BONSEYES
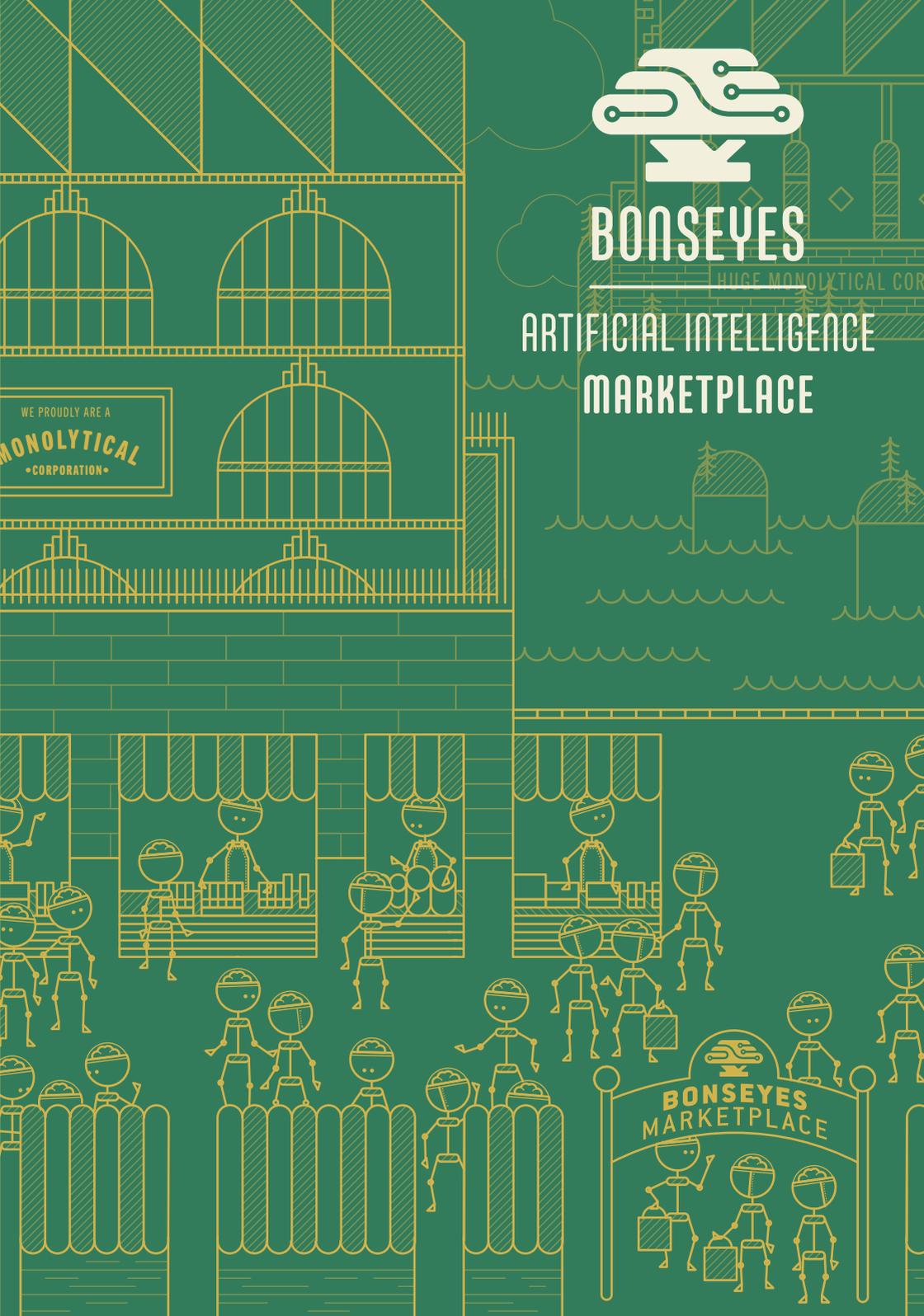
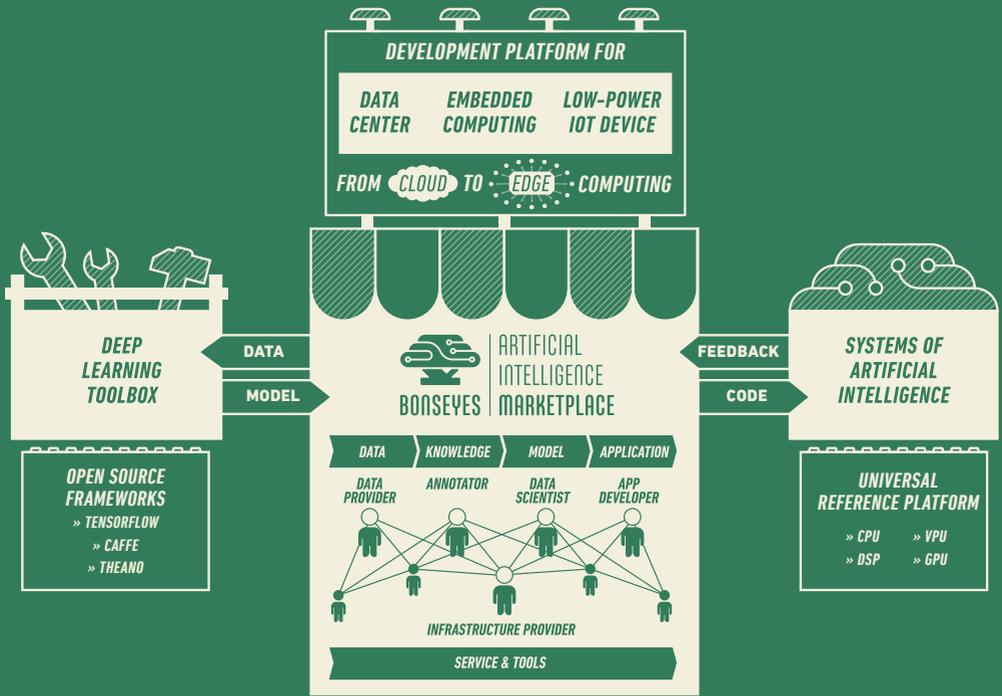## ARTIFICIAL INTELLIGENCE
MARKETPLACE

