

Peer-to-Peer Tagged Media: Advances and perspectives

<http://www.petamedia.eu>

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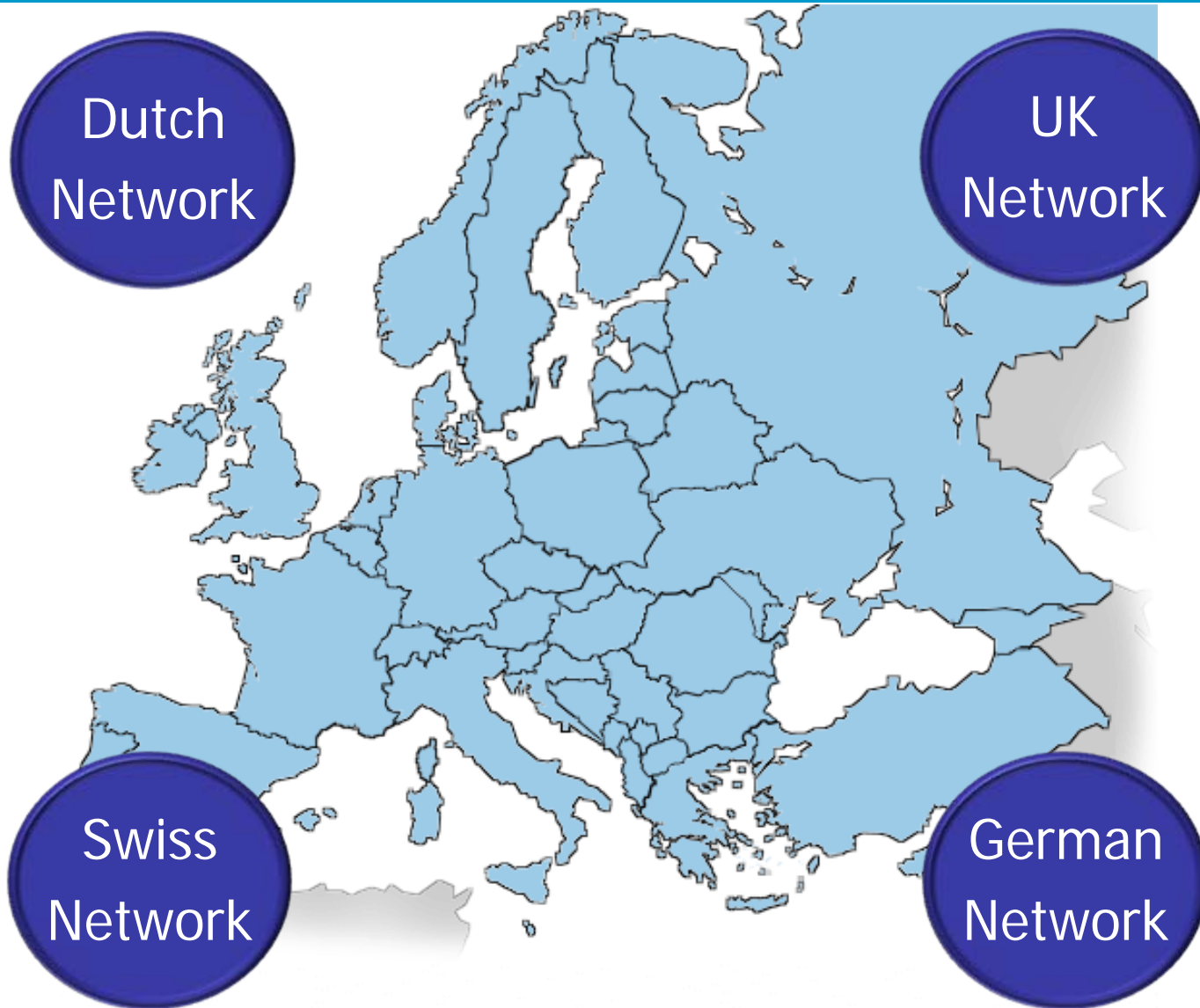
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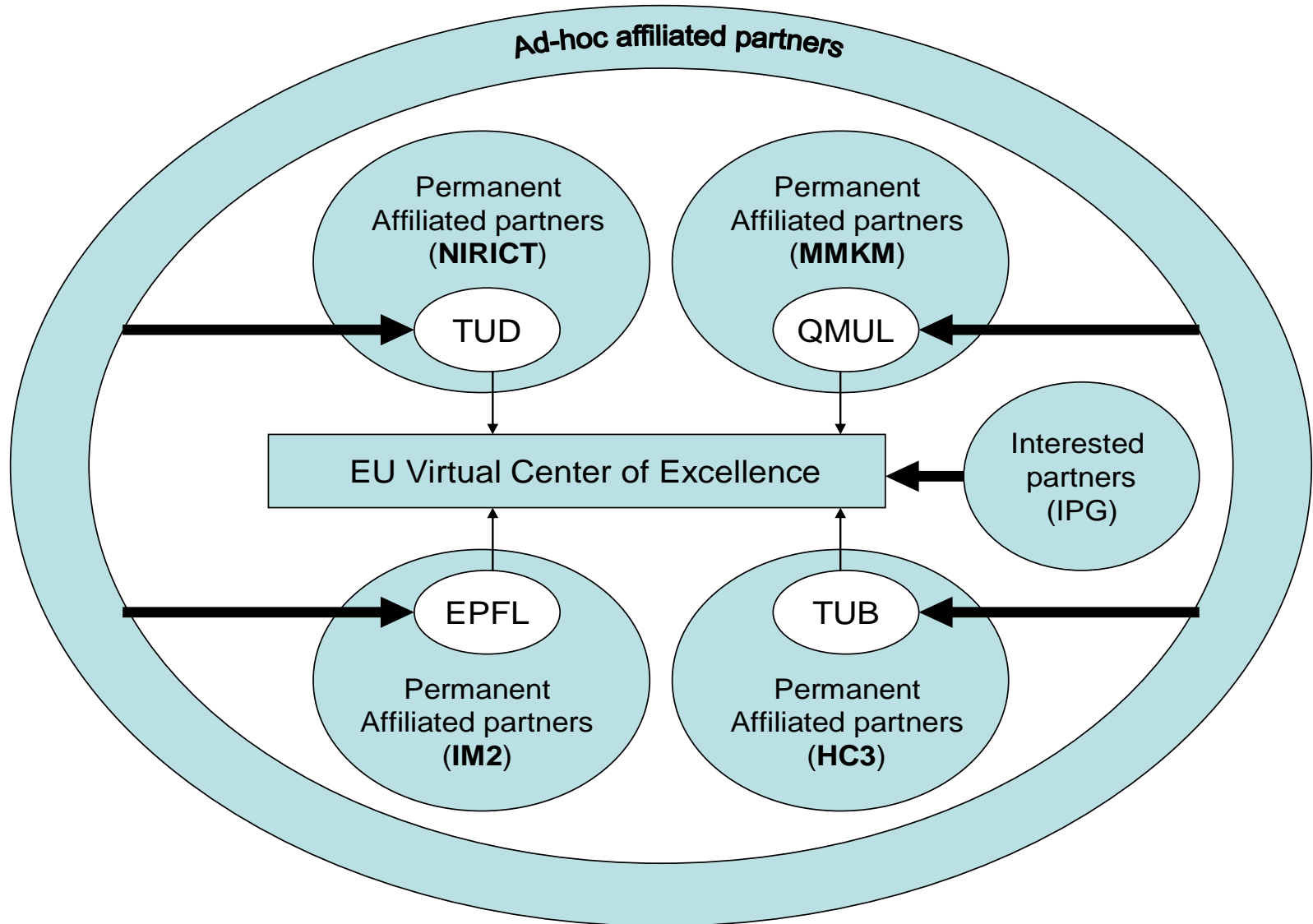
What is PetaMedia

