



- > Kallergi, A. and Verbeek F.J.
- > Video Games for Collection Exploration: Games *for* and *out of* data repositories



Universiteit Leiden

- > Imaging and Bioinformatics, LIACS
- > Leiden University
- > The Netherlands

Welcome!

> theoretical

Aim of this talk: To establish a link between video games and data collections

> that is further explored by means of a prototype

Welcome!

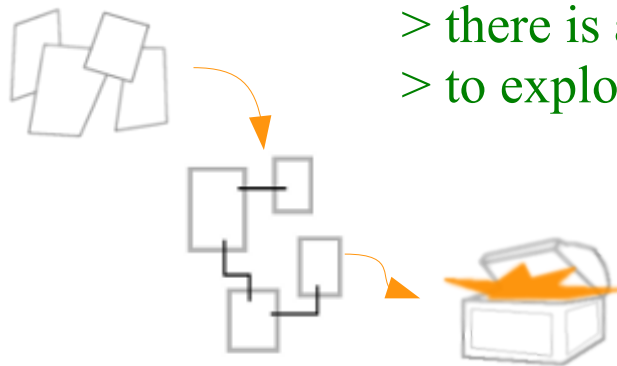
- > Thesis: Video games can be relevant for collection exploration
- > I will be explaining the reasons why I believe so and the
- > conditions under which such a thesis applies

Aim of this talk: To establish a link between video games and data collections



Collection Exploration?

data collections are treasure islands...



- > there is a need for interfaces that challenge and engage the user
- > to explore

collection exploration as an open-ended, exploratory activity

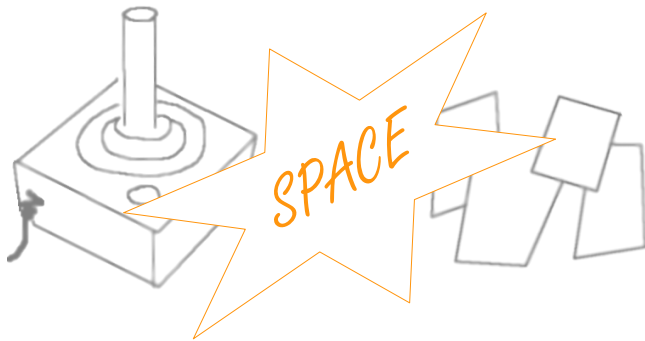
- > browse, navigate, move across (attention points in) an
- > information space

Games for data repositories: Gaming as exploration

(1)

Games can provide the relevant tasks for exploration
i.e. spatial navigation

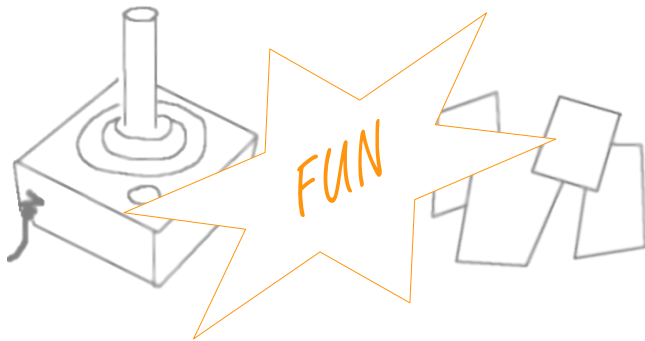
> collections as *spaces* to be navigated



Games for data repositories: Gaming as exploration

(2)
Games can provide the relevant emotional state for exploration
i.e. playfulness, positive affect

- > collections as *spaces* to be navigated in a *playful and engaging*
- > *manner*

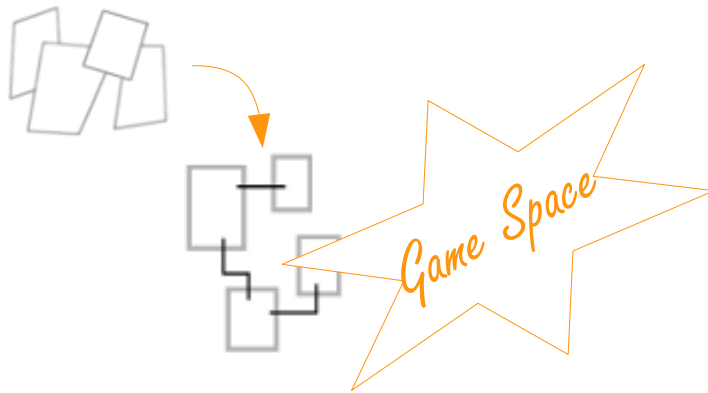


Games out of data repositories: gaming as information 'perceptualization'

(1)

A better understanding of the structure of the collection
i.e. mental model of (the structure of) the collection

- > collections as *graph structures*
- > graphs as *game spaces*

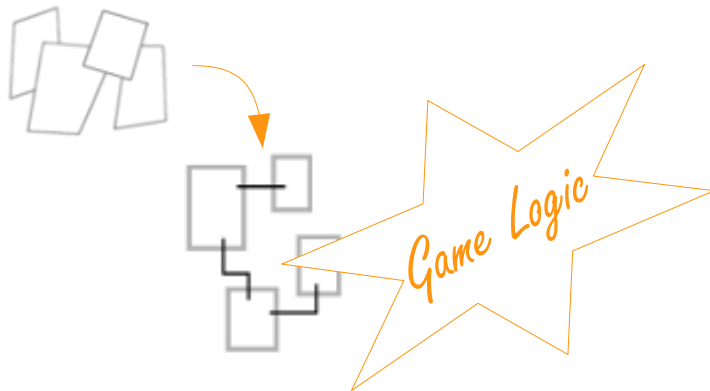


Games out of data repositories: gaming as information 'perceptualization'

(2)

Can we encode (graph) structure into game logic?
so that the player actively interacts and reasons with the
encoded structure for the needs of the game?

- > *materialized connections*
- > *graphs as game mechanics*



Onto-Frogger: A case study

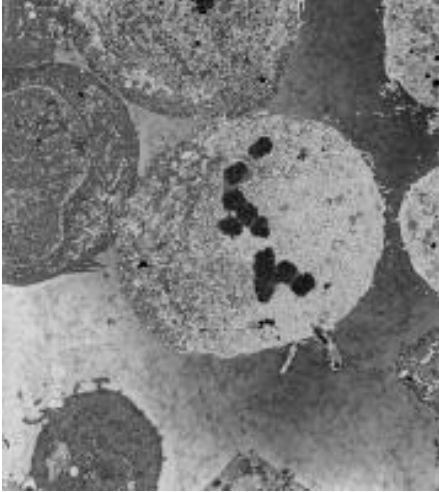
The database:

Cyttron Scientific Image Database for Exchange (CSIDx)