WE PROUDLY ARE A

MONOLYTICAL
•CORPORATION•

HUGE MONOLYTICAL COR

BONSEYES
MARKETPLACE

DEVELOPMENT PLATFORM FOR

DATA CENTER **EMBEDDED COMPUTING** **LOW-POWER IOT DEVICE**

FROM CLOUD TO EDGE COMPUTING

DEEP LEARNING TOOLBOX

DATA

MODEL

ARTIFICIAL INTELLIGENCE MARKETPLACE

BONSEYES

FEEDBACK

CODE

SYSTEMS OF ARTIFICIAL INTELLIGENCE

OPEN SOURCE FRAMEWORKS
» TENSORFLOW
» CAFFE
» THEANO

DATA KNOWLEDGE MODEL APPLICATION

DATA PROVIDER ANNOTATOR DATA SCIENTIST APP DEVELOPER

INFRASTRUCTURE PROVIDER

SERVICE & TOOLS

**UNIVERSAL REFERENCE PLATFORM**
» CPU » VPU
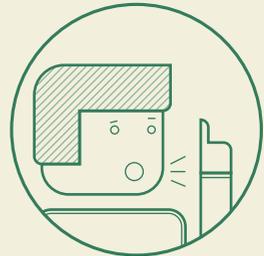» DSP » GPU

ARTIFICIAL INTELLIGENCE MARKETPLACE

Bonseyes Marketplace is an open and expandable platform. It supports scenarios where data must remain in the data provider's premises and online learning with distributed CPSs (cyber-physical systems). In contrast to existing solutions, it keeps human actors in the loop by allowing for continuous feedback for evaluating the performance of the models and obtaining metadata about context and the users' perspectives.
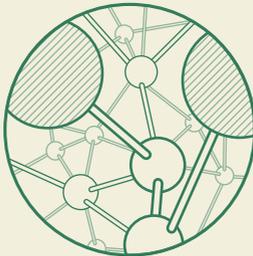
Secure Data   **Distributed Learning**   **Human Feedback**

