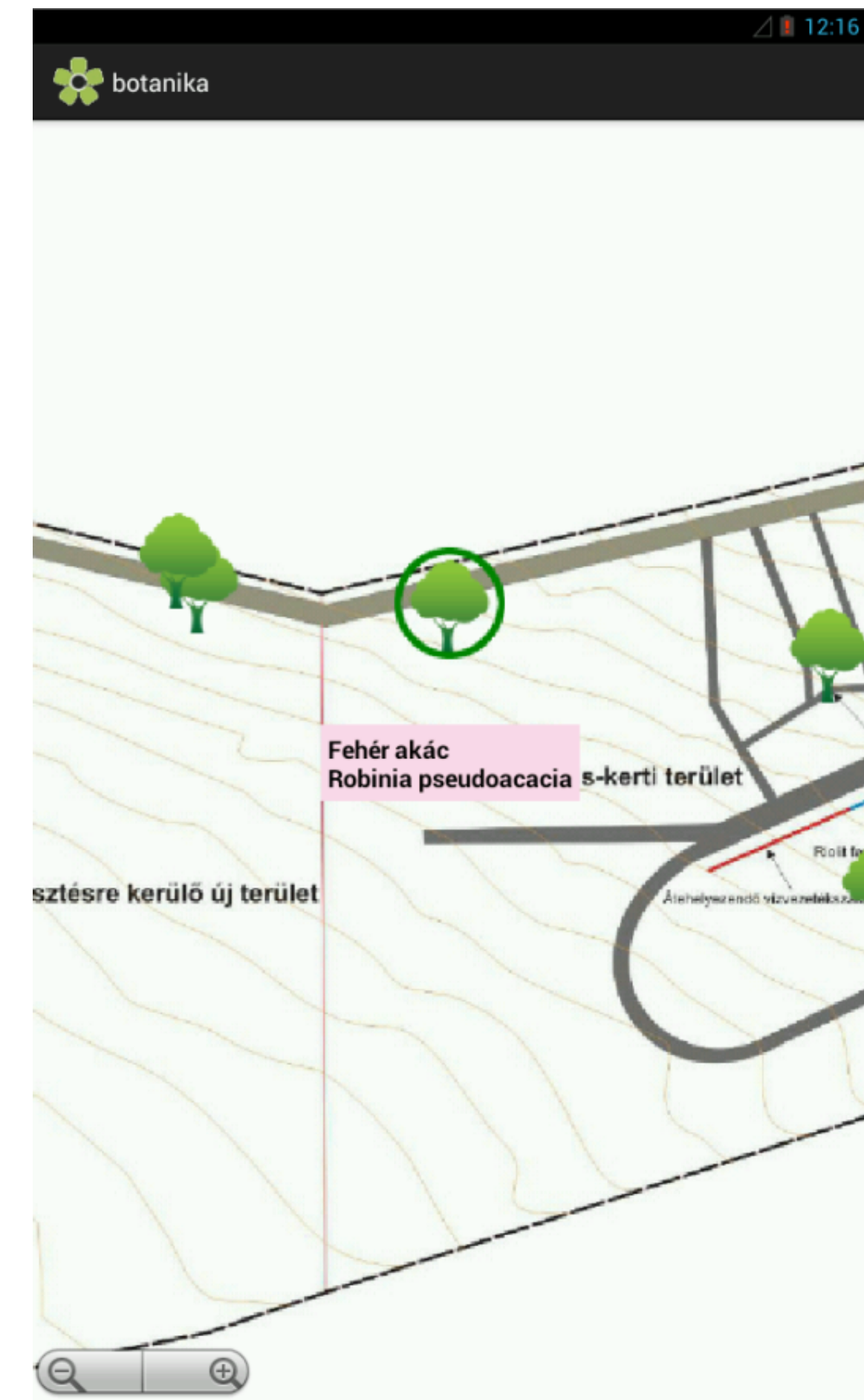
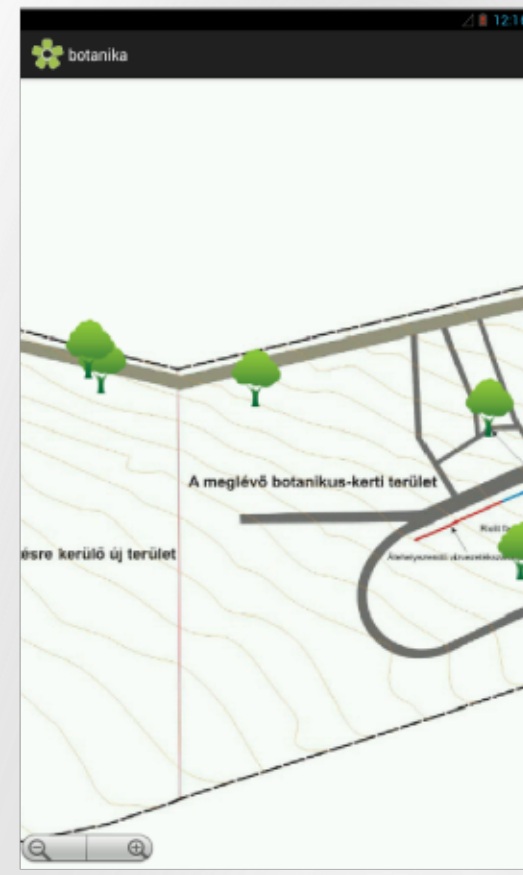