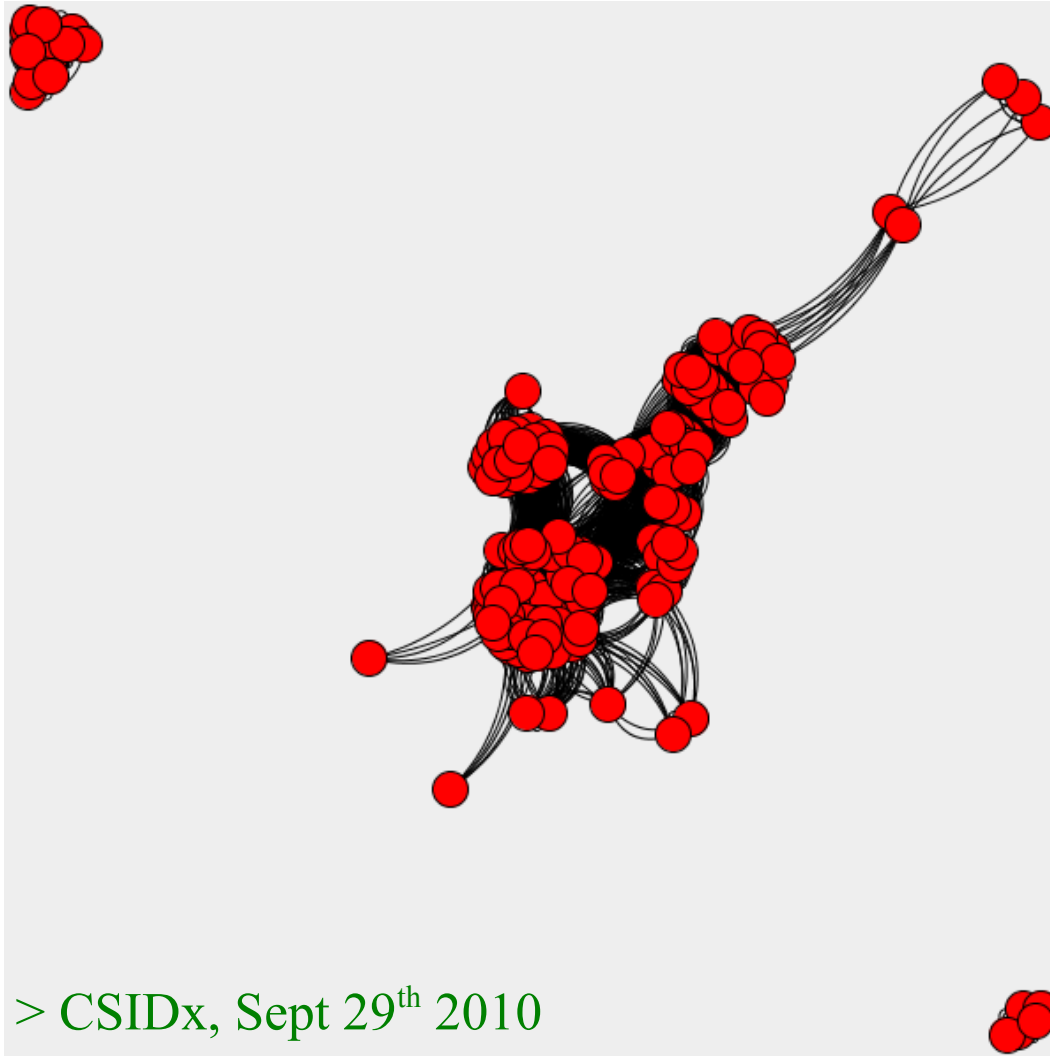
<http://cyttron.liacs.nl>

- > Kallergi, A., Bei, Y., Kok, P., Dijkstra, J., Abrahams, J. P.
- > and Verbeek, F. J. Cyttron: A virtualized microscope
- > supporting image integration and knowledge discovery. In
- > Backendorf, C., Noteborn, M. and Tavassoli, M. editors,
- > *Proteins Killing Tumour Cells*, Cell Death and Disease
- > Series, pages 291-315. ResearchSignPost, Kerala India,
- > 2009.

From database...

	<h3>Administrative metadata</h3> <p>Owner: Bart Simpson</p>
	<h3>Ontology</h3> <ul style="list-style-type: none"> Biological imaging methods <ul style="list-style-type: none"> electron micrograph Gene Ontology <ul style="list-style-type: none"> mitotic metaphase metaphase chromosome NCBI organismal classification <ul style="list-style-type: none"> Cricetulus griseus NCI Thesaurus <ul style="list-style-type: none"> Eukaryotic Cell Ovary
	<h3>Microscope</h3> <ul style="list-style-type: none"> Fixative: 1.5perc glutaraldehyde 1perc OsO4 Resin: Epon Section thickness: 100 nm Post-stain: uranyl acetate (saturated solution. 15min) lead solution (10 min) Microscope model: CM 10 Acceleration Voltage: 80 kV Filament type: LaB6 Pixel size: 7.06
	<h3>External Links</h3>

...to graph...



```
for every annotated public image {  
  if (modality!=graphic)  
    addNode(img);  
}  
  
for every node {  
  for every node {  
    if (annotation in common &&  
        annotation!= 'Alzheimer')  
      addEdge(n1,n2,annotation);  
  }  
}
```

GRAPH

197 nodes

4942 edges

12 orphans

3 components

CONNECTED COMPONENT

165 nodes

4827 edges

DIAMETER: 6.0

...to a game concept

The logo for 'ONTO-FROGGER' is displayed in a pixelated, white font. The text is split across two background blocks: 'ONTO-' is on a bright green background, and 'FROGGER' is on a black background.

ONTO-FROGGER

> focus on: ontology annotations (the edges...)

What kind of game?

(1a) Graph traversing qualities

(1b) Spatial navigation

(2) A simple game for a non-gaming audience

from database to a game concept... via analogy



Why analogy?

- (1) Tested gameplay
- (2) Familiarity

Why Frogger?

> valid trajectory in game space

(1a) Graph traversing qualities

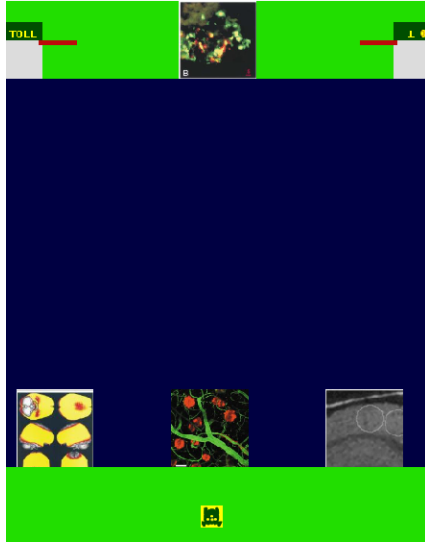
(1b) Spatial navigation

(2) An easy game suitable for a non-gaming audience

> simplicity: minimal controls and story line

> familiarity: popular, recognizable

Onto-Frogger: the game



- > “Little Onto-Frogger... He only wants to get to its target
- > image on the other side of the river! But in these acid
- > waters, Onto-Frogger needs you to guide him from floating
- > image tile to tile...”

