General Information

This document provides the recorded and pre-structured comments and quotes from four experts who participated in our study. The comments are already partly thematic-analyzed. Furthermore, the following formatting is used to ease the understanding of this document:
- All quotations are highlighted via "quotation marks"
- Some comments/quotes overlap with other sections/interview questions. This relation is highlighted by *italic text* in [square brackets] at the beginning of such a comment/quote

E1 Museum Curator (1h31m)

Data

- [*comments on Situated Vis*] Curators are particularly interested in how long visitors stay/read the exhibits or the general engagements
  - Not just simply visit frequency
- [*comments on Sequence View*] For the data categorization, the age of visitor groups is more interesting (for the designer and curator of the exhibition) while the museum is interesting in Peak vs. off-peak
  - Also, gender, education, profession

Workflow

- The current analytical workflow for curators is
  - purely observed by the curator - a field study practice
  - Currently, this is the way to understand the demographic impact
- [*comments for Scenario Sam*] This is also interesting to compare different setups
  - normally you design an exhibition with many hands-on [opportunities], and you make those very similar to this [room]. You make a mockup to see how and who interacts [with exhibits]. Technology can be used for this comparison. This mockup approach is not the most common, but it is also not rare to use.
  - Compare different description placements - the size of buttons?
  - Your system can help with this

- ○ You can review it and compare it better than real-time observation
- ● [*comments on Sequence View*] two principles of Museum curation (two formats)
  - ○ Either one-way guidance
  - ○ Or open space museum and Sequence View can be particularly interesting "if they miss one exhibit"

General, Interaction, and System

- ● Usability
  - ○ Gestures feel difficult to perform in the beginning
  - ○ Lens cube should be smaller, and the FoV is limited, which makes it currently a bit difficult to understand
    - ■ Fails a bit to understand the usage of the cuboid bounding box
- ● General AR/technology
  - ○ I like this technology
  - ○ "But I am concerned about how to get the data."
    - ■ especially how to not interrupt/interfere with the visitors both mentally and physically
    - ■ "If I tell them that they are recorded, it will influence their behaviors."
  - ○ "I like Pearl."
    - ■ "A little bit complicated to start."
      - ● However, it may be more useful to start with smaller boxes, but an analyst can change them
      - ● [*comment on Situated Vis*] Information should be closer to the individual object
      - ● FoV causing overlaying/view angle problem
    - ■ agrees to integrate it into their workflow; even thinks about using it in their current gallery
      - ● "a great chance for the museum"
    - ■ "It's a very nice experience"
    - ■ "AR has great development compared to VR"

Filter

- ○ Negative filter
  - ■ Not so sure about the negative filters
  - ■ "it can be interesting to see the difference between normal visitors who are visiting vs. not-visiting the introduction board."

- - - "(now) I don't know how to average these trajectories, but to get this average view for comparison [is interesting]."
    - ○ Segment
      - ■ "Very complicated for me"
      - ■ "[I wish to] either find some average movements or select one individual trajectory. So I can see how individuals view this object."
      - ■ "[here trajectories are] still complicated to understand. What happened here?"
      - ■ "as I'm not the trajectory expert/computer graphic expert. [It's] hard to interpret"

Visualization

- ● Trajectory
  - ○ "This is a lot. In a real museum, it can be even more overwhelming."
- ● Situated Vis associating with the Lens
  - ○ unsure about the association: "I am not so sure which information connects which boxes" as Situated Vis was connected to the Lens' hull
  - ○ How to associate the InfoVis to the objects?
- ● Superimposed View: Perception issue
  - ○ "Column is a bit too high. I cannot see the whole column in my view."
  - ○ "I should be able to compare even if it's smaller."
- ● Sequence View
  - ○ Really, very instructive!
    - ■ "I can really see how people moved."
    - ■ "if you leave space open [as open an exploration exhibition], it is very instructive to see how people moved from one object to another"
    - ■ "And see if people probably miss one object [during visiting]"
- ● Approaching View
  - ○ Interesting to understand, which side of objects is more attractive
  - ○ However, the description text will be disturbing this data but also could be used for guiding the description board placement
    - ■ *"I like it."*
    - ■ *"might be really helpful."*
    - ■ *"free-standing objects in the middle are particularly interesting to see which side is the attractive side."*
  - ○ In case of entering the exhibition room