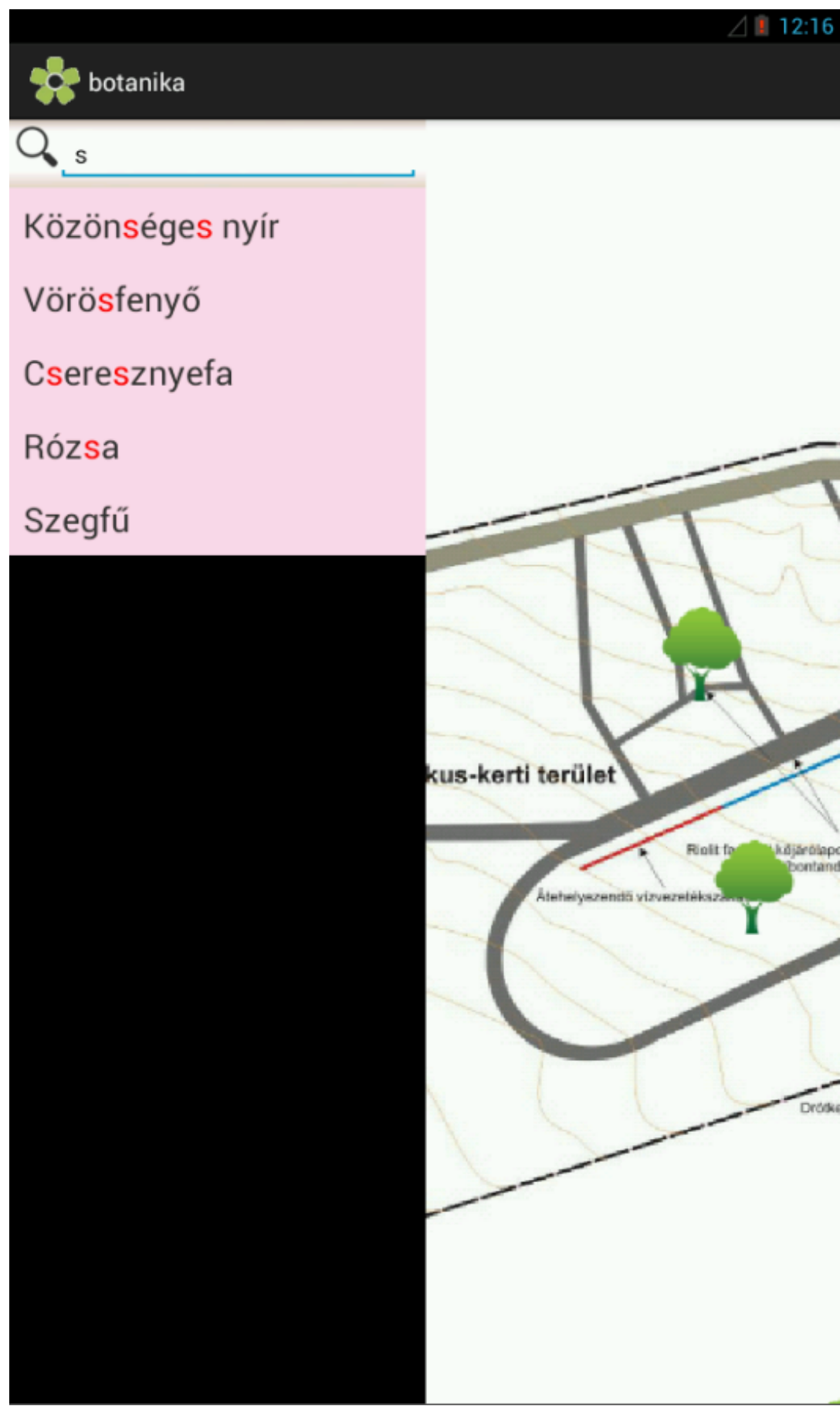


