myGander: A Mobile Interface and Distributed Search Engine for Pervasive Computing

Personalized Networked Spaces (PNetS)

Pervasive computing environments where devices may form opportunistic peer-to-peer connections.

**Data**
- Large volumes
- Generated at rapid rates
- Short-lived
- Amount available far exceeds amount used

**Network**
- Highly dynamic
- Heterogeneous
- Intermittent connectivity

**Human Users**
- Tight spatiotemporal behavior and the integration of user

The Gander Search Engine

Gander[1]: A distributed search engine for PNetS
- Performs search directly within PNetS
- Explicitly separates search from a prior indexing
- Uses mobile ad hoc networking query protocols as spatial sampling strategies

The myGander Mobile Interface

myGander[2] is a mobile interface for the Gander search engine implemented on Apple’s iPhone Operating System (iOS)

**Retrieving Search Results**
- (d) myGander search history
- (e) Ranked search results
- (f) The simulator back end provides the ground truth results for each search

**Construcing a Gander Search**
- (a) A search string specifies data of interest and constraints
- (b) Ordered relevance metrics are used to rank search results
- (c) A query protocol specifies how users’ PNetS are spatially sampled

**Deployment for Simulated PNetS**

myGander and Gander are integrated with the OMNeT++ network simulator.

**Simulation Architecture**
- (a) myGander Mobile Interface
- (b) (De)Multiplexing Proxy Server
- (c) Gander Search Engine
- (d) PostgreSQL Global Virtual Data Structure
- (e) OMNeT++ Framework
- (f) SUMO Motion Driver

**Demonstration**

We simulate PNetS in Walt Disney World’s Magic Kingdom
- 16 hours of wait time information
- Locations and features of attractions searchable entities
- Accurate walking paths

As simulated visitors walk around, their simulated devices collect timestamped data about attractions and amenities they have recently been near (within ~20m)

**References**


* Jonas Michel, Christine Julien, Jamie Payton, Gruia-Catalin Roman
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