iHorizons™
Labs @ QSTP

Creating Intellectual Value

iHorizons is an established regional innovator, recognized for its successful development of software solutions and eBusiness applications for the past 13 years. Most of our work involves original research and development in several computer science and software engineering areas, and our investment in R&D is critical to iHorizons success. iHorizons Labs at Qatar Science & Technology Park, therefore, comes as a natural extension of our activities. We recognized that QSTP would provide a unique innovation ecosystem for its members, and that iHorizons will get tremendous leverage by tying up with other innovation-driven members at QSTP and at Qatar Foundation at large.

Arabic Language Technologies

The Gap and the Opportunity

Recognizing the current limitations in the level of Arabic language technology development, which clearly manifests itself in the inferior quality of Arabic search services available today, iHorizons is set to contribute to developing a number of langue technologies to help close this gap. This is planned to be part of an orchestrated effort between a number of entities including Carnegie Mellon University, Qatar University, QSTP, and other QF bodies.

In the meantime, iHorizons has started doing some ground work on basic technologies and search components, and plans to present some beta products with unique concepts in Arabic search.

Areas for Innovation

Research in this area will focus on the aspects that have the most potential to impact the Arabic search quality and experience, including:

- **Graphical User Interface**
  Providing advanced functionality should be aided by simplicity and user friendliness. The interface we are working on will include many Arabic-specific innovative elements that enhance the usability and accessibility of search features.

- **Search Engine Components**
  The various elements in the search engine will have to understand the Arabic language and deal with it in an intelligent way. This includes everything from the crawler's ability to automatically recognize Arabic websites and content, to custom developed algorithms for language-specific and culturally-relevant ranking of results, to Arabic morphology functions aiding rich search functionality.

- **Collective Efforts**
  This work also entails developing new standards and methodologies to be agreed on by Arabic website developers and content owners to facilitate shared discovery of content and structure, possibly in a third generation web approach; i.e. semantic tagging and rich metadata models. Work will also involve algorithm tweaking for regional relevancy, which will likely benefit from semantics structures.

Enterprise Knowledge Management

Leading Forward

iHorizons has been a leader in advanced enterprise content management applications for world-class clients like Al Jazeera Network for more than a decade. iHorizons QSTP will leverage this achievement by focusing its R&D activities on developing its product portfolio in several areas, taking advantage of recent technology advances and new thinking in this area.

Challenges

From our long experience in the field of knowledge management in the Arab world, we realized that existing technologies have limitations that inhibit their ability to live up to user expectations. Our researchers identified several challenges in the Arabic knowledge management domain.

- Although some existing technologies do support Arabic at the interface level, they do not support it natively and they lack important language-relevant tools.
- Existing technologies have limited customization features, and in most cases organizations have to hire the services of specialized consultants to customize solutions to meet their needs.
- Existing technologies tend to focus on a subset of knowledge management functionality and ignore a variety of important components such as role management, workflow control, and integration with existing enterprise applications.

Managing Knowledge Effectively

iHorizons QSTP plans to conduct R&D on the areas above, with focus initially on the following features.

- **Modular Building Blocks**
  The ability to flexibly build and modify knowledge elements would enable enterprise users to create and customize basic blocks and maintain relationships between them through a high-level interface.

- **Querying and Viewing Knowledge**
  Using visual representations of data queries enables non-technical knowledge workers to build, execute and visualize advanced queries on the fly.

- **Essential Functionality**
  Advanced workflow management provides a foundation for creating customized knowledge work processes according business needs, and a reliable application host engine enables the creation of custom applications that would be plugged anywhere into the platform or integrated with other enterprise applications.
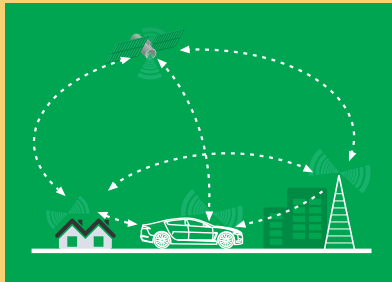
iHorizons™
Labs @ QSTP

Wireless Applications

Wireless technologies are advancing very rapidly, but the rate at which software applications are taking advantage of this advancement is much slower. With more business and consumer applications, wireless usage can take off very quickly to the advantage of telecom providers and consumers alike. iHorizons is looking at several opportunities in this domain, with the intention of creating and commercializing innovative products that would be useful all over the world.

Traffic Jam!

One example of applications with great potential in the wireless communications domain is road traffic monitoring and control. Most large cities in our region (and all over the world for that matter) are suffering from unbearable traffic jams, and the situation is only getting worse. Unless the concerned authorities have a better understanding of this problem, in the form of clear traffic statistics and patterns, it will be impossible for them to find appropriate solutions.

Those authorities, which include urban planners, traffic police, emergency response teams, and large event managers, will have their jobs made much easier if they have good information about vehicle traffic patterns and access to advanced analysis tools that would enable them to understand and predict traffic patterns in various parts of a city.

Real-Time Visualization

It would be even better if planners had real-time access to traffic patterns, with automated tools to point out important events or particular situations. Dependencies could be intelligently built so that such events would trigger proactive measures to handle a situation, change certain plans, alert certain parties, etc.

The New Infrastructure

Many cities in the region are not yet equipped to have even basic traffic information, and it would be difficult and expensive to build the required infrastructure in the traditional way. Hence, modern wireless application can play the important role of cost-effectively providing city-wide traffic gathering networks that are more flexible and informative.

The Soft Side

iHorizons is looking at building some of the necessary components for such applications, with focus on the software elements, which bring out the real benefits of data mining and decision support. We hope that in a few years our systems will be utilized by some regional and global authorities to help alleviate the increasingly complex and annoying traffic management problems.

Bioinformatics

In this interesting, relatively new area of development, expertise from software engineering and molecular biology come together to develop tools to solve problems posed by the management and analysis of biological data through the creation and advancement of algorithms, computer science, artificial intelligence, informatics and statistics.

Common activities in bioinformatics include mapping and analyzing DNA and protein sequences, aligning different DNA and protein sequences to compare them and creating and viewing 3-D models of protein structures.

The software applications we are looking at will address industry professionals' needs in mining, analyzing and serving data from many sources, including genome sequencing, with potentially important applications in areas like pharmaceuticals and agriculture.

The Potential

iHorizons' core competence in developing advanced software applications puts us in an ideal position to work with biotechnology-focused organizations on the development of highly complex bioinformatics solutions. We believe that there is a great potential for bioinformatics to enable major advances in medicine, agriculture and other areas. With the current rate of development, this field will trigger considerable interest from research and academic institutions, in addition to the aforementioned industries, with great economic potential.

Web Services

Web-based interfaces have the potential to serve a wide variety of bioinformatics applications, allowing an application running on one computer in one part of the world to use algorithms, data and computing resources on servers in other parts of the world. The main advantages lay in the end user not having to deal with software and database maintenance overheads. The availability of these service-oriented bioinformatics resources demonstrate the applicability of web based bioinformatics solutions, and range from a collection of standalone tools with a common data format under a single, standalone or web-based interface, to integrative, distributed and extensible bioinformatics workflow management systems. With iHorizons vast experience in these technologies, we believe that we will add good value to the domain.

The QSTP Advantage

Working in the R&D-driven environment of QSTP, and having the opportunity of teaming up with the relevant parties that have interest in this area, would help translate this vision into real products used by clients all over the world. In addition to providing employment opportunities to young Qatari talents in this advanced field of work, iHorizons expects the collaboration to benefit the Qatari population by developing advanced solutions for further improvement of the national health system.