- ■ "Imagine in the big museum, it might be very interesting to see which direction to go first when entering an exhibition room."
- ■ "Where are they starting from?"
- Flow View
  - Found a bit difficult to compare in the beginning (for peak vs. off-peak, why?)
    - ■ "[visualizations are] not too crowded"
    - ■ "In the situation of the peak hour, it could be interesting to show the distribution of [occupations] in the whole space."
    - ■ "Not only how they move, [but also] if there is a place always accumulates people."
    - ■ "Maybe using 3D bar chart"
  - "This might be a better one. [It's] more comprehensive [compared to the sequence view] - the overview matters."
  - "It's not that interesting for me to follow every single user. I am more interested in the average situation."
  - "It would be better to add a concrete number beside the width."
- Pace view
  - "This is something I would have expected. Nothing is surprising"
  - "for normal curators, I don't think it is too informative."
  - "But it can be interesting in a children's museum instead of a normal museum, when it has a big class of small kids, to prevent accidents."
- Avatar
  - "[seeing all at once] is overwhelming because [it is] too much."
  - "Avatar can be helpful. It would be better to have one and follow one person to know exactly they interact with exhibits", "or selecting 3 or 4 [avatars]."
  - "But this is especially interesting in case of hands-on [exhibits], I really get a picture of how they interact with them, saying how long and how."
  - "When I conceptualize exhibitions I have a picture of what they should do, but I cannot really be sure what I expected"
  - "This [view] might be very interesting."

Scenario

- Scenario Sam
  - "That is especially interesting in hands-on exhibitions given the possibility of interaction. "

- ■ "I would expect kids to be more engaged than older adults, but this [allows me] to test it."
- ■ "Maybe I can test how to engage even older people."
- ○ "This is also interesting to compare different setups."
  - ■ "Normally I also made mockups to test setups (for now), and this system can help with this test."
  - ■ "Test the description of how they (visitors) use this."
  - ■ "Change the size, the color."
- ○ "Right now, it requires the exhibitor creator to stay in the room, but with this technology, you can review and compare it."
- Scenario Taylor
  - ○ I could imagine this is a fundamental question for an exhibition designer
  - ○ "Especially when you have many trajectories it can be really complicated. So we need to find a way to understand the average visitor, e.g., [grouping] visiting the introduction board vs. not-visiting the board."
  - ○ "But it is also very interesting how long they stay at the introduction board. 5 or 10s are not really [enough time to] read it. You have to filter and find those who really read it" (referring to temporal filter)

E2 HCI Professor (1h28m)

General, Interaction, and System

- General
  - ○ "AR is very helpful and enjoyable, also compared to the encapsulation of VR."
    - ■ Connection to reality matters: "you don't lose the connection to the actual exhibits and space."
  - ○ Prototype
    - ■ The analysis is already helpful "most things that I saw are quite useful for analysis."
    - ■ However, the color coding and the color scheme can be more eye-friendly
    - ■ column/bar scale can be improved

- - ○ "Floor encoding is particularly helpful to reduce the stress of raw data, though these trajectories can give a very overview feeling, but i have the impulse to reduce information overload to the floor. "
    - ○ Head and hands trajectories, which one?
      - ■ "But showing all trajectories over time is not necessary."
      - ■ Animation view head and hand can be both helpful
- ● Lens
  - ○ "I'm not so sure lens is the right metaphor, as I'm thinking about the magic lens."
  - ○ Better show, e.g., circus to indicate that there has been visited
    - ■ To avoid missing information/trajectories
    - ■ "Some preview or some information to show this has been actually visited, or some hints to suggest to increase the lens."
    - ■ "The initial impression is nobody is here", "needs some hints, or auto adjustment, so that visualizations don't appear empty in some instances" "feedforward"
  - ○ "Need to remember lens as means to alter the filters, especially when I don't see anything (visualizations) I need to be reminded that its me to configure the lens."
    - ■ "Considering feedforward"
- ● Interaction works well
  - ○ "Gestures are easy enough"
- ● PEARL already has a lot of interesting options
  - ○ "Highlight traces instead of the rainbow color", "these convenient features make it more understandable", "I really like avatars."
  - ○ Combination of visualizations can be helpful but also overwhelming
    - ■ "Sure. but also depends on what you combine."

