

Development of an interactive Q&A Forum for Data Analysis with Artificial Intelligence

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Abstract

The rapid evolution of digital platforms presents new opportunities for fostering communication and engagement within academic institutions. This paper describes the development, customization, and deployment of a Question and Answer (Q&A) forum based on the Askbot platform, hosted on PythonAnywhere. The primary objective of this project is to establish a respectful online space where all members of the University of Guanajuato community—including professors, administrators, and students—could interact, express suggestions, and propose ideas for the university. We focused on identifying the underlying programming languages of Askbot, revealing its reliance on Python, JavaScript, Django, and Jinja2. Preliminary tests were conducted on local servers to understand Askbot's functionality and explore customization avenues. A key focus was the integration with MySQL for robust database management and data extraction for administrative analysis. The selection of PythonAnywhere as the web hosting solution followed a comparative analysis through different options. The deployment process involved resolving various installation challenges via the PythonAnywhere bash environment. Customization efforts included designing a unique forum logo, a default user logo, and adapting the website's color scheme to reflect the University of Guanajuato's institutional colors. The forum was successfully tested by university students, where participants were invited to submit suggestions and comments. Furthermore, an initial exploration into sentiment analysis of forum comments, using Textblob, a Python-based library, yielded accurate insights into user sentiment. This work demonstrates the feasibility and benefits of creating dedicated digital platforms to enhance internal university communication and facilitate feedback collection.

Key words: Q&A forum, Askbot, PythonAnywhere, university engagement, sentiment analysis, web development.

Introduction

Effective communication and community engagement are vital for the continuous improvement and harmonious functioning of academic institutions. Traditional methods of feedback collection and idea sharing can often be cumbersome or lack a centralized platform. Considering the increasing reliance on digital tools, establishing an accessible and interactive online space has become imperative. This work addresses this need by detailing the creation and deployment of a tailored Question and Answer (Q&A) forum for the University of Guanajuato community, which is called "Sinergia Q&A". The aim was to provide a respectful environment where professors, administrators, and students could collectively share suggestions and proposals, fostering a sense of shared ownership and collaboration.

This paper outlines the technical journey, from initial platform selection and local development through to web deployment and ongoing customization. It highlights the challenges encountered and the solutions implemented during the setup and personalization of the Askbot-based forum on PythonAnywhere. Furthermore, it presents the results of practical applications involving participants from the university community and an exploratory sentiment analysis of user-generated content, thereby demonstrating the forum's utility as a tool for collecting actionable insights. The successful implementation of this platform provides a model for other educational institutions seeking to leverage technology for enhanced internal communication and stakeholder involvement.

Web Hosting Selection and Deployment on PythonAnywhere

To successfully launch Askbot as a well-established and freely accessible forum for the University of Guanajuato community, it was deemed necessary to host it on a web server tailored to our specific requirements. It was imperative that the chosen server could accommodate all Askbot's installation documentation while also providing sufficient space for user-generated questions and answers.

The transition from a local server environment to a publicly accessible web platform required careful selection of a web hosting service. A comparative analysis was conducted between several web hosting providers, including PythonAnywhere [3] and AlwaysData [4]. The evaluation considered factors such as ease of deployment for Python-based applications, available resources, and cost-effectiveness. PythonAnywhere was ultimately selected as the most suitable option for hosting the Askbot-based forum. This decision was primarily driven by PythonAnywhere's superior web server storage capacity compared to that offered by AlwaysData, a factor deemed critical for the project.

Once the server was selected, we proceeded with the free trial to install Python (version 3.9 or earlier) along with Askbot and its dependencies from the bash environment. This stage involved resolving several installation-related issues concerning Askbot, some of which differed from those encountered during the preliminary tests on the local server.

Forum Customization

Following successful deployment, a comprehensive customization phase was initiated to align the forum's aesthetic with the University of Guanajuato's institutional identity. This involved several design elements:

Table 1: Sinergia Q&A customization.

Logo Design	For the forum's logo, we opted for a minimalistic design that incorporated the characteristic colors of our institution.	 <i>Source: original work.</i>
User Default Logo	Regarding the default user profile picture for new users, we sought to honor the spirit of our forum's name by symbolizing support for our university, exemplified by two bees holding the emblematic shield.	 <i>Source: original work.</i>
Color Scheme Adaptation	The specific colors belonging to the University of Guanajuato are Pantone 540C, Pantone 451C, and Pantone 121C.	  

Sentiment Analysis Implementation

To extract meaningful information from forum user opinions and subsequently classify them, a program was developed using the Python programming language. This application establishes a connection to the forum's database through the *mysql-connector-python* library [2]. Once connected, the data is processed and organized into questions and answers using the *pandas* library, which facilitates structured handling of database records [7].

For sentiment analysis, the system employs *TextBlob*, a natural language processing (NLP) library capable of classifying sentences and providing a polarity threshold that reflects the communicative intent of a message [5]. *TextBlob* is built upon two more comprehensive NLP libraries: *NLTK* and *Pattern*, which offer tools for linguistic analysis and implement various machine learning techniques such as Naive Bayes classifiers and decision trees [9], [10]. However, since *TextBlob* is implemented as a rule-based classifier, its performance is limited when processing ambiguous or sarcastic content.

Because *TextBlob* operates primarily with English text, all messages were first translated using the *deep-translator* API [6]. Each sentence is then assigned a polarity score in the range of -1 to 1 . For this study, sentiment thresholds were defined as follows: scores above 0.4 were categorized as positive, scores between 0.2 and 0.4 as neutral, and scores below 0.2 as negative.

The results are grouped by thread and visualized using bar plots generated with *Matplotlib*, which illustrate the sentiment distribution of the responses associated with each question [8].

Results

The implementation of the Q&A forum on Askbot, hosted via PythonAnywhere, yielded several key outcomes demonstrating its effectiveness as a community engagement tool for the University of Guanajuato.

Successful Platform Deployment and Customization:

The Askbot platform was successfully deployed on PythonAnywhere, overcoming initial installation and configuration challenges. The extensive customization efforts resulted in a visually cohesive forum that reflected the University of Guanajuato's brand identity. This included the integration of custom logos and a color scheme consistent with the university's official branding. The ability to manage databases via MySQL connection proved effective for administrative data access.

PROFESORADO | Sign in

tags users badges

ALL UNANSWERED Type your question or search

6 questions

Sort by date activity answers votes

INFRAESTRUCTURA y ESPACIOS. Opiniones y comentarios sobre cómo mejorar nuestros recursos en la DCI

14 views 0 answers 0 votes Feb 28 CarlosP

CUESTIONES DE GÉNERO. ¿Cómo mejorar el ambiente y la situación actual de la DCI en cuestión de género?

9 views 0 answers 0 votes Feb 28 CarlosP

ESTACIONAMIENTO. ¿Cómo podemos mejorar la situación actual?

10 views 1 answer 0 votes Feb 28 CarlosP

Conocemos el problema, pero cuáles serían las propuestas las cuales mejorarían todo el ambiente y los problemas mostrados en el debate?

14 views 0 answers 0 votes Feb 12 abeja

¿Por qué hay tan pocas mujeres en la ciencia en México?

28 views 0 answers 0 votes Feb 11 abeja

La iluminación nocturna en la División es suficiente?

40 views 2 answers 2 votes Feb 6 Karla

Tags: de x1 Equidad x1 Género x1 Instalaciones x1 MujeresEnLaCiencia x1 Seguridad x1

