

Autonomous Vehicles:

Research, Design and Implementation of Intelligent Autonomous Vehicles

Autonomous Vehicles Research Group - GPVA
<http://www.eletrica.unisinos.br/~autonom>

Tutorial page: <http://inf.unisinos.br/~osorio/palestras/cerma07.html>

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- M.Sc. Farlei Heinen - Computer Engineering B.Sc. (Director)

Grupo de Pesquisas em Veículos Autônomos
Autonomous Vehicles Research Group - Unisinos

Grupo de Pesquisas em Veículos Autônomos - GPVA Autonomous Vehicles Research Group



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Grupo de Pesquisas em Veículos Autônomos - GPVA
Autonomous Vehicles Research Group

IEEE World Congress on Computational Intelligence
 Sheraton Vancouver Vail Centre Hotel
 Vancouver, BC, Canada
 July 16-21, 2006

GPVA **Intelligent Autonomous Vehicles**

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Grupo de Pesquisas em Veículos Autônomos - GPVA
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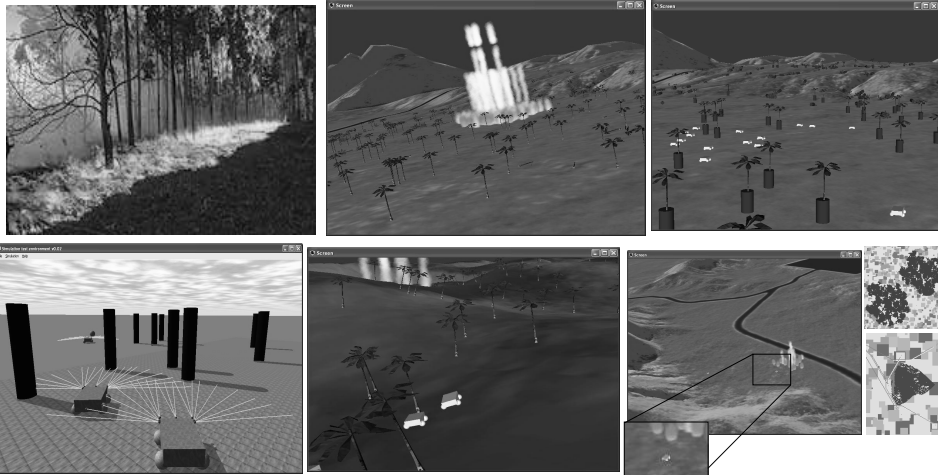
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Projeto CAN

GPVA **Intelligent Autonomous Vehicles**

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Grupo de Pesquisas em Veículos Autônomos - GPVA
Autonomous Vehicles Research Group



Intelligent Autonomous Vehicles



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Veículos Autônomos

VEÍCULOS AUTÔNOMOS

A Universidade do Vale do Rio dos Sinos - UNISINOS possui um grupo de pesquisa de nome: *Veículos Autônomos*.

Este grupo multidisciplinar, envolvendo pesquisadores dos Cursos de Engenharia Elétrica, Engenharia da Computação, Engenharia Mecânica, Engenharia Civil e do Programa Interdisciplinar de Pós-Graduação em Computação Aplicada (PIPCA), desenvolve e implementa tecnologias para automação veicular em *veículos inteligentes*, que podem, por exemplo, mover-se de forma completamente autônoma.

Para alcançar este objetivo maior, diferentes sub-sistemas e tecnologias são desenvolvidos, muitos destes através de parcerias com a indústria.

Dentre os objetivos dos diferentes projetos desenvolvidos pelo grupo destacam-se:

- Desenvolvimento da tecnologia *Drive-By-Wire*.
- Desenvolvimento de *Sistemas de Apoio ao Motorista*.
- Desenvolvimento de *Sistemas de Supervisão e Comando Remotos*.
- Aplicações de *Inteligência Artificial* em robótica móvel.
- Aumento de segurança nas estradas.
- Exploração de locais de difícil acesso.
- Inspeções em ambientes de risco à saúde humana.
- Automação de sistemas de transporte.
- Automação rural.

Os projetos aqui apresentados visam analisar os diversos tipos de sensores, atuadores, sistemas de controle, sistemas de redes e eletrônica embarcada a serem implementados em Veículos Autônomos.

<http://www.eletrica.unisinos.br/~autonom>



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Veículos Autônomos

VEÍCULOS AUTÔNOMOS

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Tip: Search for English results only. You can specify your search language in Preferences

Unisinos - Veículos Autônomos - [Translate this page]

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www.exatec.unisinos.br/~autonom/ - 11k - Cached - Similar pages

Veículos Autônomos - Agentes Autônomos em Ambientes Artificiais - [Translate this page]

Neste capítulo vamos descrever a arquitetura base definida para a implementação de veículos autônomos destinados ao Simulador de Condução DNS [Lei97] ...

virtual.inesc.pr/depccg/actas/c2/s3.html - 7k - Cached - Similar pages

Mini-Curso JA12005 - Computação Embarcada: Projeto e Implementação ... - [Translate this page]