- PetaMedia research paradigm
- Approach towards user cases
- Use scenarios
 - Near2Me
 - WeTV
 - SpudTV
- Field trials

PetaMedia as NoE



PetaMedia: partner concept



PetaMedia goals

PetaMedia strives to impact the field of multimedia research along two dimensions.

- Promoting excellence of research based on the PetaMedia *Triple synergy*
- Coordinating and supporting PetaMedia researchers in carrying out *integrative research* towards demonstrating the efficacy of the Triple Synergy.

Field trials will be key to demonstrate the effectiveness of the PetaMedia paradigm and its impact

- What is PetaMedia

PetaMedia research paradigm

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PetaMedia research paradigm

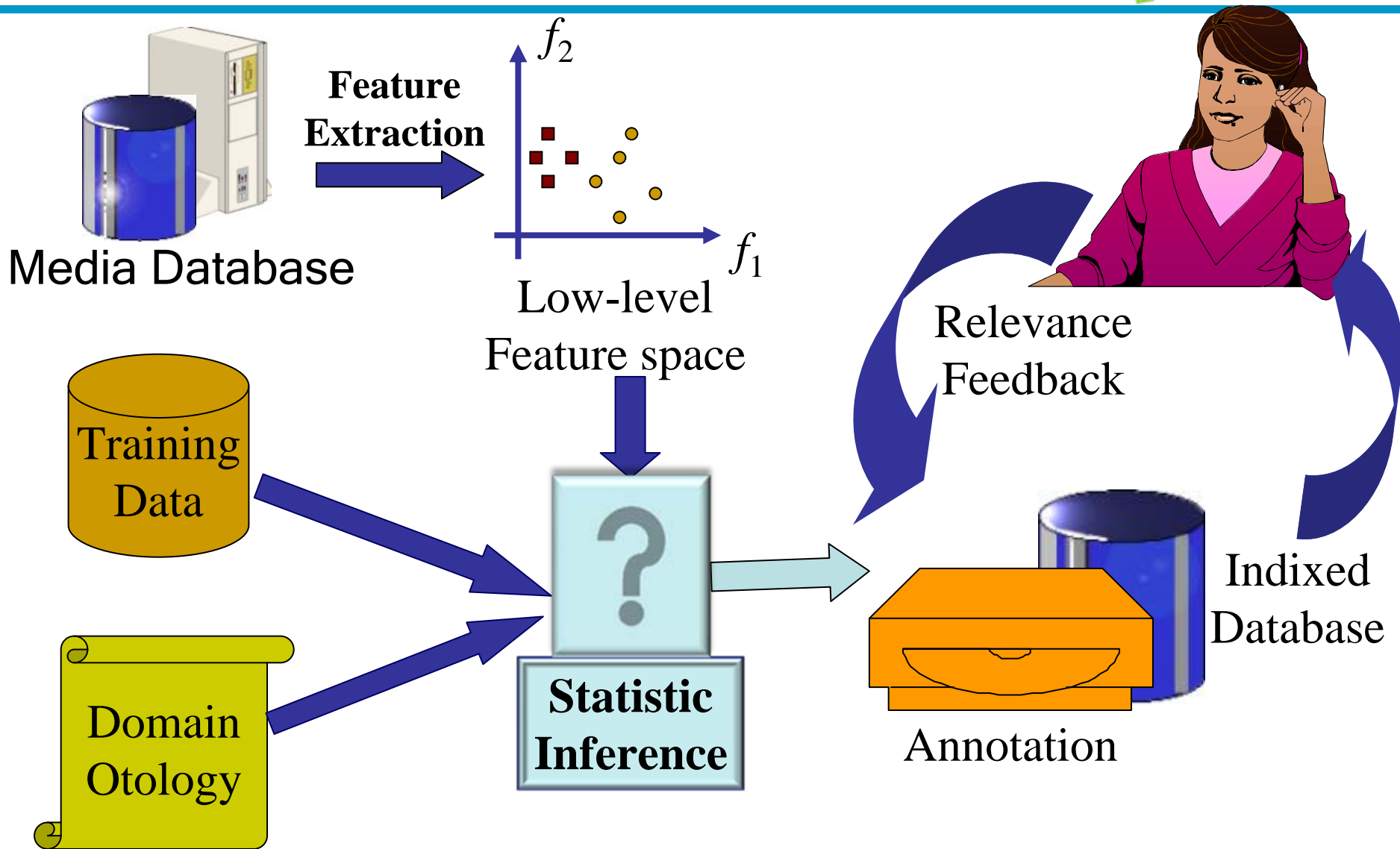
Research in the area of multimedia access and retrieval can most productively push ahead if it is grounded in the **triple synergy**:

- multimedia content analysis (for tagging)
- user-contributed tags (metadata)
- social peer-to-peer (SP2P) technology

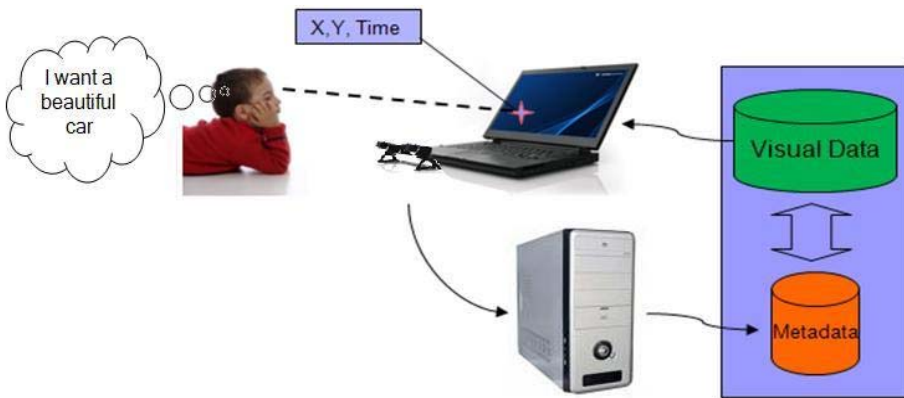
To integrate resources and promote research at the intersection of these three disciplines

MISSION

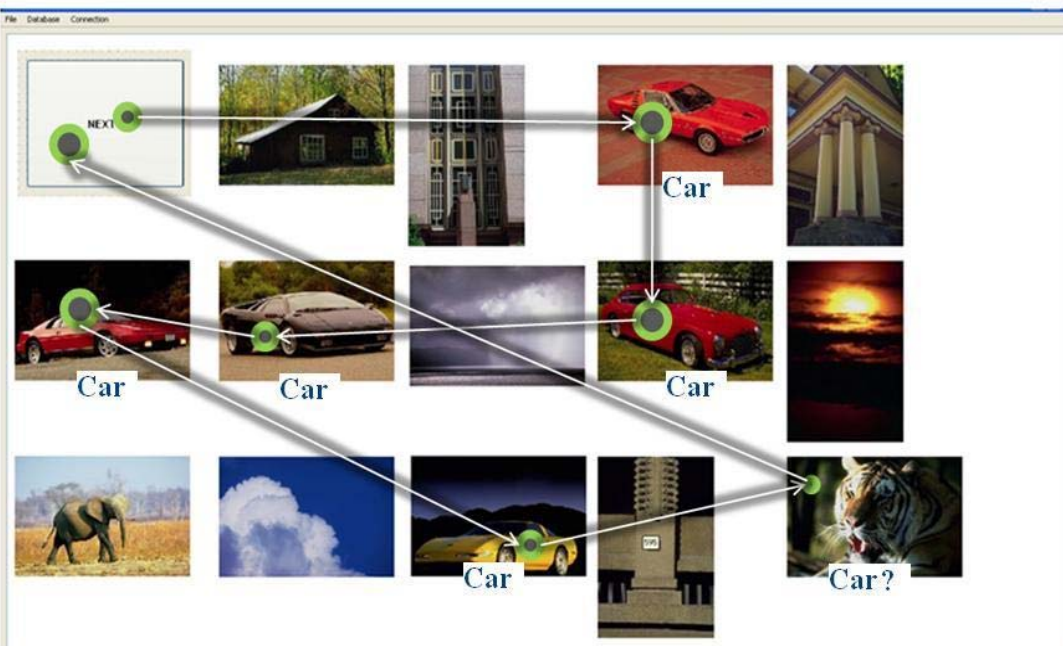
Multimedia content analysis



User-contributed tags (metadata)



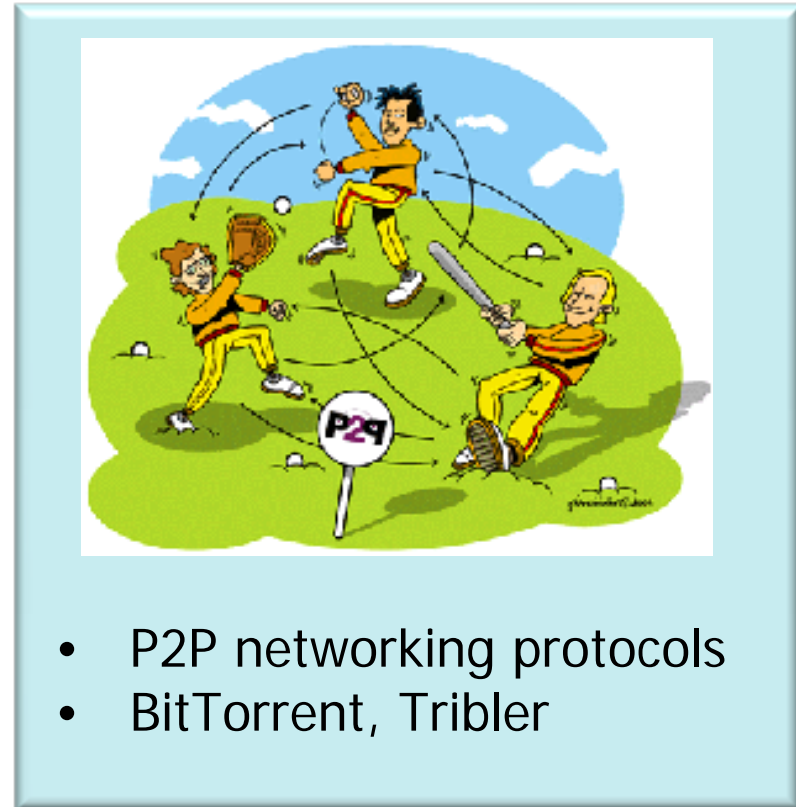
- Manual with RF
- Object driven (EPFL)
- While playing a game (ESP, tag4fun, QMUL)
- Using physiological measurements EPFL/QMUL
- Implicit (via gaze analysis, QMUL)
- Using CAPTCHAS, TUD
- Etc...



