

An EyesSpeak Prototype for the System: Dual Language Gaze Interaction Integration

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Abstract—EyesSpeak meets the desire for inclusive digital experiences by combining gaze control interactions with real-time translation capabilities on a popular website for Bangla and English speakers. By employing strong gaze-tracking technologies, user engagement is increased through interface redesign based on users’ points of interest. Live translation promotes multilingualism by dynamically crossing linguistic barriers. This prototype prioritizes user-centered design while utilizing cutting-edge technology to ensure scalability, security, and accessibility. Through rigorous usability testing and iterative improvement, EyesSpeak aspires to pioneer creative, inclusive digital experiences that promote user delight and accessibility.

I. INTRODUCTION

Today in a changing digital world of interconnectedness, internet programs must represent good communication as well as be workable. The EyesSpeak project continues to become crucial because it seeks to improve clients’ interactivity through modern facilities such as eye sensors and fast translators. By seamlessly integrating these innovations, EyesSpeak wants to increase user engagement while efficiently overcoming linguistic hurdles seen on a major Bengali-English website. We believe that by implementing this new policy, we can create a more inclusive digital environment in which people of various linguistic backgrounds can freely browse and contribute, resulting in a more diversified and integrated online community.

The project uses a complete data collection method and user interaction strategy to make sure every person is included and to achieve our intended outcomes. In order to comprehend user preferences and patterns, it endeavored to use mixed methods research design blending both qualitative and quantitative approaches. This required representation from varied walks of life with particular reference to Bengali and English speakers. While detailed surveys are intended to capture user preferences, technology literacy, and browsing habits, focus group discussions tend to delve deeper into specific user experiences and concerns. Gaze-tracking technology will be used to monitor users’ natural browsing habits, prompting design decisions to improve engagement. Real-time data collecting will allow us to identify areas where we can improve user participation and involvement.

Understanding users’ wants and needs is critical for keeping the design and development process on track and meeting their expectations. A representative sample that includes a wide range of user types based on linguistic ability, technological literacy, and socioeconomic status assures that the study’s findings are useful and applicable. Furthermore, inclusion activities, such as incorporating participants with varied visual abilities in the review of accessible features, demonstrate the project’s dedication to a user-centered approach throughout the research and implementation phases.

II. THEORETICAL CONCEPTS

A. About Prototyping

Prototyping in UI/UX design is building a simplified version of a digital product’s interface to evaluate its functionality, usability, and design before proceeding to the production phase. It’s similar to developing a blueprint or a mock-up of the finished product. Prototype quality varies from low (sketches or wireframes) to high (interactive designs that nearly resemble the final product).

The fundamental goal of prototyping is to collect feedback from customers and stakeholders early in the design process, allowing designers to iterate and create products based on real-world user experiences. Prototyping is useful for identifying potential problems, enhancing usability, and testing design choices without incurring high development expenses.

B. Prototyping in Conceptual Design

In conceptual design, prototyping is a vital link between abstract ideas and physical design solutions, helping designers to turn creative notions into real representations. These prototypes provide designers with a visual and interactive environment in which to experiment and iteratively enhance numerous design options. Mockups can make it quicker for designers to understand how things they think about may actually function in real-life. The designs made are better because they are based on experience. This is achieved in that it creates more informed processes that are also productive hence reducing the probability possibilities of mistakes or errors as far as the aspect of design goes. Multidisciplinary design teams find it easier to communicate and collaborate when they have

accepted prototypes. These provide a prospective design as well as stakeholders with verbal or visual means of discussion for its enhancement by both developers and designers.

This collaborative approach guarantees that all viewpoints are considered and integrated into the design process, resulting in more robust and comprehensive solutions. Furthermore, prototypes allow stakeholders to provide input early in the process, instilling a sense of ownership and investment in the finished product.

Moreover, prototypes can be used by designers to detect problems early, saving time and resources later in the project lifecycle. For example, when certain ideas are tested on potential users, as well as stakeholders, this may help in finding out whether they have any usability problems or not. This iterative design process ensures that the final product fits customer requirements while reducing the possibility of costly redesigns or failures.

In general, prototyping during conceptual design which fosters creativity, innovation and collaborations ensures that the resulting product is user centered, functional and successful.

C. Different types of Prototyping

Low-fidelity and high-fidelity prototypes are two major types of prototypes used in the conceptual UI/UX design process, with each serving a distinct purpose and presenting unique benefits and problems.

Low-fidelity prototypes are differentiated by their simple and uncomplicated representation of the final design. They are usually quick to make, inexpensive, and can be done by anyone, including non-design team members, because of their use of simple lines and forms. This style of prototype is great for evaluating information architecture and user flows early in the design cycle. However, they lack complex graphics, interactions, and transitions, which can reduce the accuracy of user feedback and make it difficult for stakeholders to envisage the finished product. Despite this, low-fidelity prototypes are essential for brainstorming and effecting rapid alterations during testing or meetings.