Este curso tem por objetivo apresentar um panorama sobre as novas tendências, técnicas e aplicações de computação embarcada em veículos autônomos ...

www.inf.unisinos.br/~osono/palestras/ja12005.html - 12k - Cached - Similar pages

Google: Veículos Autônomos

Google: Intelligent Autonomous Vehicles

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Intelligent Autonomous Vehicles

- **Introduction**
- **Robotic: Automatons, Mobile Robots and Autonomous Robots**
 - ⇒ Perception, Action, Locomotion e Communication
 - ⇒ Control and Intelligence
- **Intelligent Vehicles**
 - ⇒ Technologies for Vehicle Automation
 - ⇒ Control pyramid
- **Intelligent Control of Autonomous Vehicles**
 - ⇒ Control: Computational Architectures
 - ⇒ Simulation of Autonomous Vehicles
- **Computer Vision**
- **Practical Applications**

Agenda Intelligent Autonomous Vehicles

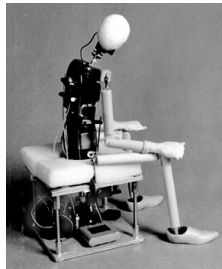
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- Introduction
- Robotics:

**Automatons,
Mobile Robots and
Autonomous Robots and Vehicles**

Intelligent Autonomous Vehicles

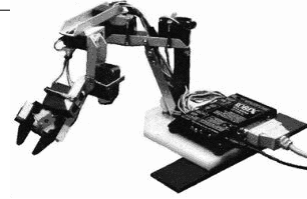
Robotics: Origin



Robotics: Origin

Intelligent Autonomous Vehicles

Robotics: Evolution



Robotics: Origin

Intelligent Autonomous Vehicles

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Robotics: Robot Types

* Manipulation Robots:

- Fixed Base Robot Arms
Industrial manipulators
- Embedded Manipulator Arms
- Robot Cranes

* Mobile Robots:

- Industrial AGV (Automated Guided Vehicles)
- Indoor Robots: Vehicles, Holonomic, Humanoid, ...
- Outdoor Robots: Terrestrial (road, all terrain / off-road),
Underwater, Aerial, Inter-planetary, ...

Robot Types

Intelligent Autonomous Vehicles

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Robotics: Robot Types

*** Manipulation Robots:**

- Fixed Base Robot Arms
Industrial manipulators
- Embedded Manipulator Arms
- Robot Cranes

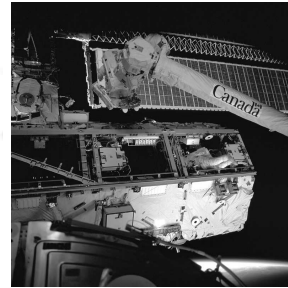
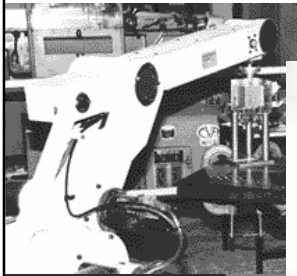


Figura 2: Ponte Rolante



Robot Types

Intelligent Autonomous Vehicles

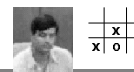
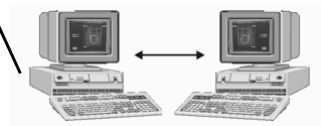
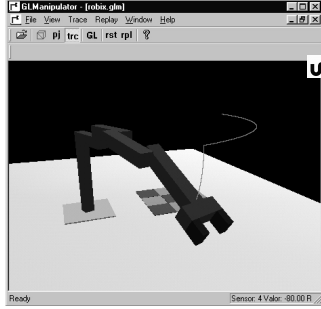
Robotics: Robot Types

*** Manipulation Robots:
Fixed base robotic arms**



Videos-Unisinos/JogoVelha.mpg

Software-Unisinos\SimArm-Robix



Robot Types

Intelligent Autonomous Vehicles

Robotics: Robot Types

*** Mobile Robots:**

1. Vehicles

- Terrestrial Vehicles / Indoor
- Terrestrial Vehicles / Outdoor
- Space Exploration Vehicles
- Water Vehicles: Boats and Underwater
- Flight Vehicles: Dirigible balloons, Airplanes and Helicopters

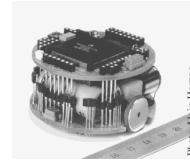
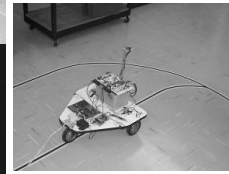
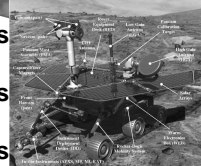