Social P2P technology



- Social network analysis
- Mapping and measuring relationships and flows between people, groups, organizations, etc.
- The nodes in the network are the people or groups
- The links show relationships



- P2P networking protocols
- BitTorrent, Tribler

- What is PetaMedia
- PetaMedia research paradigm

Approach towards user cases

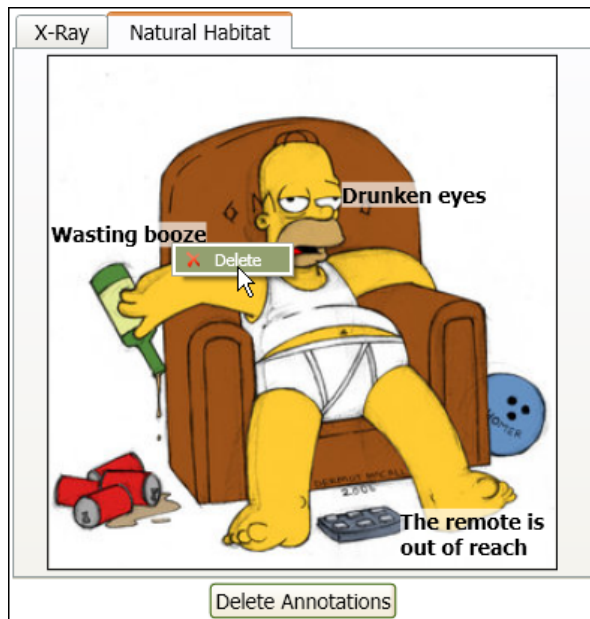
- Use scenarios
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Use scenarios: rational

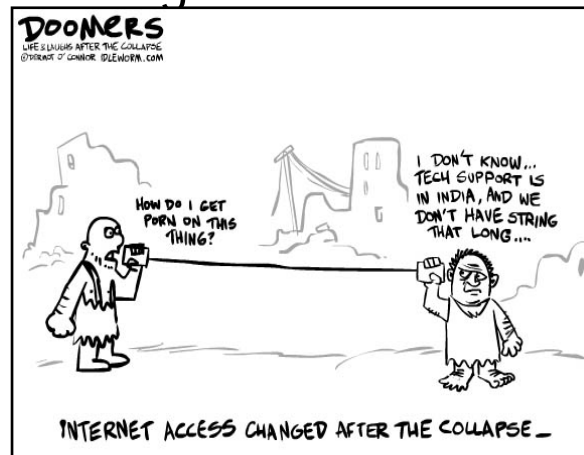
- Narrow the wide spectrum of Petamedia Triple Synergy by taking a people centric approach
- Focusing on relationships between people acting as peers in a social net
- They will help to evaluate PetaMedia technology from the user perspective

Based on the goals of:

annotating content



accessing content
 i.e., searching and
 finding



Watching
 video content



"I stopped watching Sesame Street the second I figured out it was educational."

Use scenarios: Data

Three kinds of data sources are of interest:

Tags and other annotations that users create while explicitly interacting with the system

- Manual tagging
- Automated annotation

**Explicit
Tagging**

Data that can be collected by observing users during their interaction with the system

**Implicit
Tagging**

Data users create by interacting with each other in the system

- Data from social interaction, who I am talking with, who is talking with who in a give event
- Online social gaming

**Social
Tagging**

Use scenarios: Goals Vs Data

Putting "Goals" and "Data" in a 2D Diagram, we can illustrate major key research topics that arise when multimedia access is viewed from the perspective of the PetaMedia Triple Synergy.

	Annotate	Access	Watch
Explicit	Content-based tag generation	Tag-based retrieval and browsing	Tag-driven scalability
Implicit	Tag generation by observing users reactions	Leverage affect to improve access&retr.	Perceptual, content quality
Social	Tag refinem. using social information	Improve search&retriev. with social info.	Content delivery in P2P

