Picard ASR

Picard ASR is an advanced automatic speech recognition (ASR) system that is dedicated to run on platforms with extremely low resources. Especially the amount of on-chip RAM dominates the price of a microcontroller. That is why Picard ASR is strongly optimized in terms of RAM memory consumption. Thus, Picard ASR is the first high quality state of the art speech recognition system (worldwide lowest RAM consumption down to 15 kB) which is able to run on low price microcontrollers. This enables the usage of speech controlled human machine interfaces (HMI) not only in high-end life style products but also in medium and low price consumer products. Hence, Picard ASR provides the potential for speech HMIs to appear in everyday life, making our world a bit more interactive.

Linguwerk GmbH is a competent partner, manufacturer, and service provider in the fields of signals, technology, and media. We successfully face every challenge whether it is a conventional product, future technology or custom solutions.

Die Linguwerk GmbH ist als Technologieunternehmen kompetenter Partner, Hersteller und Dienstleister in den Bereichen Signals, Technology und Media. Ob es um klassische Technologieprodukte, Zukunftstechnologien oder um die Erarbeitung von maßgeschneiderten Lösungen geht, wir stellen uns mit Erfolg jeder Herausforderung.

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Picard ASR

The world's smallest speech recognition system.

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Picard ASR – the world's smallest speech recognition system

Applications

Picard ASR is a speech recognition system optimized to run with minimum system requirements, thus it can be used in almost any hardware environment and in various application software, for example

- Household appliances
- Smart home automation
- Toys
- Smartphones and tablets
- Embedded systems
- Medical devices
- Machine control systems
- Automatic light control
- Computer games
- Navigation systems
- Photography and video equipment
- Assisted living systems
- Interactive language training
- Automated dialog systems
- Entertainment systems

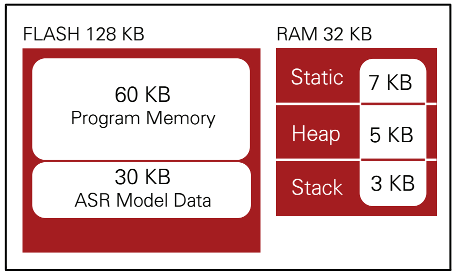
Speech Recognition Technology

- Phoneme based HMM (Hidden Markov Model) recognizer
- MFCCs (Mel-Frequency Cepstral Coefficients) with velocity and acceleration features (delta and delta-delta features)
- Acoustic model: GMMs (Gaussian Mixture Model) with 64, 128 or 256 Gaussians
- 3 state linear phoneme HMMs
- monophone and triphone HMMs

Technical Data

- Continuous ASR of words, phrases or sentences
- Recognition accuracy up to 98 %
- Speaker independent
- Main world languages available
- Unlimited vocabulary size
- Platform independent
- CPU clock: **40 MHz**
- FLASH: **90 kB** (60 kB program, 30 kB ASR model)
- RAM: **15 kB** (7 kB static, 5 kB heap, 3 kB stack)

Memory Consumption of
Picard ASR on a PIC32 MX 250
Microcontroller 50 Mhz



Usage of Picard ASR

Application designers can use Picard ASR to introduce smart speech HMIs into machines, devices, entertainment systems, home appliances, technical toys and many more. For the design of the human interaction the grammar of Picard ASR needs to be defined. An ASR grammar is a number of semantic units (words, phrases, sentences) within a speech dialog menu. These units are to be recognized in parallel at once.
A complete dialog structure consists of several grammars which are loaded subsequently depending on the current dialog menu. With the help of a software tool provided by Linguwerk GmbH, the application designer can generate own ASR grammars including phoneme transcriptions of words. Picard ASR is delivered as a platform independent software library.

Are you interested in Picard ASR or one of the products or services offered by Linguwerk GmbH? Do you have any feedback or are interested in a collaboration? Please contact us. Whatever your request, we will be pleased to help and answer your questions.