Photo:Adam Herzog



Robot Types

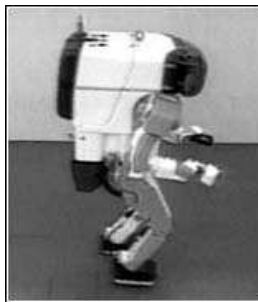
Intelligent Autonomous Vehicles

Robotics: Robot Types

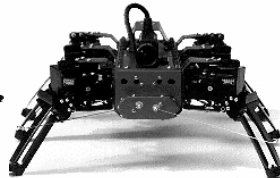
*** Mobile Robots:**



2. Humanoids



3. Animats



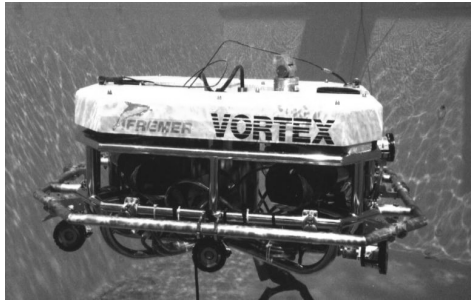
Videos-Robotica\ASIMO

Robot Types

Intelligent Autonomous Vehicles

Robotics: Robot Types

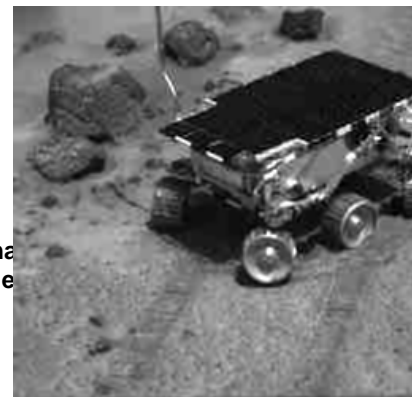
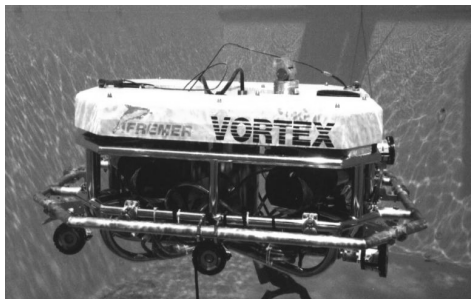
* Mobile Robots:



A. Tele-Operated Mobile Robots

Robotics: Robot Types

* Robôs Móveis:



A. Tele-Operated Mobile Robots

Robotics: Robot Types

* Robôs Móveis:



A. Tele-Operated Mobile Robots

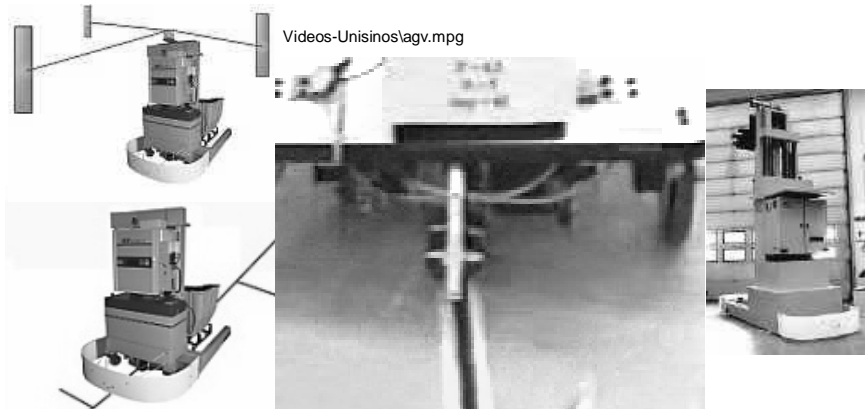
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Robot Types

Intelligent Autonomous Vehicles

Robotics: Robot Types

* Mobile Robots:



B. Semi-Autonomous Mobile Robots => AGV

Robot Types

Intelligent Autonomous Vehicles

Robotics: Robot Types

* Mobile Robots: (commercial)

>> Autonomous Mobile Robots <<



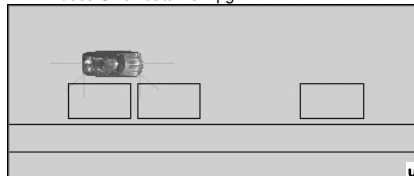
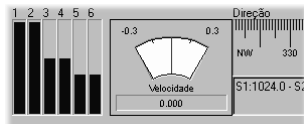
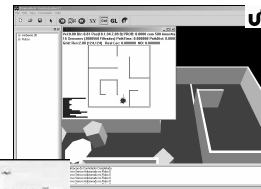
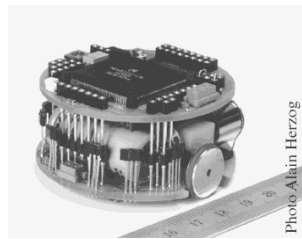
AUTONOMOUS Robots

Intelligent Autonomous Vehicles

Robotics: Robot Types

* Mobile Robots: (academic)

>> Autonomous Mobile Robots <<



AUTONOMOUS Robots

Intelligent Autonomous Vehicles

Robotics: Robot Types

* Mobile Robots / Fixed Robots

>> Autonomous Robots <<

Videos-UnisinosJogoVelha.mpg



MSF-VisSDK
Intel OpenCV

Robotics: Robot Types

* Mobile Robots:

>> Autonomous Mobile Robots <<

Challenges:

- * Interaction with the Environment
- * Greater Autonomy
- * Execution of Complex Tasks
- * Robustness
- * Intelligence

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Intelligent Autonomous Vehicles