Technology matrix

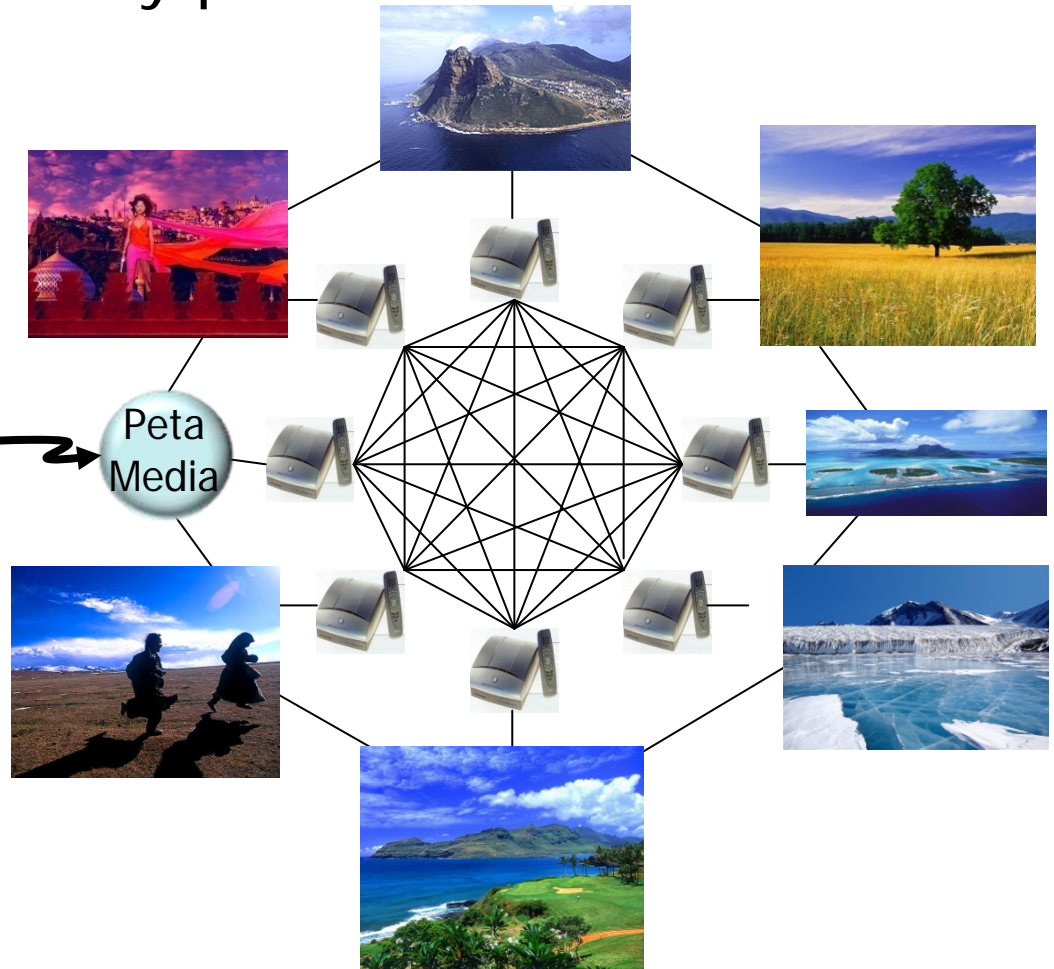
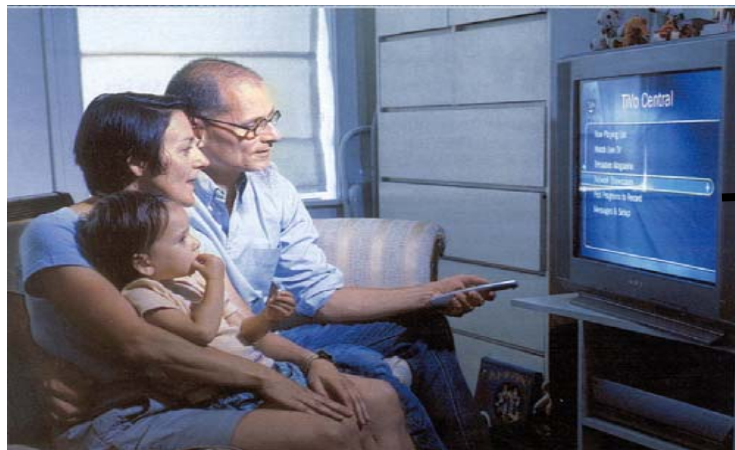
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Near2Me

Giving users access to social multimedia collections that will bring them nearer to far away places



Near2Me: data

Use Scenario: “I want to add a clip into an online collection and wish it to be automatically enriched for subsequent search/use”

Use Case Steps:

- User uploads video clip
- System suggest tags
- User selects and/or accepts system’s suggestion (user stays in control)
- System suggests position within social space
- User selects and/or adjusts system’s suggestion (user stays in control)
- System shows a “final picture”

The field trial system will:

- support users in placing video clips into a social space
 - close to related content
 - close to related people)
- provide a representation of the video clip within the social space
- reflects how well that video clip can be found within the collection via search or browsing.

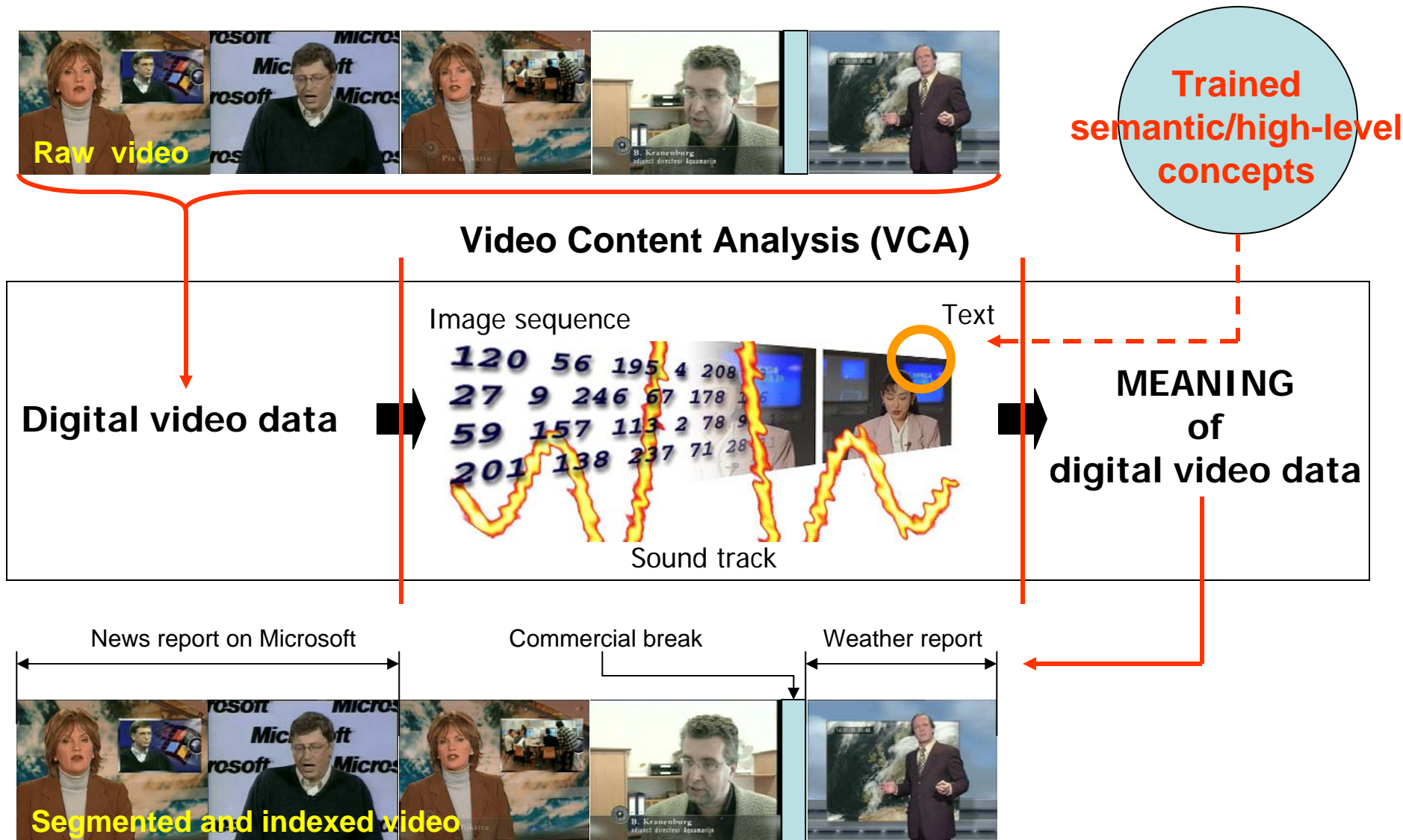
Facebook, YouTube video about travel enriched with social information

Data

Near2Me: required technology

- Automated content-based tag generation, e.g., tags representing location, semantic objects and video quality
 - feature extraction, segmentation, keyframe extraction, clustering and classification, metrics in visual space, speech recognition
 - concept detection, semantic inference
- Semi-automatic tag generation and enhancement
 - relation to other content, interactive learning, visualization in social space, interactive user interface
 - Tag recommendation, multimodal (visual+text+usage+...), analysis of user network, analysis of social net for user/usage pattern

Near2Me: required technology



Near2Me in the technology matrix

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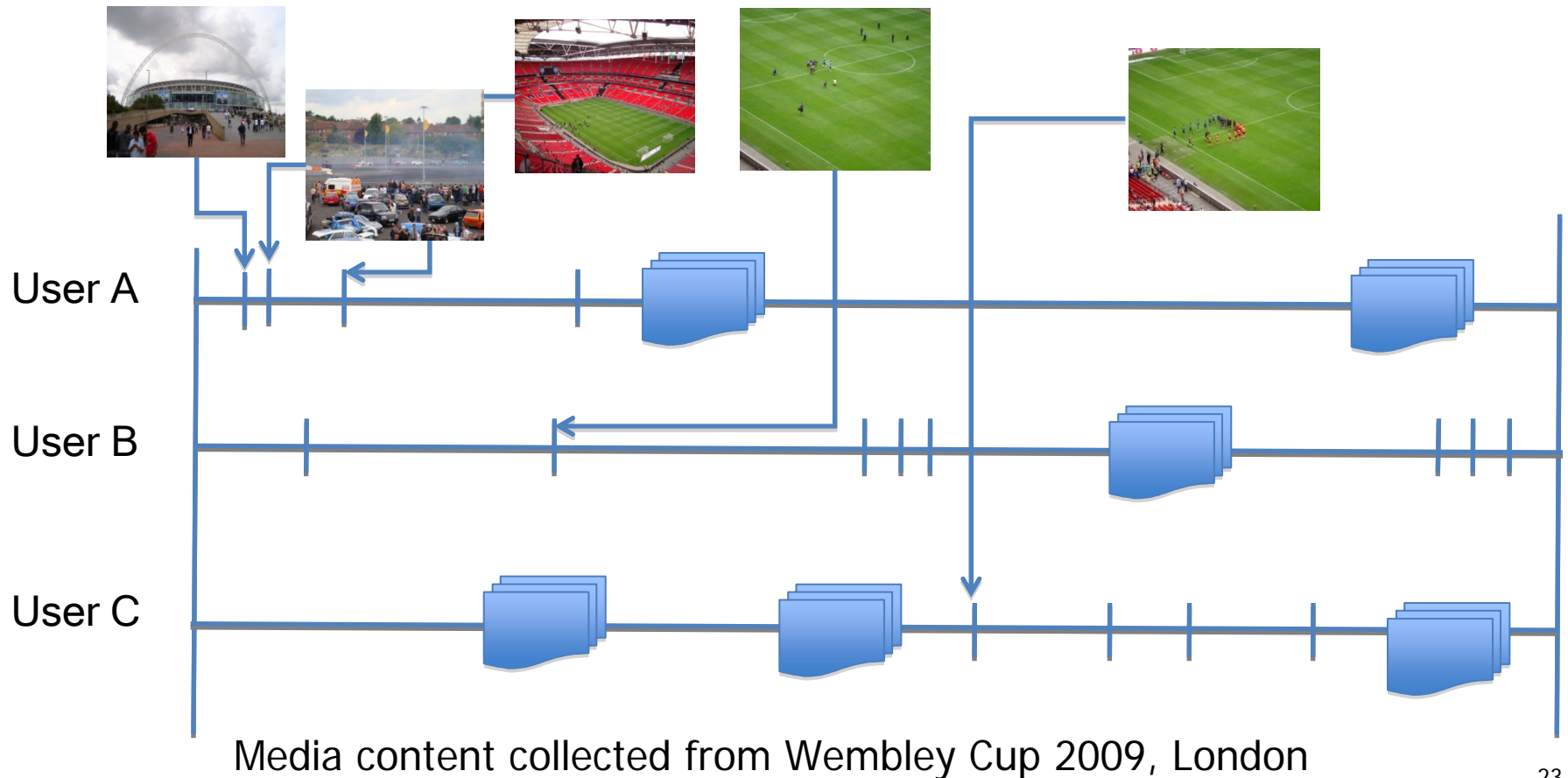
Near2Me: risks

- **Content availability**
 - Large enough
 - Ground truths
 - meaningful subset of a connected social space
- **Enough users for the field trials to have a scope broad enough to allow us to conclusively answer our research questions**

We are attempting to define our data and users needs as explicitly as possible

Action

Users assemble personal narratives using a social media collection consisting of user-contributed content chronicling an event from different perspectives and available via a social P2P network.



