

Robots in performance

What, why and how?

– and a short intro to what we are doing at RUC

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in collab. with

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What and why?

Different performative intentions

- Problematizing the phenomenon of robot technology; philosophically, sociologically, xxxx-cally

or

- Including pieces of robot technology in dance/theatre

We can study the phenomenon from several viewpoints

- Dramaturgic
- Technical
- "Robot theatre" used as setting for HRI testing (Human-Robot interaction)

Our research project: mainly dramaturgic, but also technical as we want to build and play with our own robots

Examples of robots in performances

- Olympia in "Contes d'Hoffmann", opera by Offenbach (1881)
 - A coloratura soprano playing the roles as a mechanical doll that attempts to sing and dance
- HRI studies by, e.g., Hiroshi Ishiguro; theatre plays with very-human-looking robots
- Blanca Li's "Robot !"

Examples of robots in f ces



very-human-looking robots

opera by Offenbach

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- Olympia in "Contes d'Hoffmann", opera by Offenbach (1994)



a mechanical doll that

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Our own work at RUC

- Vocabulary and classification of dramaturgical aspects of robots on stages

and

- Build and use our own robots in order to learn more about: what can be done, how it should be done, why it might be interesting

A classification matrix

Dimensions (under development)

1. Type or purpose of performance
2. Performative gestalt
3. Kind of role
4. Movements and mechanical flexibility (not so sure about that one)
5. Apparent level of autonomy

A few remarks on "how"

Technically speaking, the same ***audience experience*** may be provided by

- fully autonomous technology with communicative and performative skills (requires empathy??); ability to improvise and take decisions
- remote controlled by human performer
- human performer in robotoid dress (cartoon style/faking "real" robot)
- everything pre-recorded

... and all sorts of combinations thereof

Building and testing our own robots

– work in progress, student projects/theses more than welcome!!

Robots appearing as familiar domestic objects (not humanoid!)

- Having Perf.design students to direct small scenes for human players and one or more robots

Interesting questions

- how to make such animated objects expressive
- how to "direct" such objects
- how to implement that stuff in the best way!

Scenario

- Directors and such need an interface; currently a script language
- Natural to use for "dir's and such", simplicity x expressivity
- Interface and workflow must be natural (as above)
- Version 0.0: A fully controlled script language; scripts can be executed on simulator and on the actual robots

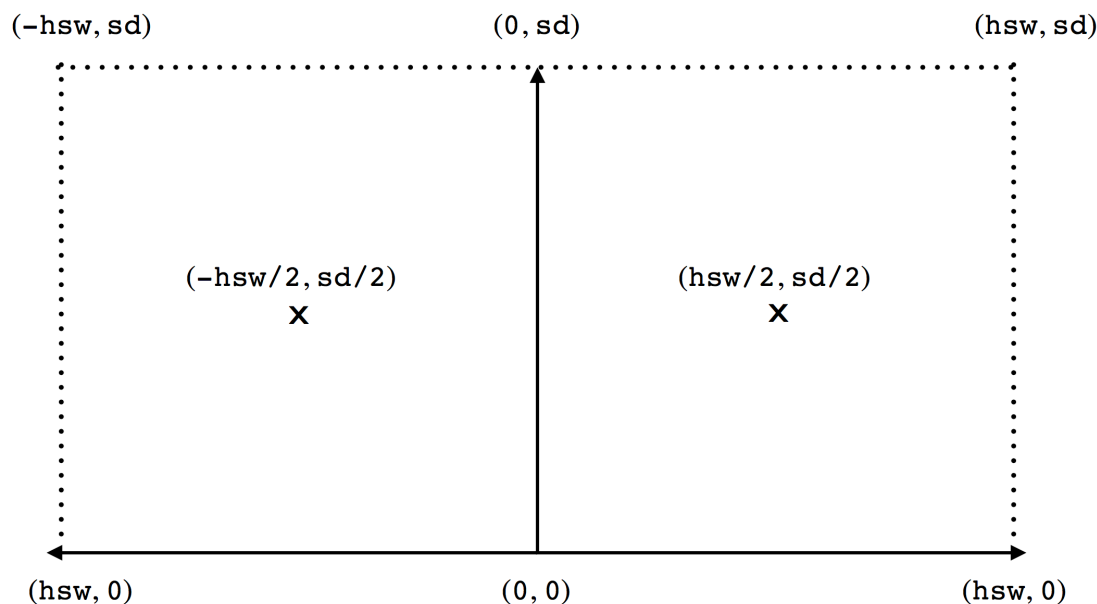
(Technical aside: This require highly accurate localization system; one option is *Qualisys Motion Capture System*)

A few details of our scripting language CCRSRIPT

(see details in report; reference on moodle)

- "Choreographing Constrained Robots Script Language "
- "Constrained" as it embeds physical constraints of what the actual robot is expected to do

To start: introduce a coordinate system:



Units

- meters and those shown

Angles for poses and movements

- compass and degrees
- north, south, nne, nne+7

Example of pose:

`pose(0, 0.5*sd, south)`

Example of a script

```
grid();
referencePoint(color(255,0,0),hsw/2,sd/2);
referencePoint(color(0,255,0),-hsw/2,sd/2);

restrictedArea("green stuff", color(192,255,192),
               p(-hsw+0.5, sd-1.75), p(-hsw+3, sd-2) );
restrictedArea("light stuff", color(192,192,255), p(0.5,0.5), p(hsw-2,1) );

Robot nille = robot("Nille", color(255,128,128));
Robot frederik = robot("Frederik", color(128,128,255));

initialPose(nille, pose(-1,sd/2, east));
initialPose(frederik, pose(1,sd/2, west));

followRouteBacking(nille, pose(-4,sd/2, east));
followRoute(frederik, pose(-1,sd/2, east));
synchronize();
...
```


Other facilities in CCRSCRIPT

- Robots accelerate/decelerate and move with default speeds unless otherwise specified

- This may be fine-tuned, e.g.,

```
moveTo(nille, -hsw/2, sd/2, south, "++__++____---!");
```

- You can use procedural abstraction to invent your own patterns of movements, e.g.

```
void steps(Robot rob, int n) {  
    for(int i=1; i<=n; i++) {move(rob, 0.3); moveBacking(rob, 0.3);}}
```