Sensor Networks on-the-fly

The future of machine to machine communication is built on autonomous discovery of networking resources. Prime among those, are sensors that could report live data and feed decision making systems. The prevalence of smart devices (smartphones, tablets, smart watches, etc) offers a unique opportunity for developing instantaneous sensing networks. That is, collecting sensed data from a multiplicity of devices in any given region without deploying an infrastructure beforehand. This project will focus on developing heuristics for online discovery, [profiling and registration of on-the-fly sensing and networking resources. Building on a resource classification system that is available to this project, the objective would be to manifest available resources in a given region over a map interface. This could typically be realized over Google maps' API. A core challenge in this project is identifying usable sensors among those that are unreachable, highly-mobile (i.e. only instantaneously available), or with poor quality.

Supervisors:

Sharief Oteafy and Hossam Hassanein

An app for improving reading: Word-Matrices for morphological Instruction

Today's young learners often fall behind in reading, leading to significant drop-out rates and less educational involvement, especially as they advance from one grade to another. Recent studies stressed the impact of morphological awareness in reading competency. Simply put, Morphology plays a critical role in binding letters, meanings and sounds. It describes how words are made up of *morphemes*, which are the atomic units of a word reflecting a certain meaning. For example, "hang + er" is built from two morphemes. There are many tools being developed to teach morphology, and increase students' awareness at an earlier age to improve reading comprehension and potentially their prospects in education.

In this project, you will develop a comprehensive game for morphological instruction, varying different prefixes, suffixes and word roots to help students in early grades. The application should be both easy to use and simple to vary by the instructor (to adapt to the class). It should also collect statistics on users' performance, noting their current "morphological knowledge", their advancement, and alert the instructor about struggling students.

Educational background

Understanding basics of morphology, morphemes as building blocks, and a basic understanding of Etymology (references below)

Computing background

Developing mobile applications (on tablets/ smartphones) and developing modular interfaces to adapt to morpheme data bases, and enable active reporting of results to a centralized DB (possibly hosted on a 3rd party Cloud server).

Co-supervision and collaboration

This project will require close collaboration with supervisors from Computing and Education. Namely: **Sharief Oteafy, John Kirby and Hossam Hassanein**

Available resources

- http://educ.queensu.ca/research/spotlights/morphology
- http://educ.queensu.ca/sites/webpublish.queensu.ca.educwww/files/files/People/Faculty/Kirby's%20Prize%20for%20Excellence%20in%20Research%20presentation.pdf
- www.affixes.org