WeTV Motivation

- Sharing of information on events via the web has gained popularity
- The use of social networks facilitate sharing of information among common friends
- “Journal” creation could enable the user to reconstruct an event
- As opposed to other types of user generated content, event participation leads to multiple sources of content
- Enables to assemble personal narratives using a social media collection consisting of user-contributed content
- Allows chronicling an event from different perspectives and is available via a social peer-to-peer network

I want to create a video journal of an event that I attended and include content that was captured by other users

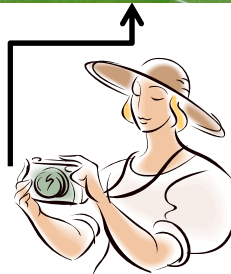
I want to relive the experience, watching the same event recorded from someone else’s perspective

User case

WeTV required technology

- Media analysis combining images, video and text sources
- Visual Analysis and Knowledge Extraction
 - Kernel methods (SVM's)
 - Biological methods (PSO, ACO)
 - Knowledge extraction using SIFT Features
- Visual coherency vs timeline of events
- Metadata mining regarding the event
- Authoring tools
- Multimedia data search and retrieval in P2P networks or other distributed social networks
- Algorithms to model, explore and evaluate peer authority in P2P networks
- Analysis of Social network profiles. Relationships for prioritizing collaborative fusion

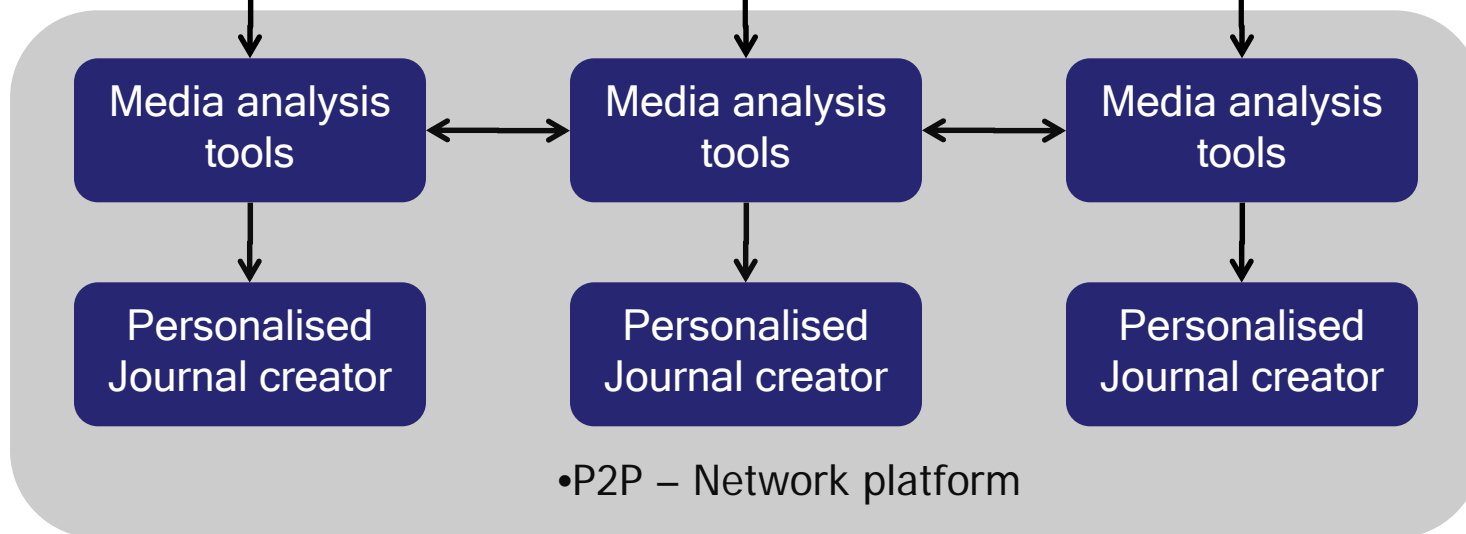
Envisioned Architecture



• ...



- Online Complementary
- Resources



WeTV in the technology matrix

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Making it possible for the user to throw away the remote Control

- Personalized content is selected and recommended/displayed to a user who supplies no active information

Use Scenario:

- I'm sitting on the couch and I am a couch potato tired after a long day of work
- content is recommended automatically based on my measured physiological state and affective reactions to the media that is displayed.