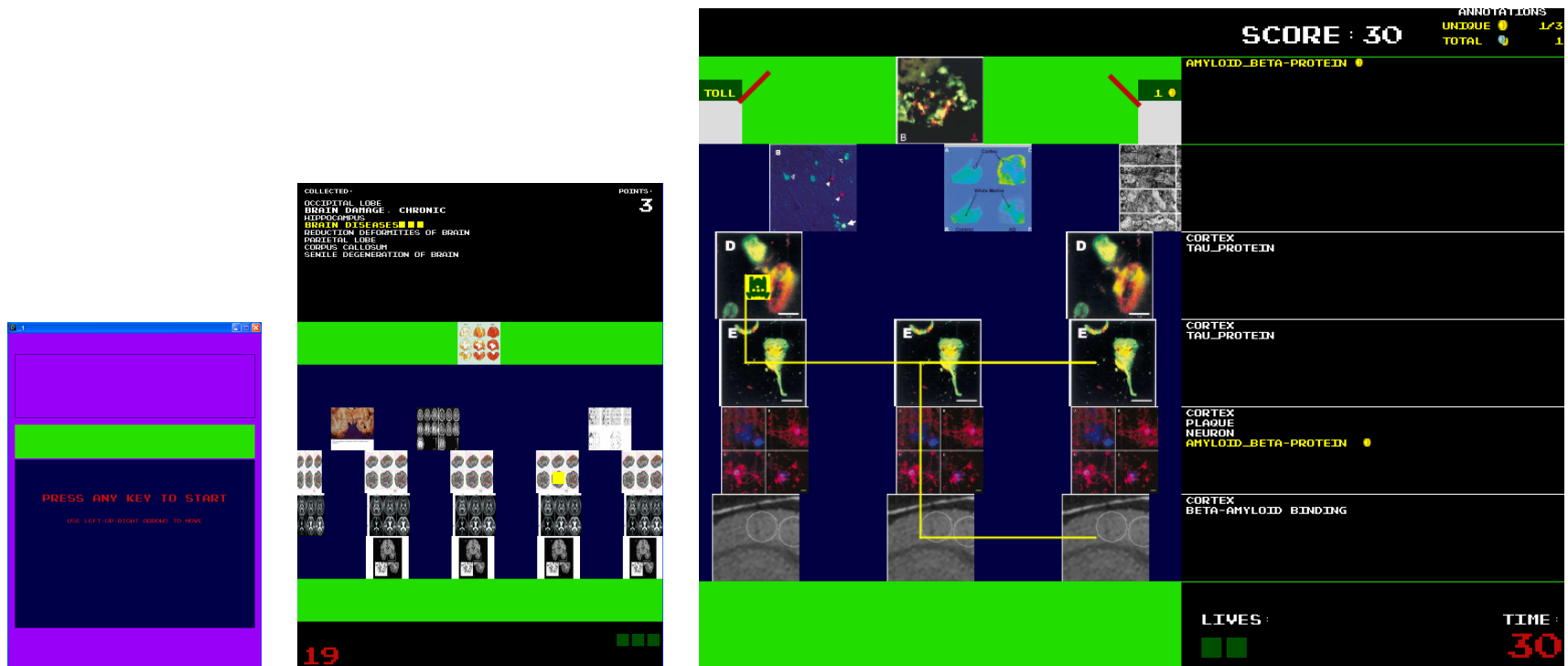
- > “Can you now help Onto-Frogger collect enough coin
- > annotations before reaching the other side? The target
- > image is your guide!”

“A frog's exploration across images, their annotations and the connections established by these annotations!”



Onto-Frogger: the evolution

- > we learned a lot along the way...
- > proof of concept: yes, we can! but how to do it right?
- > proof of concept: encouraging results, but how to verify?



Discussion

(1) Evaluation

Onto-Frogger as a *hybrid* piece of work

- > how (and as what...) to evaluate?
- > how to verify the theoretical claims on video games for collections?

interface?



game?

visualization?

(2) Framework

Producing suitable games for a given dataset

- > is Onto-Frogger a 'proper' game for the dataset in question?
- > what to encode into what?

Acknowledgements



Universiteit Leiden



Cyttron
Imaging and Bioinformatics
LIACS
Leiden University

<http://www.cyttron.org>
<http://bio-imaging.liacs.nl>
<http://www.liacs.nl>
<http://www.leiden.edu>

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