PROBLEMS TO BE SOLVED

Bonseyes aims to solve two key challenges: the strong industrial need to address data network effects and data wall problems of building systems of artificial intelligence at the European level. More specifically Bonseyes will:

- Address the programming and design challenges of distributed architectures and autonomy of systems. It will do this by managing and synthesizing the "data deluge" created as we operate ever larger software systems with billions of connected, sensor enabled devices.

- Reduce the time of development and cost of ownership of the ever-growing roles of data analytics and machine learning in distributed and autonomous systems.

DEEP LEARNING TOOLBOX

The **Deep Learning Toolbox** will extend existing open source deep frameworks to provide a set of components that are tailored for embedded, constrained, distributed systems operating in real environments with power, memory, and speed constraints.

It will move deep learning research from predictive performance of large scale centralised models to cost-sensitive, distributed, sparse satisficing models that are robust to changes in data environments and real-life dirty data scenarios. The toolbox will provide functions and interfaces to measure accurately the true cost of running a given model on a given target platform.

The toolbox for deep learning in embedded systems will enhance existing standardised middleware packages (e.g. Tensorflow) that are not tailored for most embedded architectures.

KEY OBJECTIVES

To create a platform for open development of systems of artificial intelligence emerging as a key growth driver in Smart CPS (cyber-physical system) systems in the next decade. Opposed to monolithic system design currently used in closed end-to-end solutions, Bonseyes will focus on an open architecture to enable an eco-system of companies to collaborate in building complex distributed "intelligent" systems.

- ✓ Reduce development time by 50%.
- ✓ Reduction in cost of ownership by a factor of 5 related to training of deep learning models.
- ✓ Reduction in computational and memory by a factor of 10.
- ✓ Demonstrate building four challenging scenarios' within 12 months.

HETEROGENEOUS COMPUTING

Bonseyes will support multiple **Universal Developer Reference Platforms** with pre-integrated middleware via open source and vendor packages. Support for a wide array of Multicore CPU-based platforms, GPUs (graphics processing units), VPUs (vector processing units), and DSPs (digital signal processors) without the need for time consuming and specialized engineering development.

MULTI-CORE CENTRAL PROCESSING UNITS	CPU	DSP	DIGITAL SIGNAL PROCESSORS
VECTOR PROCESSING UNITS	VPU	GPU	GRAPHICS PROCESSING UNITS
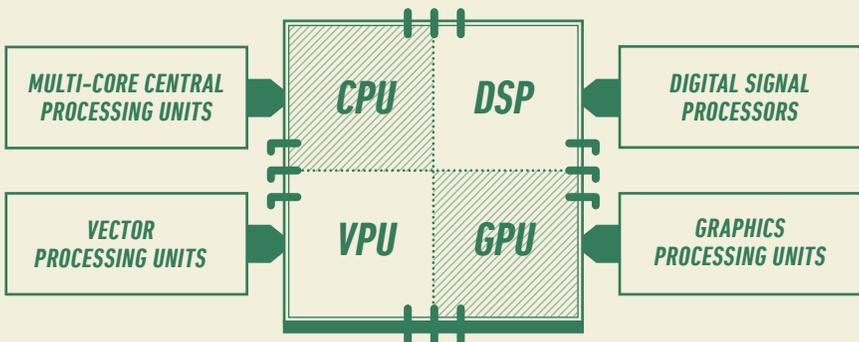
# ARTIFICIAL INTELLIGENCE DEMONSTRATORS
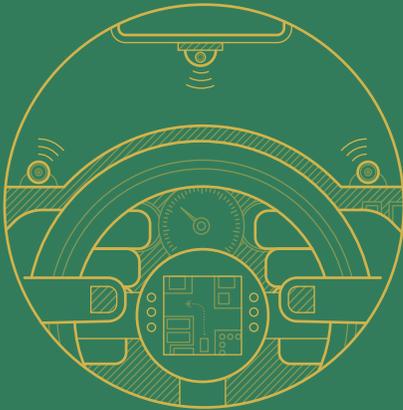
Automotive Safety and Cognitive Computing