Emotion in Valence-Arousal Space

High arousal

fear
anger



surprise
joy



*Negative
valence*

*Positive
valence*

disgust
sadness



anticipation
acceptation



Low arousal

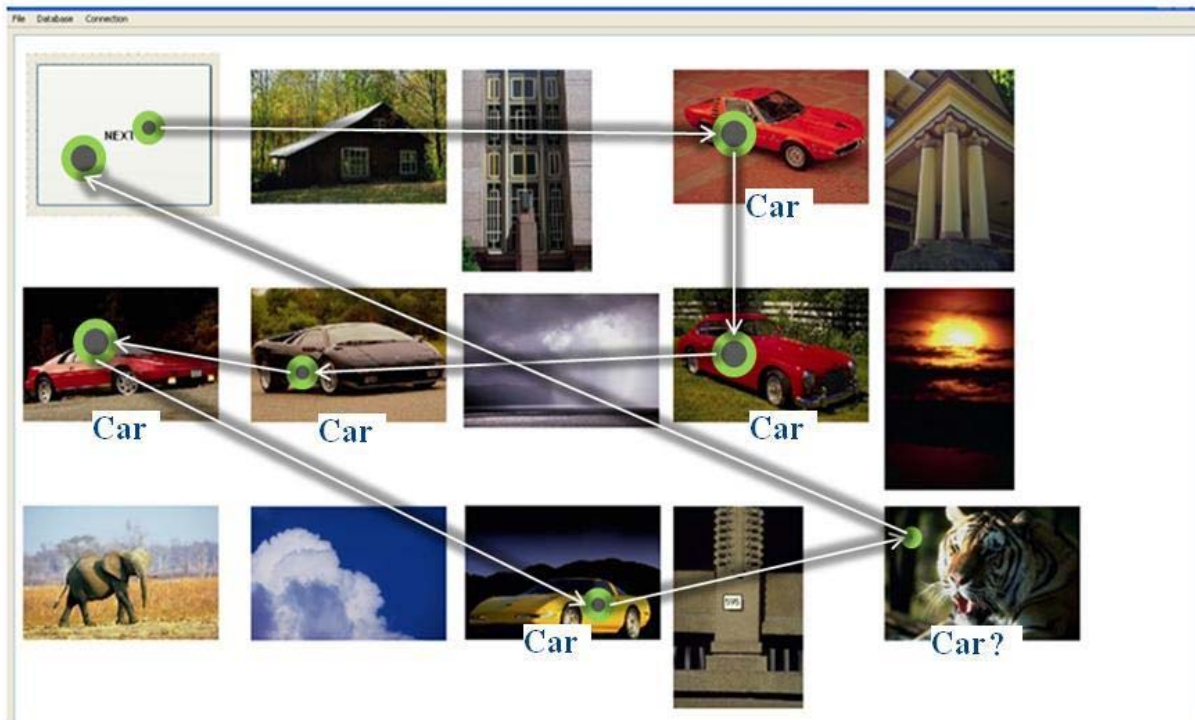
SpudTV: required technology

- Algorithms for collaborative filtering and recommendation
- Personalizing recommendations based on affective reactions
- Exploiting brain signals to create a user taste profile
- Non-intrusive user behavior observation methods
- Methods for measuring brain activity and physiological reactions
- Algorithms to predict preference on the basis of information concerning the affective reactions of users to video
- Video compression technology adapting to end device
- Techniques for affect multimedia content analysis

SpudTV: technology example



Implicit gaze analysis



SpudTV: research questions

- Does inclusion of affective reactions improve personalized recommendation?
- Can multimedia content analysis predict the reactions reliably enough to improve recommendation?

Outstanding technology:

- Algorithms that can predict preference on the basis of information concerning the affective reactions of users to video

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 **Field trials**

PetaMedia field trials

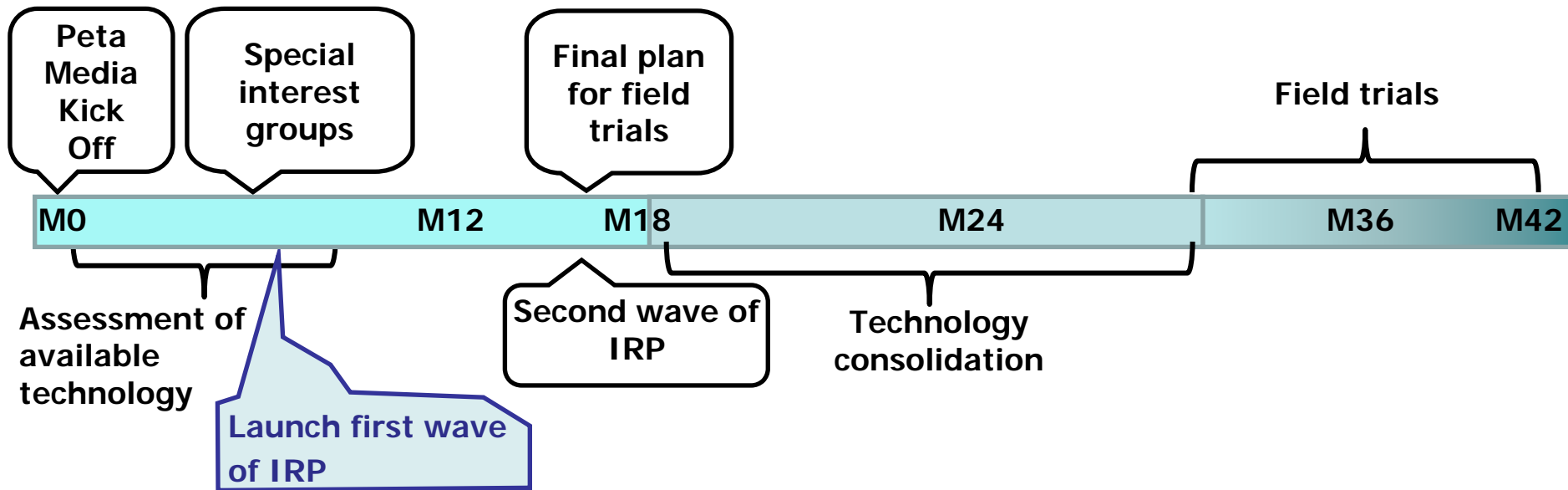
- Provide PetaMedia with the opportunity to match scientific progress against the project vision
- The project has already given this vision a tangible form: use scenarios and IRPs
- The use scenarios were instrumental to:
 - build consensus among partners concerning the form and content of the field trials
 - set up a roadmap to ensure that the necessary research foundation and infrastructure is in place at the start of the field trials (focused IRPs)

Field trials objective

To evaluate the contributions made by research and development founded on the PetaMedia Triple Synergy, with respect to improvements both in performance and in user perceptions

- Two sorts of field trials are planned for PetaMedia:
 - trials that evaluate performance in a real world setting where it needs to confront challenges of scale, bandwidth and complexity of social networks
 - trials that measure the success of the technology in terms of usability and effectiveness

Road map towards field trials



Thanks



peta
media



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