Filter

- ● Segment
  - ○ helps to reduce the complexity
    - ■ "It's already cool", "so not the whole room is filled with 'spaghetti' ", "works well"
  - ○ Some hints to adjust the height to avoid missing [segments because of the size of the box]
- ● Negative Filter

- ○ "Most complex thing and still a bit overwhelming" *in the beginning*
- ○ "It is an interesting question and nice feature", "but thinking in this negative [filter] way is …"
- ○ Maybe helpful for "outlier detection"
    - ■ "A lot of advanced situations, e.g., these two people didn't come close to the information board, which gives me some sense of how they visit the exhibit."
    - ■ "But still a lot overlapping happening", "still a lot of information in these trajectories."
    - ■ "Could consider combining with floor-based visualization to see how people are going there to there", "floor visualization reduce the information load to the basic information that they visit."
    - ■ "Also could be combined with the segment filter, it is more calming."

## Visualization

- ● Trajectory
    - ○ "It is really like a spaghetti monster."
    - ○ To differentiate the categorical visitor with color is a bit difficult
        - ■ Red is more preattentive
            - ● "red is popping out."
            - ● "I can pretty much get the right one so I could imagine others can be just gray."
            - ● "I can switch the ID and just highlight one (by this color), in order to get a meaning out of this spaghetti [heap]."
        - ■ "continuous colors are merging to one thing so not so good for categorical codes."
        - ■ "With this much color, it is a bit difficult to have a correct differentiation."
    - ○ "It is enjoyable to watch it but from an information point of view, they are disturbing compared to the floor things."
    - ○ New concepts for trajectory
        - ■ interaction:
            - ● "Push traces/[trajectories] to the floor to get more clear [aggreagted] visualizations".
            - ● "to get it up and put it down can be very playful to explore"
        - ■ Visualisation: could also consider edge bundling

- - - Generally trajectories are disturbing
- Situated InfoVis
  - Better side by side/ hinge next to the referents, not the bounding box
    - "So it can be pretty far away from the actual objects."
    - Occlusion of situated InfoVis when standing in front of the Introduction Board
    - Very distracting and not really readable since it is so close
- Superimposed View
  - Cross-reference can be performed
    - "For the first glance, the bar here and there are similar so I can make an easy cross-comparison, to see if exhibits have the same pattern of visiting"
  - Perception might be problematic
    - "However, as always if you have perspective, it is hard to tell or be sure [about the volume]"
  - Actual volume Labels can help readability though some placement is not good (WL: implementation; labels are inside the walls)
    - "These labels help a bit to mitigate [this problem]"
- Sequence View
  - "The main idea is pretty nice".
    - "Mapping to the floor is quite useful. It is less complex than interpreting these 3D trajectories."
    - "Right now it's really nice as they fix in the floor and I feel like following the footsteps"
  - "Of course you have trade-offs."
    - "Because you focus on the floor and you lose the focus [of exhibits], though curators might know where they are by heart."
    - "I have to look down and up a lot to remind myself."
    - "Maybe you could level this floor view up", "I don't know exactly"
  - Visual representation
    - "Very organic looking arrow", "like a flow of birds"
    - Mushing, not clear cutting angle
- Flow view
  - Occlusion Overlapping is a bit hard to interpret in the center
    - "There are some patches now; it gets a lot of occlusions, overlapping [in the center]"

- - - "I can only see a large leaf instead of an individual [in the center] so not easy to concentrate on people passing from here to there"
      - "Try making small and solid?", "right now it is a bit 'spider-weby'"
      - "Interaction could an option to help this"
    - "I can make you a sketch"
      - A sketch for improving the visual representation
- Approaching View
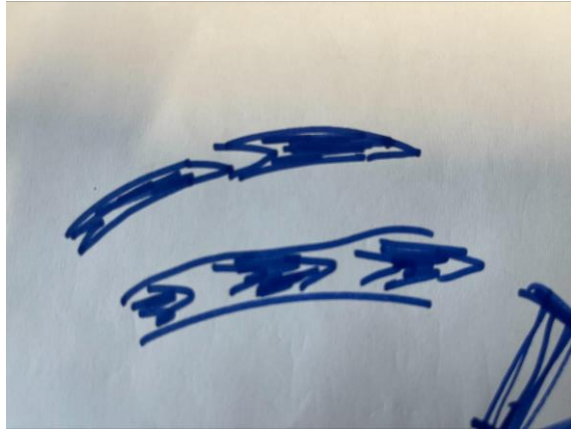
  - Quite interesting; very important info; incredibly useful
    - "The idea is quite interesting to know which direction people approach", "then maybe place something or remove something"
    - "This one can be incredibly useful; prevent overlapping between exhibits and co-existing showing "
  - Bars are overlapping a bit; don't swap the order if stacked bar
    - "Close to the center of referent, they are overlapping of head of bars "
  - Suggest some other layouts
    - "Thin at the start and only large on the cap of category, to make it more organized"
    - Sketches: skeleton / glyph / radius sun burst
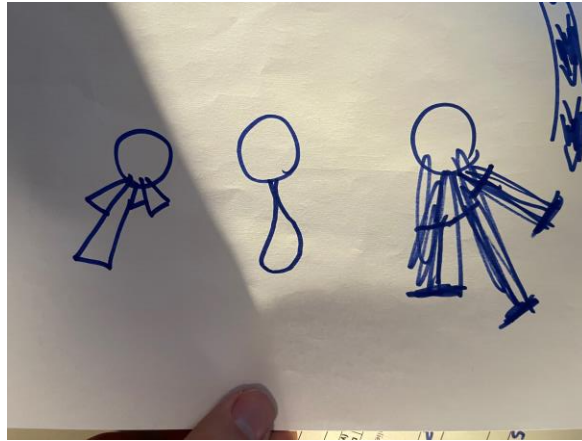
- Pace View
    - Anchor point needs some offset: now it's a bit misleading, feeling conflicted with the physical material "feeling people really running into objects instead of a course in front of objects"
    - Work nicely; it is cool; How visitor went
        - "This one works nicely", "the general idea works well"
        - "I can really feel how the visitors go, like here faster and faster"
        - "I have the feeling that I want to reinvent or experience the movement"
    - But the green color is a bit aggressive
        - "From the style view, the green is a bit aggressive, really neon"
- Avatar
    - "Animated way solves much problems of static traces"
        - "Overlapping is significantly reduced", "Can follow closer"
        - Heads positions are misleading; cyber head is a bit creepy; unhuman posture issue
        - "Focus on one of two people"
        - "Immersive feeling but pretty useful"

Scenario

- "Though I am not a curator, I would find it very helpful to evaluate how sufficient the setup is"
    - Meanwhile, heuristic pre-knowledge (of the museum) can also be interesting in their assets

E3 Human Movement and Trajectory Expert (1h58m)

General, Interaction, and System

- Movement analysis (so the subject is human or doesn't make difference to me)
  - "There are some differences considering the physiology of the objects."
  - "But in the end, you analyze the time series and spots, like repetition and frequency. "
  - They are the same
- AR
  - Overall, I'm impressed. It was a great experience.
  - Aggregated visualizations
    - "Very helpful, if I could grade it I would score as highest as possible."
    - "Especially when there is so much data involved, then they are so useful to find the path."
  - Environment
    - "Very helpful."
    - "I'm coming from Computer Graphics and movement data is multidimensional. "
    - "It feels more intuitive to explore the data, especially if it's about trajectories and paths through space to analyze in the space."
    - "And the movement is also always correlated with environments. "
    - "So it makes much sense to also analyze in this environment and space."
  - Prototype
    - "I like it a lot; I would like to use this for data that I recorded for activities of daily living or some like this. "
- Interaction
  - "Creation is very intuitive; I like it; I can really interact with the boxes and the data, and walk around."
- Workflow
  - It depends on the research questions and how many people at all in the time slot there: "I will first get the overview", "I won't start with trajectory."
  - "It is really good that you could have different starting points", "so perhaps I could change my procedure because the system allows me to do so"

- ○ For the fewer data (like 10)
  - ■ Starting with an avatar to observe how crowded the room is, to make a general impression;
    - ● "Avatars help me understand how close they are to each other"
    - ● "How much room is taken by themselves."
    - ● "indicator of how they were moving around the objects, like bending over"
    - ● " and also the different heights so I can have indicators of their ages "
  - ■ Then start with walking paths with aggregated
  - ■ Then individual to put me in their shoes (by trajectory)
- ○ For more information
  - ■ "I will start visualizations on the floor"
  - ■ "Approach view, heatmap, superimposed view"
  - ■ "Then go to the individual to the trajectories view"
- ● Future
  - ○ Exchange of museum visitors in real and virtual space
    - ■ Remote visiting
    - ■ Interaction between real and virtual visitors
    - ■ Hybrid presence
  - ○ Museum practitioner
    - ■ "Would they be trained in such system?: to train practitioner from previous exhibitions; iteration naturally"

Filter

- ● To realize the users profile with spatial filter
- ● Negative Filter
  - ○ "There are still a lot of trajectories visible."
  - ○ "Does it help in this use case? I'm thinking -"
  - ○ "I will filter based on the user groups, but maybe not too much to do with the objects" - later on changes the opinions
  - ○ "When do I start with objects and When do I start with humans."
- ● Segment
  - ○ "It's helpful, it is very reduced. I like this feature a lot."

- - - "Totally different approach now, I don't have too much data to analyze, I just have the starting points to derive some insights into the user's behaviors."
    - "Before we have where they approach this object and now I really have the indicators of interaction with the objects: where the people interact and can be substituted for to the eye movement"
    - "So I can derive some focus on the table. "
  - "Otherwise should I collect the data in such a huge space?"
- "Also interesting to see how disability people like a wheelchair and blind ones approach the objects"

Visualization

- Sequence View
  - "Does time encode into this visualization? Like how fast are is the transitions?"
- Approaching View
  - Saw something related to this vis in Architecture Drawing → Paper
- Avatar
  - The simultaneous congestion level of the room
    - "How much room is here for people to move"
    - "Especially for older people with restricted view and mobility - they might be afraid of the space"
  - "Yeah, I am interested in this co-located situation"
  - "Avatar is great to provide the focus"
  - "It could be interesting to add demographic data, like age, on the [avatar-]head"
- Trajectory
  - "I am very familiar [with trajectories]. In the daily analysis, it is typical to analyze trajectories"
  - Good visualization
    - "a secure and understandable approach"
    - "color coding is understandable"
    - "Color Rainbow for me is also familiar"
    - "I could work well with this"
    - "Arrow on trajectories is direction. Understandable"
  - "This is a jungle of trajectory"

- - - "When I try to follow one trajectory, I will try to grab it to start and toggle the clue of data"
    - "Start with one and hop over to the next one"
    - "Have an impression of how people are affected by other visitors or by objects"
    - "I will not only focus on the object but human, or people; that's why to choose a trajectory to define a person"
- Sitauted View
  - Use case
    - Maintenance: "when are they a lot of people in the spot, but also when they are not"
    - "I like the graphic visualization because it is very helpful; its very good feature; I really like it"
  - Data
    - "I will also be interested now how people stay here based on the age?"
    - "So I can also change and schedule the (visitor) group"
- 3D superimposed
  - "I want to get a comparison over the group between different objects"
  - Use Case
    - "I am thinking about the use case when I need to access these data"
    - "Maybe if it is not visiting at all I can consider changing the location of the objector removing this object"
    - Co-located: "When there are a lot of people in the peak hour accessing objects, do I need to change the spots, perhaps for these objects nearby"
  - "It's a good way - a different way to analyze the data."
    - "it's very dense and I can explore very easily"
  - Perception
    - "It is ok; Making sense"
- Sequence View
  - Step back to the corner for an overview
    - "I need to have an overview"
  - Comparison
    - "I am looking for difference"
  - "Perhaps also give me the trajectories."
    - "Not really hopeful in this case due to the distance [in between two visualizations]"

- - - ■ "Trajectories present not too much information"
  - ○ "It makes sense based on the use case. I see. I like it."
- Flow View
  - ○ "I am thinking about the additional value compared to before; so for which question i choose which one"
  - ○ "It is helpful; different users will choose different visualizations"
  - ○ "These two visualizations are much more condensed (compared to trajectories) so can supplement each other;"
    - ■ "this is more about users flow; another is more about getting an impression of individual needs"
    - ■ "I will choose different approach for different research questions"
    - ■ "Perhaps I will now start with this approach, then trajectories view to go into the details; so overview then diving deeper"
- Approaching View
  - ○ "It extends the visualisation you give me before"
    - ■ "I could change the layout based on this for, e.g., people with wheelchairs"
    - ■ "I like this a lot; very innovative"
  - ○ "It is really good considering [lense allowing for different] resolutions"
    - ■ "For instance for corona use case, i can see people come to near each other when standing in front of objects"
    - ■ "I could use this visualization to estimate the risk, and then change, like using another table"
    - ■ "Risk management in the museum"
  - ○ "Could be also interesting when there is crowd, how people approach this object "
    - ■ "To extend it, saying correlate the age, how older change behaviour compared to the younger, how they approach the object"
    - ■ "How to design a museum more user friendly"
    - ■ "Or museum for children"
- Pace View
  - ○ "I am now thinking about fragile objects"
    - ■ "I coud use this information to change the layout when there is a lot of passing through the area fast"
  - ○ "Its helpful"
  - ○ "And how should people navigate the space, for this it could be helpful"
    - ■ "Could be also speed depending on the different groups of person"

- - - ■ "Correlate to ages"
    - ○ "To encode speed is always a good idea when analyzing movement"

Scenario

- Sam
  - ○ "Very practical, makes a lot of sense"
  - ○ "I already a lot questions like this; it is really cool to see how he changed different approaches"
- Taylor
  - ○ "I really like it", "Really cool"
  - ○ "Object of different kind"
    - ■ "Now i realize it is helpful to ask more questions about exhibition"
    - ■ "Now also makes more sense for me how to use more visualizations for combination, like trajectories and negative filters"
    - ■ "I didnt think about this question before"
- "In both scenarios starting with objects view, now its different questions."
  - ○ "When I think about the task regarding design the exhibition differently based on the object"
  - ○ "I used to be thinking about people, perhaps I have a different perspective for now"
  - ○ "I could learn from the system, and thinking about the questions which are more object-related"

E4 Exhibition Curator (1h32m)

General, Interaction, System, Filter

- AR
  - ○ "Very very immersive"
    - ■ "Really in your room, in your exhibition areas; at the moment you look at your data you analyze them, you want to do something with it; it is very good to be there"