MAPPING:

Exploration and Identification of Surrounding Objects near EKC



Applications:

- Touristic guidance [2] [4]
 - Query of locations
 - On the basis of route plan
 - Actions at restaurants
 - Visitor's book near sights
- EKC Messenger
 - Teacher tags (message wall, task list)
 - Room tags (attendance register, curriculum for the lesson)
- Navigation inside inner spaces

Concept of an application:

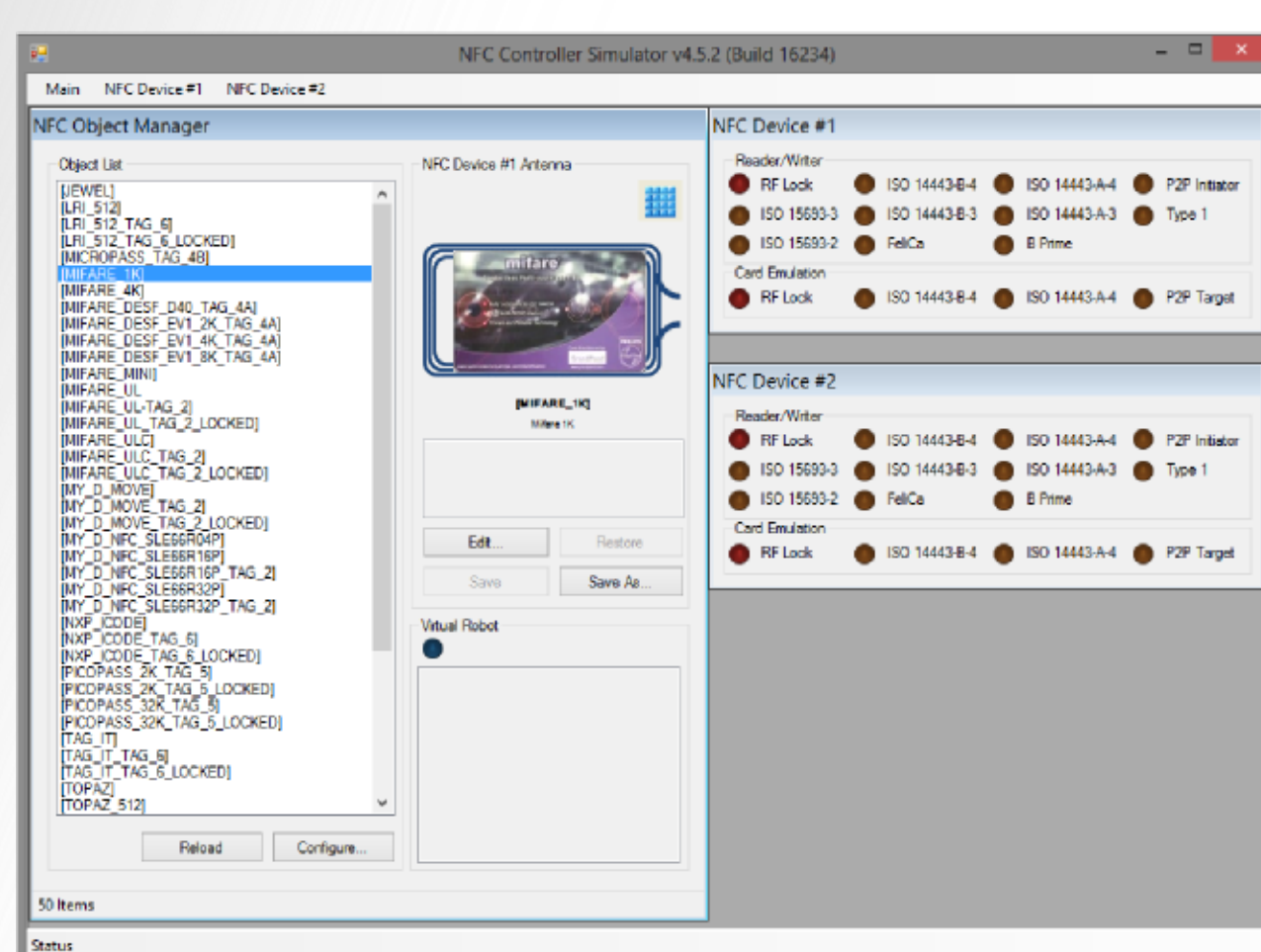
- Database of maps, objects, events
 - Searchability of certain maps, objects, events (information and position)
 - Exchangeability of maps, objects, events
 - Placeability of objects, events
 - Previously placed objects, events
- Navigation:
- Outdoor: primarily GPS, correction QR-code, NFC
 - Indoor: QR-code, NFC