- ➤ Scene, people and driver detection, to trigger active or passive safety systems

- ➤ In-vehicle driver assistant, able to personalize the driver experience

Consumer Emotional Virtual Assistant

- ➤ An emotional virtual assistant will be implemented for natural HMI (human machine interface) interactions

- ➤ Communication between API (application programming interface) services and users will also be implemented
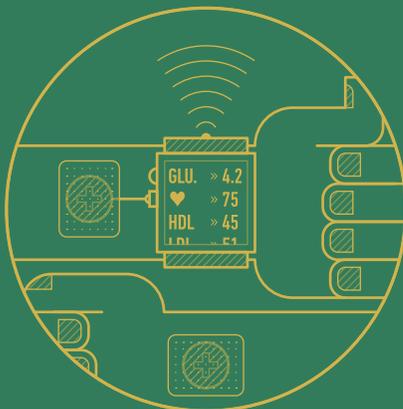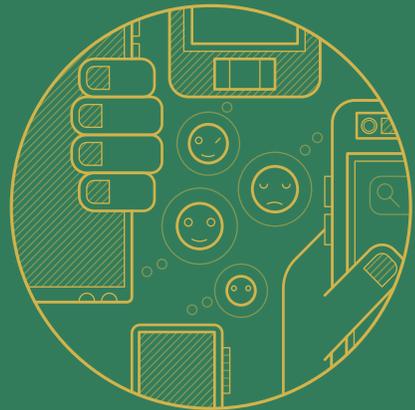
Healthcare Patient Monitoring

GLU. » 4.2
♥ » 75
HDL » 45

- ➤ Use of smart low-power devices to plan and schedule further diagnostic procedures

- ➤ Prediction of further diagnostic

WWW.BONSEYES.COM

nVISO SA
ⓘ **SME** *Switzerland*

**Universidad de
Castilla-La Mancha**
ⓘ **ACADEMIA** *Spain*

Trinity College Dublin
ⓘ **ACADEMIA** *Ireland*

The University of Edinburgh
ⓘ **ACADEMIA** *United Kingdom*

**Fachhochschule
Nordwestschweiz FHNW**
ⓘ **ACADEMIA** *Switzerland*

**Klinikum rechts der Isar
der Technischen Universität
München**
ⓘ **ACADEMIA** *Germany*

**Institute of Communications
and Computer Systems**
ⓘ **ACADEMIA** *Greece*

SYNYO GmbH
ⓘ **SME** *Austria*

**HES-SO Haute école spécialisée
de Suisse occidentale**
ⓘ **ACADEMIA** *Switzerland*

ARM LIMITED
ⓘ **INDUSTRY** *United Kingdom*

ZF Friedrichshafen AG
ⓘ **INDUSTRY** *Germany*

RT-RK
ⓘ **INDUSTRY** *Serbia*

SCIPROM Sàrl
ⓘ **SME** *Switzerland*

Blekinge Tekniska Högskola
ⓘ **ACADEMIA** *Sweden*

TIM LLEWELLYNN *Project Coordinator* **nVISO SA** *Lausanne, Switzerland*
✉ **INFO@BONSEYES.COM**   📞 **+41 (21) 353-8511**

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra