



## Proposal for [Brown Institute RFP](#)

### ***Background***

Chatbots, or conversational assistants are one of the most effective public engagement and education tools, providing timely information in 24/7 manner. Since the beginning of COVID-19 outbreak, several chatbots have been released to provide the public with information regarding the virus. However, the assistants available today to the public are based on curated answers to pre-defined questions, either by giving the user a list of questions to choose from ([1](#)), or matching a open-text question to a pre-defined set of question intents ([1](#), [2](#)). Therefore, they often unable to answer the questions posed with satisfactory accuracy, or to address questions that are not related directly to the medical aspect of the epidemic, leading users to consult other, potentially unreliable, sources.

### ***Project Description***

We propose to leverage cutting-edge natural language processing (NLP) technology to create a Web-based chatbot to assist those affected by a coronavirus lockdown in three domains:

- Answer open domain questions about COVID-19 using authoritative reference corpora such as Wikipedia, the CDC, and PubMed
- Provide updates on the global status of the pandemic (using up-to-date, verified news sources)
- Provide tips for wellness and self-care while working in isolation

The project will be based on the technology developed as a part of [“qary” open-source project](#). All training of the bot and software development will be performed by interns and volunteers contributing to open-source repository.

### ***Project outcomes and impact evaluation***

The main deliverable of the project will be a mobile web application for COVID-19 question-answering and wellness coaching to mitigate the psychological strains of isolation and promote pro-social behaviors and habits. We will evaluate the success of the project using the following parameters: - **Chatbot accuracy**: the accuracy of the chatbot will be benchmarked with a list of questions collected from the public forums, such as reddit, Quora and similar sources. Chatbot’s answers will be scored using USE metric using answers collected as a benchmark. The chatbot will not be released to public use until reaching the F1 score of X. In addition, the chatbot accuracy would be evaluated using similar benchmarking method after the release. - **User engagement**: the engagement of the public with the chatbot will be measured using internal analytics tools. Usage metrics, such as number of users, sessions, and user satisfaction from the conversation with the bot, will be collected to analyze and improve the chatbot’s performance.

### ***Project timeline and budget***

Total budget is \$5000:

- \$800 in compute resources and cloud infrastructure over 6 months
- \$4200 in grants to volunteers over one 4 weeks after ATP (authorization to proceed)



## Workflow

All software and data will be pushed to GitLab daily. Documentation on GitLab will enable developers anywhere in the world to download and run the app on a laptop or a web server (using the provided Docker containers). Features and milestones will be tracked within GitLab “issues” allowing the general public to provide feedback and feature suggestions. A mobile web application will be integrated and deployed to <http://qary.ai> after the apps have each been tested by beta users.

Software development, data gathering and curation will be performed by volunteer data scientists from the San Diego Python User Group and Machine Learning Group. Volunteers who are not currently actively employed on salary will be given priority over other potential interns. Training and mentoring of volunteers will be provided free of charge by Tangible AI staff.

## Estimate

Total volunteer and intern effort is estimated at 120 person-hours. Four volunteers are currently contributing to the software package, “qary” and will be re-tasked for this effort.

### *State of the Art Question Answering App*

52 volunteer-hours (~2 weeks) to build and deploy the Question Answering mobile web application.

- 8h (\$280): compile urls and unstructured natural language text on COVID-19
- 8h (\$280): build/test/deploy python script to scrape URLs and query APIs daily
- 8h (\$280): compile ML training set of 100+ question-answer pairs from authoritative sources
- 16h (\$560): train (fine tune) ALBERT to answer 100+ COVID-19 FAQs accurately
- 12h (\$420): create/test/deploy REST API and webapp for user interaction from smartphone

### *Deterministic Conversational COVID-19 Coach*

48 volunteer-hours (~1 week) to build and deploy COVID-19 Coach for isolation well-being support.

- 8h (\$280): Deterministic chatbot for answering FAQ questions about COVID-19
- 16h (\$560): Add well-being and self-help coaching features (home isolation, exercise, etc)
- 16h (\$840): Test with beta users, refine UX, deploy and maintain for 6 months

### *Integration*

- 20h (\$560): Integrate COVID-19 Coach with SotA question answering chatbot REST API