On the other hand, high-fidelity prototypes are almost identical to the end product in terms of design, content and interaction. They need specialized knowledge because they are produced by means of coding or prototyping tools. They come in handy when one wants to see how particular user interface elements or interactions work or if one needs substantial user feedback during the final stages of design. Adding a real feelings to the final design makes them good for usability testing and presenting stakeholders. Meanwhile the construction and updating of high-fidelity prototypes may cost more time and money than low-fidelity ones. True sense is provided by these to the concluded design thus they are ideal for usability testing as well as stakeholder presentations. High fidelity prototypes on the other hand may takes longer time and become costly to create and maintain than low fidelity ones.

D. Prototype Construction

There can be multiple different approaches while building up a prototype, whether it be a high fidelity or a low fidelity one. Some of the approaches that can be done are explained below

- **Sketch Prototypes:** Sketching the prototype by using pen and paper can help a lot to understand and visualize the initial design of any software solution which will be worked on in the future.
- **Wireframes:** We can create simple wireframe diagrams with Balsamiq, Sketch or Adobe XD. Designers can easily sketch simple layouts by dragging and dropping using these tools.
- **Clickable Prototypes:** Employing Marvel, InVision or Figma to generate interactive prototypes. They allow designers to connect static screens hence less time consuming design tasks.

E. Scenarios and Personas in Conceptual Design

Scenarios and personas are key tools in conceptual design for understanding and empathizing with product or service customers.

Personas are fictitious characters developed through research to represent various user types who may interact with your service, product, website, or brand. They capture your target users' needs, experiences, behaviors, and goals, allowing designers to step outside of their own views and gain a greater understanding of the variety of user demands. Personas are not real persons, but rather are created using genuine data obtained from various individuals, bringing a human touch to otherwise cold study facts. They function as archetypes against which design decisions can be evaluated, directing ideation processes and ensuring that the design is oriented on the user's wants and experiences.

On the other hand, scenarios are detailed accounts of a user (commonly a persona) in everyday life experiences that help in the design of a solution. They depict a "big picture" of a series of occurrences thereby enhancing understanding of user behaviors by designers in a given situation.. Scenarios help in exploring and justifying motivations behind particular user needs and actions, as well as presenting a clear way in which a persona looks forward to the evolution of interactions. They also highlight pain areas in existing processes or predicted difficulties in new ones. They are written as detailed stories that focus on the persona's aim, the setting (which includes the physical, social, legal, and organizational contexts), and the events that led up to the situation. This is because scenarios are used in order to capture crucial interactions with a system, but not all possible interactions in order to make sure that what is designed is in line with what users want and need.

III. PROPOSED METHODOLOGY

A. Reasons to use Low Fidelity Prototype

Using low-fidelity prototypes in component design provides numerous advantages, particularly in the early stages of the

design process. Here are a few crucial elements that emphasize these advantages:

- Employing inexpensive prototypes for essential unit construction is beneficial in several ways especially when it comes to initiating new ideas in designing. Users would rather prefer a work-in-progress than a close-to-final design because it seems like they are more of an idea than real; examples are just lines on paper or doodles. Such an early feedback helps to identify possible issues early enough hence improving the later versions as elaborated further down this course.
- To lessen the total risk associated with the development process right from the start, low compatibility models are used as early as possible in the product design. This way time and resources can be saved because feedback allows for easier alteration and improvement of the same.
- Low-fidelity prototypes make it easier for strategists, developers, and project managers to work together because they involve all those groups in the collaboration. This type of prototype requires minimum design skills thus can be produced by many team members encouraging interdisciplinary cooperation and making sure that everyone agrees to the way the design is headed.

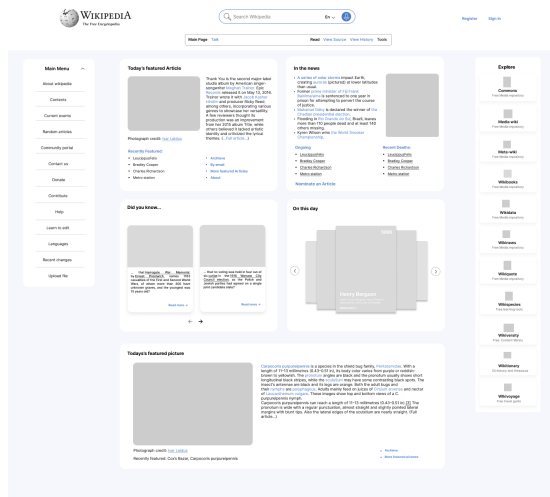


Fig. 1. Low fidelity Design

B. Prototype Description

The main basis of the prototype that we did was based on the redesign of a popular website, Wikipedia. The steps that were taken to materialize that are mentioned below:

- Languages, about Wikipedia, contact us, and other primary menu items have been integrated on the landing page to make it easier to use, and also to reduce cognitive overload
- The updated search bar now supports language translation and has an audio input option.
- Wikipedia's sister projects now appear on the right side of the desktop interface.