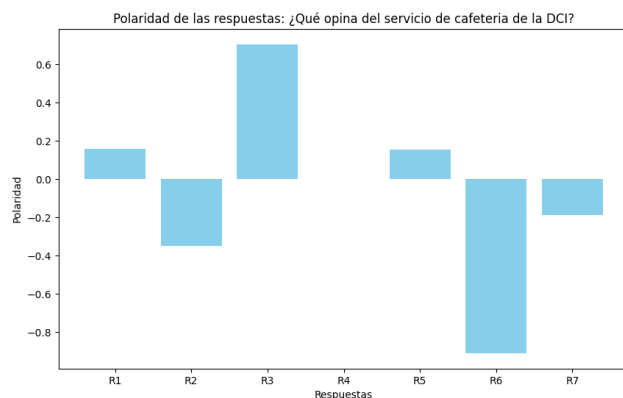
Proyecto creado por Sinergia Q&A

Laboratorio de Cómputo Avanzado
División de Ciencias e Ingenierías Campus León

Figure 2: Sinergia Q&A forum's home page. Source: original work based on Askbot [1].

Promising Results in Sentiment Analysis:

The preliminary sentiment analysis performed on forum comments demonstrated a high degree of accuracy in categorizing the emotional tone of feedback. This analytical capability provides a valuable tool for administrators to quickly gauge public opinion, identify areas of concern, and prioritize actions based on the overall sentiment expressed by the community. For example, comments identified as expressing positive sentiment could highlight successful initiatives, while those with negative sentiment could pinpoint areas requiring immediate attention.



Pregunta: ¿Qué opina del servicio de cafetería de la DCI?			
	Respuesta	Sentimiento	Polaridad
0	Los precios son bastantes elevados, podrían ca...	Negativo	0.160000
1	El aguacate nunca está bueno.	Negativo	-0.350000
2	Esta muy bien, debería haber más	Positivo	0.705000
3	Por favor cambien la administración	Negativo	0.000000
4	Precios elevados, pero falta más variedad	Negativo	0.153333
5	La comida es muy mala	Negativo	-0.910000
6	Las porciones son insuficientes y poco equilib...	Negativo	-0.187500

Figure 3: Polarity distribution of responses to a forum question. Source: original work.

If a significant volume of negative comments is detected around a specific area or feature, a follow-up mechanism can be established to prioritize the attention of that area based on user polarity. On the contrary, when positive comments are concentrated on a particular characteristic of a service, this can be used to identify service conditions, valuing them as friendly, functional, or those rejected by users, paying special attention to the most accepted by users so that these qualities can be strengthened in the organizational strategy.

Another key advantage of polarity analysis is the early detection of trends: for example, in the introduction of new products in a coffee shop, the implementation of an evaluation system, or the adoption of a new educational plan. In these scenarios, sentiment analysis makes it possible to timely identify the degree of acceptance or rejection, evaluate the effectiveness of the decisions made, and monitor the evolution of their impact over time. Likewise, the integration of multiple global variables associated with the forum (date, topic, category, number of people, among others) makes it possible to develop segmentation strategies that clarify links between the general feeling of users, anticipating failures in processes, services, or policies, and allowing the design of preventive responses.

Conclusion

This project successfully developed and implemented a customized Q&A forum using Askbot, hosted on PythonAnywhere, specifically tailored to serve the community of the University of Guanajuato. The extensive research into Askbot's architecture, including its reliance on Python, Django, JavaScript, and Jinja2, provided a solid foundation for development. The integration with MySQL facilitated effective data management, crucial for administrative analysis of questions and answers. The strategic decision to deploy on PythonAnywhere, following a comprehensive comparative analysis of hosting options, proved to be a robust solution for web accessibility.

The forum's aesthetic customization, incorporating the university's branding, significantly enhanced its appeal and perceived integration within the institution. The tests conducted by university students proved that the platform's effectiveness in fostering community engagement and gathering valuable suggestions and feedback. Furthermore, the successful preliminary sentiment analysis showcased the potential for leveraging advanced analytical techniques to extract deeper insights from user-generated content, thereby informing administrative decisions.

This work not only establishes a functional and user-friendly communication platform but also paves the way for future research into automated content analysis and enhanced feedback mechanisms within academic settings. The positive outcomes suggest that similar Q&A platforms can be highly beneficial for fostering interactive and constructive dialogue within diverse institutional communities.

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