Task 1 - Problem Definition, Goals, Measurements

AIBeSa

Authors: Beloslava Malakova (TU/e: 1923404), Alicja Gwiazda(TU/e:2017830), Stanimir DImitrov(TU/e: 1932217), Aleksandra Nowińska (TU/e: 2008580)

Expectations:

1. Clearly define the problem.
    - Get familiar with the use-case.
    - Clearly state what the problem is and why it is important to be solved.
    - Break down the problem into subproblems.
2. Propose a solution.
    - **Do not** try to **design** a software, but **come up** with a solution to the problem on a very high level **(no code, no technology).**
    - Think about inputs and outputs.
3. Goals/objectives definition.
    - Use the hierarchy to define goals at different levels but **do not try** to finalize them. There is more that we need to see before deciding which goals (milestones) we need to achieve.
    - Typically these decisions are based on the dialogue between your team and the client (the entity that has come to you with the problem), in this case - the lecturer.
4. Prepare a maximum of 1 page A4 outlining the above.
    - Writing things down will allow you to see if something is wrong and if something else is needed.
    - Have three sections:
        - Problem definition
        - Objectives
        - Measurements / KPIs

Idea 1:
Art Guide (my idea)
Goal: Develop an app that lets users take a photo of a painting, or a sculpture, and then generates an audio + text description in English (art style, context, when it is created and so on)
Components:
Image recognition (classify artwork)
Knowledge graph / Wikipedia API to fetch descriptions
Creating the app
Unique angle: Supports tourism/ enthusiasts accessibility
Scalability: Could be deployed as a simple app with take a photo window and then just audio speaker and the same text for the speaker is written

Idea 2:
“Accessible News” Reader
Automatically convert daily online news (both articles + embedded images/infographics) into audio podcasts with contextual descriptions.

AI Components:
Web scraper + summarizer (extracts main story).
Image-to-audio captioning (explains infographics or memes).
Natural voice TTS with adaptive intonation.
Unique angle: Combines summarization + accessibility, targeting people who cannot easily consume visual content.
Scalability: Continuous updates with RSS feeds, cloud pipelines for processing.

Problem Definition

When visiting museums, galleries, or cultural sites, many visitors struggle to access clear and engaging information about the artwork they see. Traditional labels often provide only minimal details, and guided tours are not always available, affordable, or accessible in the visitor’s language. This creates a barrier for tourists, casual art enthusiasts, and especially individuals with accessibility needs (e.g., people with visual impairments).

The problem is how to provide immediate, personalized, and understandable information about artworks to a wide audience without requiring prior art knowledge.

We break this into subproblems:

1. Artwork identification: recognizing a painting, sculpture, or object from an image taken by the user.
2. Contextual explanation: providing information beyond the name (art style, historical context, cultural relevance).
3. Accessible presentation: delivering information in multiple modes (text + audio) to suit diverse user needs.
4. Ease of use: ensuring the interaction is simple (e.g., “take a photo and get an explanation”).

A high-level solution: a mobile app that allows users to take a photo of an artwork and immediately receive a spoken and written explanation. The system relies on existing resources (art databases, Wikipedia) to ensure reliable and scalable content delivery.

Objectives

Main Goal: Enable visitors to engage with artworks in an accessible, interactive, and informative way.

Sub-goals:

- Provide fast and accurate correct artwork recognition.
- Deliver concise, contextual explanations of identified artworks beyond basic labels.
- Ensure inclusivity by offering both text and audio explanations.
- Design the interface to be intuitive and simple
- Support tourists and international visitors by delivering audio-first accessibility
- Increase engagement in cultural spaces via interactive explanations.
- Encourage adoption among tourists and casual art enthusiasts.

Measurements / KPIs

To evaluate success, we propose the following measurable criteria:

- Accuracy of recognition: (% of artworks correctly identified, ≥ 85%).
- Response time: average time from photo upload to output (target <10s).
- User satisfaction: average rating from pilot tests (target >3/5).
- Tourist adoption: number of downloads/active users in cultural sites (≥50–100 pilot users)
- Content richness: average length and coverage of generated descriptions (art style, context, year, artist).
- Accessibility impact (% of audio-mode users ≥40%).
- Retention rate (% returning users ≥30% in first month).