Development:

- Sufficient requirements:
- Instantiation of NDEF messages, createMime() (min: API level 16)
 - android.nfc, android.nfc.tech packages
 - AAR record inside NDEF messages – starting application (min: API level 14) [5]
- Necessary requirements:
- Using of supported IDE (Android Studio, Eclipse)[4]
 - Online, offline functioning
 - Using of current design patterns (e. g.: navigation drawer)
 - Other technologies (QR-code, GPS)
- Protection:
- User interface: public and checked admittance
 - Tags only after authentication

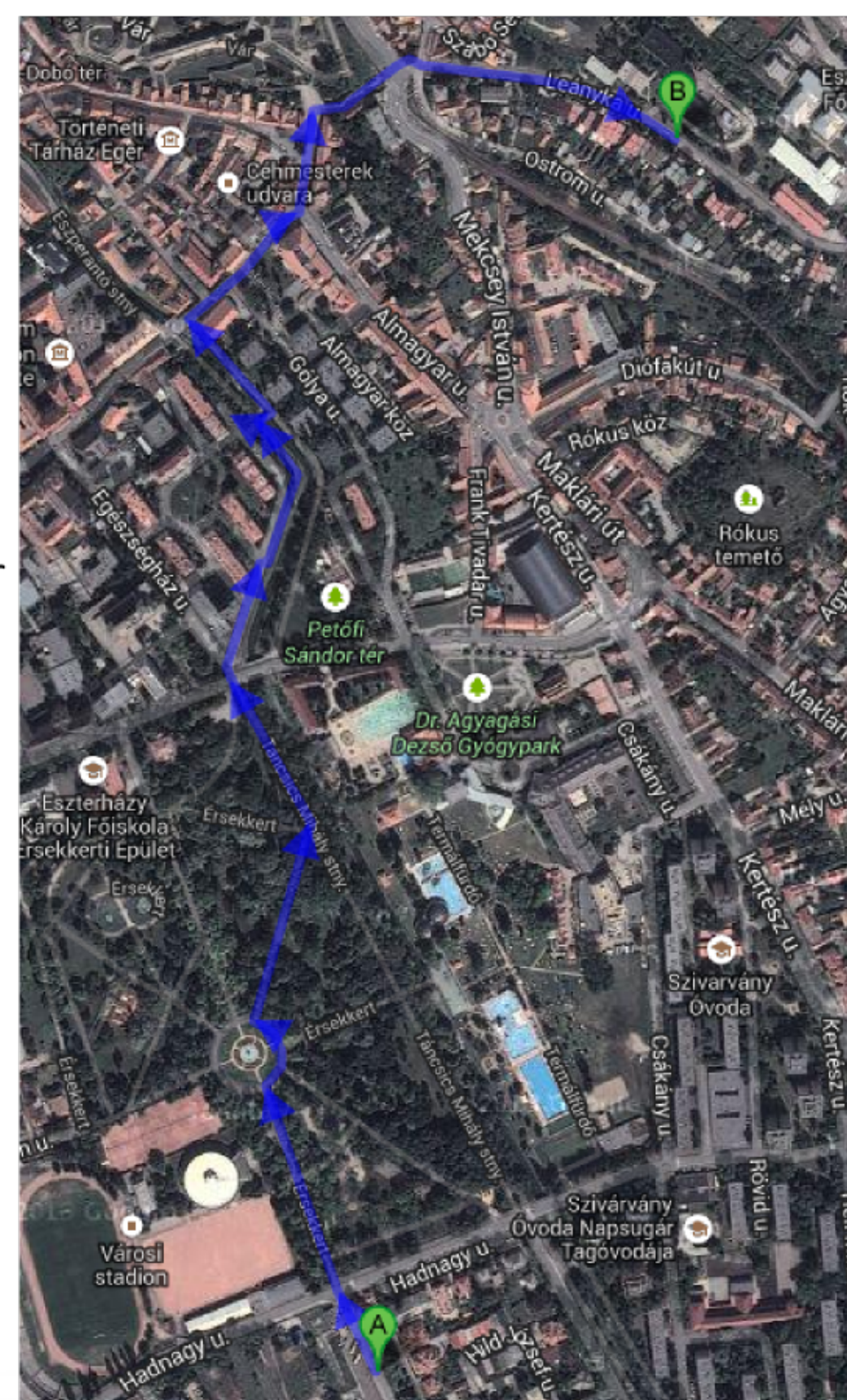
Testing:

- Physical testing:
 - Compiling code to the smartphone connected to PC, then running there
- Existing objective tools:
 - Nexus 7 (Tablet PC)
 - Mifare Classic 1K(ISO/IEC 14443 Type A card), NXP Icode(ISO 15693) – NDEF support
- Virtual testing: [2]
 - OpenNFC (Android 4.2.2 image)
 - OpenNFC NFC simulator and Connection Center (tag and reader interaction)



Android:

- Mobile operation system based on Linux kernel [6]
- Proposed for portable devices using touch screen
- Good programmability
- NFC compatible since 2010 (2.3, API level 9)
- Free IDEs (Eclipse, Android Studio)
- Dynamic progress
- Suitable documentation
- Wide vocational fellowship and IRC support (specially for developers too) (IDC, Gartner)
- 1/3 of applications are (or will be) NFC compatible



NFC (Near Field Communication):

- Set of standards for small intelligent devices [3]
 - Establishing radio communication with each other by bringing them into proximity (few inches)
- We can use this:

- To get position
 - For contactless payment
 - For sharing information
 - For multiplayer gaming, etc.
- Communication can between:

- Two NFC devices
 - An NFC device and an unpowered NFC chip (tag)
- 1/3 of new devices use NFC (market researches - IDC, Gartner)



Internet of Things (IoT):

- Work based on this conception
- Attributes:
- Communication between Objects- People
 - Objects – Objects
 - Decision making of Objects according to environmental changes (sensors) [1]

New demands, expectations:

- Events (open days, Researcher's Night, Museums' Night, conferences, etc.) - visitors
 - Erasmus, national conferences, sport events - foreigners
 - Interstate convention - brazilians
- Need for technological renewal inside and outside of EKC
- Necessity for:
- Dynamic navigation on maps
 - Possibility for query of locations' position
 - Mark of Events' positions
 - Route planning between two spots

One of the project's research group, called

Hybrid Technologies:

- Collective use of RFID (or technologies based on that) with other technologies
- Goal: Reach better efficiency in solving of some kind of problem [2]
- One of our research site is the possible use cases of Android and NFC

The other tasks:

- BOCI (Business Oriented Creature Identification)
- Indoor localization using NFC and mobile sensor data corrected using neural net



ICAI 2014



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