



Speak, Find. ...EASY!

Single-Input Voice Search for Embedded Applications

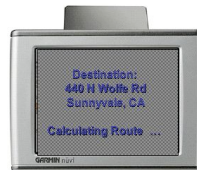
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Novauris Technologies

3/11/09

NovaSearch® Voice Search

❑ **SILVR™ (Single Input, Large Vocabulary Recognition)**

- Powerful (because it's simple)
- Flexible (input)
- Versatile (tasks, platforms)



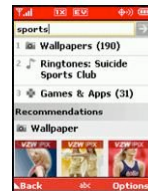
Please speak the Street address:

"440 North Wolfe Road Sunnyvale, CA"

Quicker, Easier, Safer!

❑ **Embedded** as well as **Client-server** based

❑ All core engine technologies and IP **developed in-house**



Embedded Voice Search

- What is it?
 - Voice search of information locally stored in the device
 - Processing done on the device without server
- Why is it interesting?
 - Device capabilities (CPU, storage) increasing
 - Challenges in user interface for information access
 - No network dependencies (QoS, latency, charges)



“New IBM Chip to Let iPods Hold 500,000 Songs” – Science Magazine April 2008

Note: 3rd alternative is Distributed ASR (DSR) (See talk on new kind of DSR on Tues PM – B203)

NovaSearch[®] Compact

- Embedded speech recognition for speaker-independent spoken access to large databases
 - Largest application built: one-shot US address search
 - >5.2M street-city-state items; >320,000 words in vocabulary
 - Also supports “simple” tasks (commands, digits, etc)
 - Operating systems supported
 - Windows CE, iPhone, Linux
 - Hardware requirements
 - CPU: ARM/Xscale (400MHz+ recommended)
 - Memory (e.g. US Address): 6.5MB (RAM); ~500MB (NVM)
 - Languages: English, Japanese, Korean

NovaSearch Compact: Demos

**Address
Search for
Navigation**



One-shot US address entry

**POI Search
for LBS (US
English)**



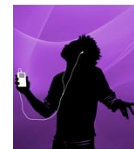
US Points of Interest

**POI Search
for LBS
(Japanese)**



Japan Train Stations

**Digital
Media
Access**



Say It, and Play It!

NovaSearch Compact: Demos

**Address
Search for
Navigation**



One-shot US address entry

One-shot US address entry

- Any number-street-city-state
e.g. "8860 Boundbrook Ave,
Dallas, Texas"

- Natural input for street numbers

Optional Fields:

- Directional qualifier (N/E/S/W...)
- Street classifier (Bld, Ave...)

- Device: HP iPAQ hx2795
- OS: Windows Mobile 5
- CPU: Marvell PXA310 (624MHz)
- Required RAM: ~6.5MB
- Required ROM: ~500MB (DB)

NovaSearch Compact: Demos

POI Search
for LBS (US
English)



US Points of Interest

US Points of Interest (POIs)

- 50,000 POIs
 - Common POIs (Starbucks)
 - Categories (Hospitals)

US POI-City-State

- Generic POI + city + state
 - 300+ common/categories
 - 2,500 cities

- Device: HP iPAQ

NovaSearch Compact: Demos

POI Search
for LBS
(Japanese)



Japan Train Stations

Japan Train Stations

- 9,000+ Japan railway stations
- Short and confusable sets

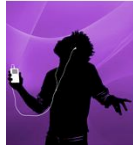
Tokyo Train Routing

- “From A to B”
- 350+ stations in the Tokyo area

- Device: Apple iPhone 3G, iPAQ

NovaSearch Compact: Demos

Digital
Media
Access



Say It, and Play It!

NovaSearch Flex Jukebox

- 10,000 song titles and artists

Input flexibility:

- Title by artist (*Hey Jude by the Beatles*)
- Artist, title (*The Beatles, Hey Jude*)
- Title only (*Hey Jude*)
- Artist only (*The Beatles*)

- Device: HP iPAQ

NovaSearch Compact: Demos

Flexible
Phrase
Recognition



Handheld Translator / Robots

Phrase Translation

- Spoken English phrases into Japanese and Korean
- Covers 1,500+ base phrases spoken in many different ways

Examples:

- "I'm afraid the TV is broken"
- "There seems to be a problem with my television"
- "Unfortunately, the TV isn't working"
- "The television's faulty, I'm afraid"
- etc.



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More demo Videos on **YouTube**
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www.youtube.com/novauristechnologies