- ■ "For example, I could also look at this by computer BUT this is not the same, its better you are there you inside you have your own body to represent and compare with"
    - ○ Reasoning
      - ■ "You can relate to it; i look around the gaming machine and look if people look from this direction: so you can understand, aha this side has better looking on the control or anything; but you can see immediate; compared to the computer with floor map i cannot have the same impression"
- ● Proptotype
  - ○ "Its very nice experience and environment"
  - ○ "Maybe considering, idk, like a framework to get more visualisation and adjust them"
  - ○ "To collect other data"
  - ○ "To experiment and try something new"
  - ○ "You have great ideas of visuallizations"
- ● Interaction
  - ○ "Its quite easy; its kinda like throwing something, a box to the object; its very nice."
  - ○ "I get the dimension adjustment"
- ● Workflow
  - ○ "When you really plan for an exhibition, you wanna to see if people have enough space to watch exhibits"
- ● Visualization order/ workflow
  - ○ See tracking tracks, Flow View
    - ■ "I m not so sure i need the number already"
    - ■ "Did they leave/ miss something out?"
    - ■ "Empty space?"
  - ○ Order
    - ■ "Might be the some visualizations"
    - ■ "Also the impression of direction"
  - ○ Avatar
    - ■ "head movement is nice one, because you dont know how height it is, so you could know from the head movement, you could know small guests"
    - ■ "Interactioning; if our idea really work"
    - ■ "Can be the next or the last one step"

- ■ "But with a group, like a kids group"
- ● Future
  - ○ "I want to use it in the next [exhibiton]; please install it in the flyer please
  - ○ "Data communication and presentation"
    - ■ "I really like excluding and including filter"
      - ● "For the attendee or presenter, they want to know was it is good, what they did, its a nice way to get the answer"
      - ● "Look, we have this data and visualisation, see your project is very good"
  - ○ Domain
    - ■ "Architecture; open space design; interior design;"
  - ○ Features
    - ■ "Color changes; personalize the visualizations"
      - ● "Attention color; see the problem;"
      - ● "snapshot ; export; with data and visualizations talk to other colleagues about this"
    - ■ "More visualizations; but I don't can name [a specific one] because you already have a lot"
  - ○

Filter

- ● Negative filter
  - ○ "I notice the corners are red"
  - ○ "I like it very much; its very interesting; filter function is really nice especially it is reacting with the bounding box;"
    - ■ "Better visiable; not so overwhelming; tho still not too much"
    - ■ "Yeah (who never visited this place) kind of this question can be answered this moment"
    - ■ "I can see if they are just passing through or anything [instead of interacting]"
  - ○ After some modification
    - ■ "Only two or one trajectories left"
    - ■ "To exclude areas, not necessary to object, but saying way maybe, like somewhere none walked there"
      - ● "So it might be possible to another object or exhibit; it could be nice"

- ○ How to use it
  - ■ "All your situated problems and how you want to put them together"
  - ■ "If you have two objects you have to be visited together; and plan them; and you find the perfect space and work perfectly"
  - ■ "this is really working; my idea really works"
  - ■ "Even you have more than two or three, like a queue you have to follow up"
  - ■ Also the hands, if you want people to touch interactive objects especially."
  - ■ "So you can see the hand movement, and see if they get the idea of the interactive stuff, e.g., in my [cases] sometimes the bottom is a bit hidden, you can test if it is really good to be there"
  - ■ "I am thinking about Museo Leonardo Da Vinci"
- ● Segmentation
  - ○ Not sure
    - ■ "Not sure about this one", "I like the visualization, like a modern art", "these small pieces hanging around; very nice"
    - ■ "I am not so sure about the information if they really help"
    - ■ "I can see the direction how they approaching; this might be the information that I can take from this;"
    - ■ "Another way from the approaching view"
  - ○ Filter is more interesting
    - ■ "You already have another representation for this one already"
    - ■ "Im not sure if it is working better, the other one, might be yes [filter]; But separation, you have the ways, so you can focus on the objects"

Visualization

- ● Trajectory
  - ○ Very confusion
    - ■ "So many lines and colors"
    - ■ "It is just too much"
    - ■ "Its information overloading"
- ● Situated Bar Chart
  - ○ "it 's very easy to understand these bar charts"
  - ○ "Its good that visualisation updated based on the lenses"