- Sections like today's highlighted item, news, and Did you know are disjointed, making them impossible to read.
- These segments were divided into independent cards to better organization and readability.
- Improved alignment in today's highlighted item and differentiated between current and recent fatalities in the news section.
- Used a carousel-style design for the "On this day" portion, and a card system with graphics and clear text for the "Did you know" section.

C. Design Decisions

The design decisions that had been taken and materialized while constructing the prototype was a reflection of the previous research and surveys that had been done while preparing the personas and scenarios for the project. The design decisions that had been taken have been described below briefly:

• Navigation:

- Use of gaze tracking to find the most popular portions of the Wikipedia website.
- Ensure that these key regions allow for easy navigation and access to critical information.
- Using gaze tracking information, incorporate user-centric design concepts to streamline the navigating experience.
- Create intuitive navigation pathways that match users' visual engagement habits without directly including gaze tracking data into the project.

• Live Translation Toolbar:

- Include a dynamic translation toolbar that will automatically translate Wikipedia pages from Bangla to English in real time.
- Allow users to seamlessly switch between languages while reading articles, with the option to change translation choices.

• Adaptive Interface Design:

- Design responsive interfaces that adapt to diverse screen sizes and devices, guaranteeing the optimal user experience across PCs, tablets, and smartphones.
- Prioritize readability and usability in interface design, taking into account diverse user preferences and accessibility requirements.

D. Prototype Construction

Along with constructing the prototype from sketch prototypes, to low and high fidelity prototypes by using Figma, we also held a few studies which were considered while building up the prototype.

This data collection method for the project is stressing on a combination of qualitative as well as quantitative methodologies so as to have a full grasp over consumer preferences and practices. This involves getting information from a broad spectrum of people highlighting those speaking Bangla and English with various dialects. Surveys will inquire about user

preferences, linguistic abilities, and technological competency, whilst focus groups will investigate specific user experiences and difficulties. Gaze-tracking technology will be used to detect natural surfing activities, and real-time data collection will provide insights into user involvement. Furthermore, the study aims to comprehend the target audience's demands and needs in order to effectively inform design and development processes. Students, professionals, and the elderly will be sampled to ensure representation in terms of linguistic competency and technological literacy, and socioeconomic status.

IV. EARLY DESIGN AND PROTOTYPE

The prototype has been constructed in Figma, and the link is attached herewith: **Figma Design Link**

V. CONCLUSION AND FUTURE WORKS

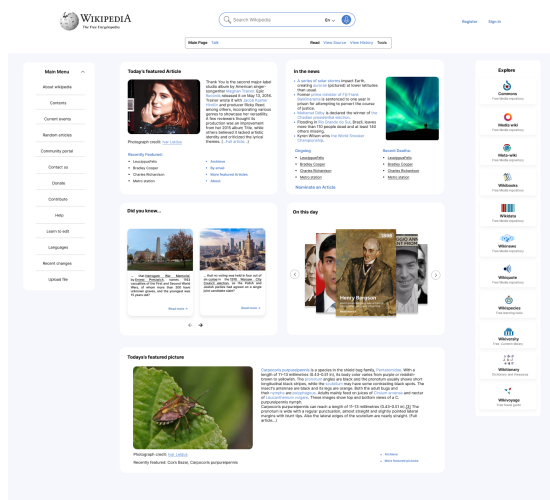


Fig. 2. High fidelity Design

The report demonstrates on the early work done for the project by building up low-fidelity prototypes and the future works that will be done will be based on expanding the primary design made in the prototypes and also adding a extra few features in the process.

Some of those features are mentioned below:

• Accessibility Enhancements:

- Contributing screen reader compatibility, high contrast settings, and keyboard navigation shortcuts would be a step towards enhancing Wikipedia's accessibility. One way of ensuring that there is still room for improvement is by conducting accessibility audits and carrying out user tests involving different groups so as to identify all possible problems to be rectified in the redesigning process.

• Real-Time User Feedback Mechanisms:

- Add feedback channels to the interface so that people can provide immediate comments and suggestions while surfing Wikipedia.

- Collect real-time input on the usefulness of the live translation feature, interface design, and general user experience to guide incremental improvements.

• Interactive Learning Tools:

- For a human visitor to be able to ask questions and test their knowledge as they read articles, the learning portals will deploy interactive learning modules or quizzes that rely on Wikipedia information.
- To match the client with apt content, gaze tracking should be applied in determining how much time they spend using the learning tools.