0LAUK0 robots everywhere

Swarm technologie

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Where innovation starts

Introduction problem

- **Water pollution**
  - Harbor of Rotterdam
- **Sludge**

USE aspects

- **Society**
  - Living/working climate
  - Environment
  - Attractiveness of a tourist region
- **User**
  - The department of public works
- **Enterprise**
  - Efficient

Technical hurdles

- **Detect waste and sludge**
- **Autonomous**
- **Expandable to larger environments**
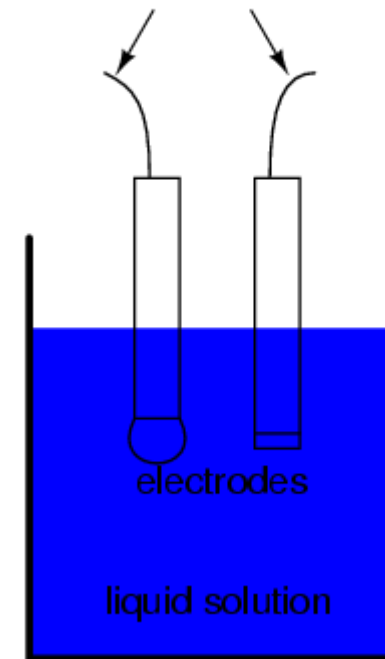- **Dynamic Environments**

Swarm Technology

- **Swarm intelligence and Swarm robotics**
- **Advantages**
  - Independent and autonomous
  - Large network of observations
  - Can handle dynamic and unknown environments
  - Simplicity of individuals
  - Redundancy
  - Scalable
- **Upgradable**
  - Selfsustainability / Self regulation and recovery
  - "Survival of fittest" improvement

Approach

- **In several water bodies**
- **Measuring**
- **Sensors**
  - pH
  - Temperature
  - Oil
  - Heavy metals
    and other dangerous materials
  - Silt and garbage

Voltage produced between electrodes is proportional to the pH of the solution

electrodes

liquid solution

End goal

- **All in one**
- **Simulation**
- **Realistic and capable**
- **Output**

Software

- **Netlogo**
- **Matlab / Simulink**
- **V-Rep**

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