- Superimposed View
  - "Its good information what you can get from the data"
  - Visual Representation
    - "But i am not sure about the (visual) representation"
      - "So huge", "do you really need such a focus", "maybe smaller?", "maybe also because of hololens (FoV), I have to move backward to see the whole bar"
      - "If I am close to the objects, I cannot really see the whole bar"
    - "It depends if I want the whole picture or the small picture"
      - "The main thing for this scene is, if you standing way back and you have the whole room in one view, you could compare them. That could be interesting. And therefore I need that big"
      - "On the other hand it's hard to compare the front ones and back ones (due to the perspective) since the back ones are smaller"
  - Labels
    - "Do I really need the numbers? Or do I want a feeling of number but not the actual numbers"
- Sequence View
  - "I like it very much, very interesting; I like how it goes with lenses; I also like you can see two groups"
  - In this visualization, I like the overview more
    - "Because I can see how should I arrange and change the positions or anything and make it maybe better"
    - "Its kinda hard to walk because on the floor again";
    - "the view of Hololens is restricted; you only have the middle of the view."
    - "It's hard to see in the middle."
  - "I am now missing the 'how many' question"
    - "Saying in the afternoon people stay more here so they move to this object first then to another one"
    - "But I guess in this vis you want to know in which road they visit all objects"
  - "Yeah it could be interesting to have combination (3d bar and sequence view) so I know how many the count, and the ways so I can perfectize the order of objects"
- Flow View

- ○ combined and effective
  - ■ "It's more structured; more combined; you could have a quick overview; it's better and I can get more out of it."
  - ○ Visual Representation/ Sytle
    - ■ "I'm not sure about the gray edges; do you really need this?"
- ● Approach View
  - ○ "It's also very interesting"
  - ○ "I'm now putting two visualizations together by myself"
    - ■ "From which object to another they moved" → sequence view
    - ■ "And why they are coming from this side" → approaching view
    - ■ "But I'm not so sure how to combine"
    - ■ "If you see the direction of objects how people coming from, I ask myself: WHY?"
  - ○ Visual Representation
    - ■ "The blue and green are too close in this case; the parts are swimming; I cannot tell how many and I just get a feeling how many coming from this [direction]"
- ● Pace View
  - ○ "Confusing color coding" due to Not the peak and off-peak hours comparison
  - ○ "Im not sure of it if it really helps"
    - ■ "I can see people move here slow and here fast but I don't know if it helps"
  - ○ Visual Representation
    - ■ Suggest a sketch to indicate the direction a bit.
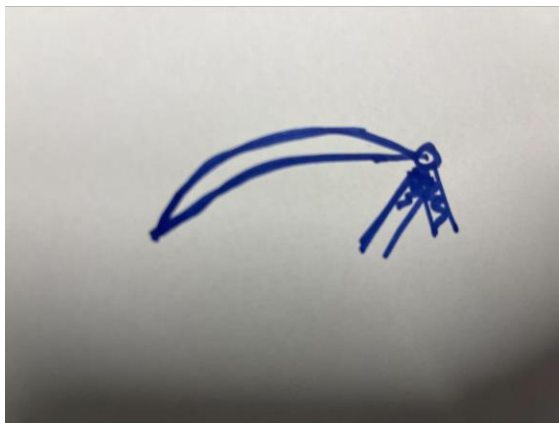
- ● Avatar
  - ○ "Its overwhelming to see so many"
    - ■ "Concentrate on one or two and follow them"

- - ■ "It is very interesting to see the head movement, saying they are looking down"
  - ○ "I can see how they are interacting and how long they interact, which i didn't see before"
    - ■ "If they are just surrounding and just look at things, i don't know if it is really necessary to see how they look at objects; interaction is more important"

Scenario

- "I like the bottom one with introduction board then you find the error or the problem; ok let's make this more interesting"
- "The top one, similar one, i guess this is something you think about this before, a good one curator should get this beforehand"
- "Decision process"
  - ○ "Yes it can support this decision making process"
  - ○ "If you have like same for different exhibitions"
  - ○ checking categories of exhibits: "Because the paths not only depend on the surrounding and the room or where the objects are surrounded, but the objects theirself, like whether they are interesting"
  - ○ checking ways: "Like ikea, if you have path guidance designed, it can be verified by your system; they directly go the way you want to go; this is very good system to validate over time"
  - ○ "Especially for the same exhibition, to make it better; that can be the scenario to use it. "