

Create new set of activities for Sugar in Python (Sugar Labs - GSoC 2019)

1. About Me:

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Languages known: English, Gujarati, Hindi

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2. Technologies I know:

Programming languages: Python (MOOC), C, C++

Libraries: [fastai](#)

3. Coding experience:

Practice: [Project Euler @ Hacker Rank](#) - rank 496/98000

4. OSS experience:

I'm just getting started with OSS. It's only been 1+ months I've started looking at various OSS projects I can contribute to. Till now I was spending most of my time understanding open source eco-system and how things work if I want to contribute to a project.

5. Why SugarLabs?

There are a few things that I wish I knew at early age. And activity that I'm proposing helps students with exactly that. I loved the work of the Sugar Labs because it makes learning easier.

I found this project “Create a new set of activities” interesting because I love the idea of gamification of things. I believe I can make a significant contribution to this project with the guidance of the mentors.

And to contribute better I’ve started learning GTK from the documentation given by the mentor. And with that I looked for an issue in any activity to solve. And I made my first ever [PR](#). It was actually an activity which I found on wiki page of SugarLabs. I’m waiting for the Author’s feedback on this. I am hoping for the PR to be merged soon ☐

I am learning Machine Learning and Deep learning from 2+ months from fast.ai MOOC. **I am hoping that the skills that I learned will also be helpful in building better activities.**

6. My motivation for GSoC:

I got exposed to the world of OSS with the help of my cousin who is working as a software engineer for 8+ years. He suggested me to contribute to OSS projects and GSoC. I got to know the importance of open sources for the good of whole community and also learnt that if I want to understand and know how to work in real world of programming than I must contribute to open sources.

7. My GSoC project details:

Title: Create a new set of activities for Sugar in python.

Definition: Add new activities to make the students’ learning experience better.

I have planned to add 2 new activities to the Sugar.

Activity 1:

Title: “Why things are the way they are?”

This activity will be divided into lessons.

So, one planned lesson is “Career options!”. This lesson will be having 2 sections. One section will be having a quiz and second will be having different stages based. I’ll explain section 2 first!

Section 2:

And **the aim of this stages is to make the children understand what they can become in the future and the main goal is to make them understand their personal interest.** Here, the **different stages of the activity are about the different fields** and we will teach them in the different stages that how people work in that field and the importance of that field with a small story about that field so that after some stages they can have interest in one or two of them more than other fields. And **by the description of the field and stories I mean that kind of stuff which is true and make them go in the world of fantasies.** Like if one field is Artificial Intelligence then we can give them an example like this is the field which can make the robot which can talk with you, think with you, which can help you, which can do anything for you like a normal human being. And we can put a small story in which an AI robot helped a kid in something.

Likewise, we can add n number of fields in this.

Section 1:

The section 1 will be having a big quiz with children friendly UI and the quiz will be about their interests. We will ask them, “do you like to do this or not?”, “Do you ever think how the robots work?”, “Do you love math or not?”. We will cover questions for all the fields covered in the section 2. And from the answers of that first my algorithm will decide the stories and fields to suggest the student. I am thinking to take the reviews or ratings from the users and use them to train a suggester for the fields by a server.

And like this “career options” lesson we can add more lessons. List of other lessons is listed below but I am planning to make about 2 lessons in this summer time and other lessons we can add after the GSoC period and I am thinking to extend this activity upto 5 lessons after GSoC period.

List of other lessons:

- As I mentioned before one lesson on math (About the reality and applicability of mathematics).
- One lesson on the career options.
- One on the badness of bad habits like smoking.
- Something on good manners and bad manners.

Impact:

Students will learn something which no one teaches at school and which I believe every child should be taught. And I know that, to make children interested in this kind of informative activity is a little bit tough but I will set every lesson in a way they will love. **Actually, I am a Gujarati and Hindi poet and I can write stories too. So, I'll set the stories so interesting that children would love. And to make their experience better I am thinking to add voice recording of the stories which will read the stories for the children and there will be the words of the stories shown on the screen. So, by listening and reading the stories at the same time will make their pronunciations better.** So, I think it will be very helpful activity in making their future brighter. And I'll try to make the UI as children friendly as possible so that they love to play around.

Activity 2:

Title: "Machines can learn the way you learn"

This activity is about machine learning. It will be having an Image classifier which will take photos from the user and take the labels (Categories) for the photos from the user and it will request the students to first classify the photos for different categories and then the activity will train a model for that classifier and then predict the category for new photos.

As the UI system the activity will be having a cartoon type learner, whose name will be "mecho" and he will be always with the user during that activity. When the user first time enter the activity mecho will welcome the user and introduce himself and tell them that he is a machine and he can learn things in the way we humans learn. And then he will teach the user how to use the activity. Every interaction in the activity will be between user and mecho. For example, if as the categories the user enters cars and bikes then mecho will come and ask the user to show him some pictures of cars and bikes. And at the prediction time there will be an option for the user to correct the mistakes of the mecho and mecho will retrain himself for the corrections. And if it couldn't perform well it will ask the user to give better photos or more photos.

Implementation:

I will implement the UI with GTK. And the deep learning module I will use is fast.ai which is a very powerful library for deep learning and machine learning in python. **And I will be using a pre-trained model of resnet-50 so that the user can get very high accuracy in very small amount of training and not need much good hardware also.** One example for the power of a pre-trained model is that I got 93%

accuracy for cars vs bike classification with only 40 to 50 photos. And I'll make the activity be saving all the classifiers on the journal so that the users can have the previously made class fire every time.

Impact:

The interactions with the “mecho” will be teaching the users how the what is machine learning and deep learning and how it works and the basic concepts of the deep learning. So, the child learners will understand the fundamentals of machine learning with this activity.

Timeline:

Dates	Objective
Before May 7	<ul style="list-style-type: none"> • Contribution to different activities in the Sugar by solving issues and adding features in the activities. • Practice of GTK.
May 6-May 27	<ul style="list-style-type: none"> • Community boarding • Talking with the mentors and deciding of the final and detailed timeline for the project (if changes required in this one) • Setting up the development environment
May 28-June 4	<ul style="list-style-type: none"> • Creating UI for the “Why things are the way they are?” activity. • At this time the content in the stories will be blank.
June 5-June 12	<ul style="list-style-type: none"> • Finding or creating the contents and the quiz questions for the first lesson, “Career options!” • And setting this up in the UI of the activity.
June 13- June 20	<ul style="list-style-type: none"> • Creating the deep learning model

	and the server for the “career options!” lesson and setting this up in the activity.
June 21- June 24	<ul style="list-style-type: none"> • Testing of the activity and solving the Bugs.
June 24- June 28 (First Evaluation)	<ul style="list-style-type: none"> • Deliverable: A working activity “Why things are the way they are?” with one lesson “Career options!” • Work: Building lesson 2 of this activity.
June 29 – July 6	<ul style="list-style-type: none"> • Starting to make the lesson 2 for this activity “Applicability of mathematics” (The next lessons of this activity, I will be making all the time in next period. So, if I am waiting mentors reply for something or somehow, I am free then I would have something to work on) • Designing mecho for the second activity “I can learn the way you learn”.
July 7- July 14	<ul style="list-style-type: none"> • Completing of lesson 2 and setting that up with the UI. • Completing the UI system and setting up “mecho” in it.
July 15- July 22	<ul style="list-style-type: none"> • Making the backend part of this activity which is the learner which is an Image classifier. • Testing and solving the Bugs of the 1st activity’s lesson 2. • Testing of “Mecho”.
July 22- July 26 (Second evaluation)	<ul style="list-style-type: none"> • Deliverable: The UI system with “mecho” activity “I can learn the way you learn”. • And the lesson 2 of the activity “Why things are the way they are?”

July 27-August 2	<ul style="list-style-type: none"> • Making the backend part of The 2nd activity. •
August 3- August 10	<ul style="list-style-type: none"> • Making of the model of Image classifier for activity 2. • And testing of that with different Images.
August 11-August 18	<ul style="list-style-type: none"> • Setting up all the things together. • Testing of whole activity and solving bugs.
August 19- August 26 (Final Evaluation)	<p>Deliverable: Total 2 new activities!</p> <ul style="list-style-type: none"> • “Why the things are the way they are?” activity with 2 lessons. One is “career options!” and second is “Applicability of mathematics” • “I can learn the way you learn” activity.
After GSoC 2019	<ul style="list-style-type: none"> • I will take “Why things are the way they are?” activity upto 4-5 lessons. (But that will be a slow process because my collage will be started) • I’ll always take care of my activities. And will try to contribute to other activities also.

I have an exam in the starting of the may so the dates are from 29th April to 7th May.

So, after 7th May I will be totally available for GSoC and I have no other plans and any trips for the summer vacation. I have vacation for 2 months in my collage and after that my 2nd year will be started. But there is a system that if you are doing any project, then they allow us for taking leave for that period from the collage.

So, if I am getting selected, I will be having that leave for GSoC.

And I will be contributing for 50-60 hours per week. There is no problem in that, I have coded for 12-12 hours per day during my previous vacations.

Thanking You,

Rushabh Vasani