

Project Update - 2

Participants :

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Mihir Agre (190260030)

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1 Work Done

Here are the highlights of the work done on the project in the past week:

- Refactored into Object-Oriented Framework, introducing two main classes:
 1. **Simulation Class**
 2. **Visualiser Class**
- Numba Optimisation using `parallel=True` and `prange` (on the `object_oriented` branch on github)
- New kernels written in **Numba CUDA** framework have provided a significant speedup (on the `cuda_optimized` branch on github)
- 3D visualisation implemented using `vispy` library
- Work on GUI started using `pyqt5` library since `vispy` natively supports it

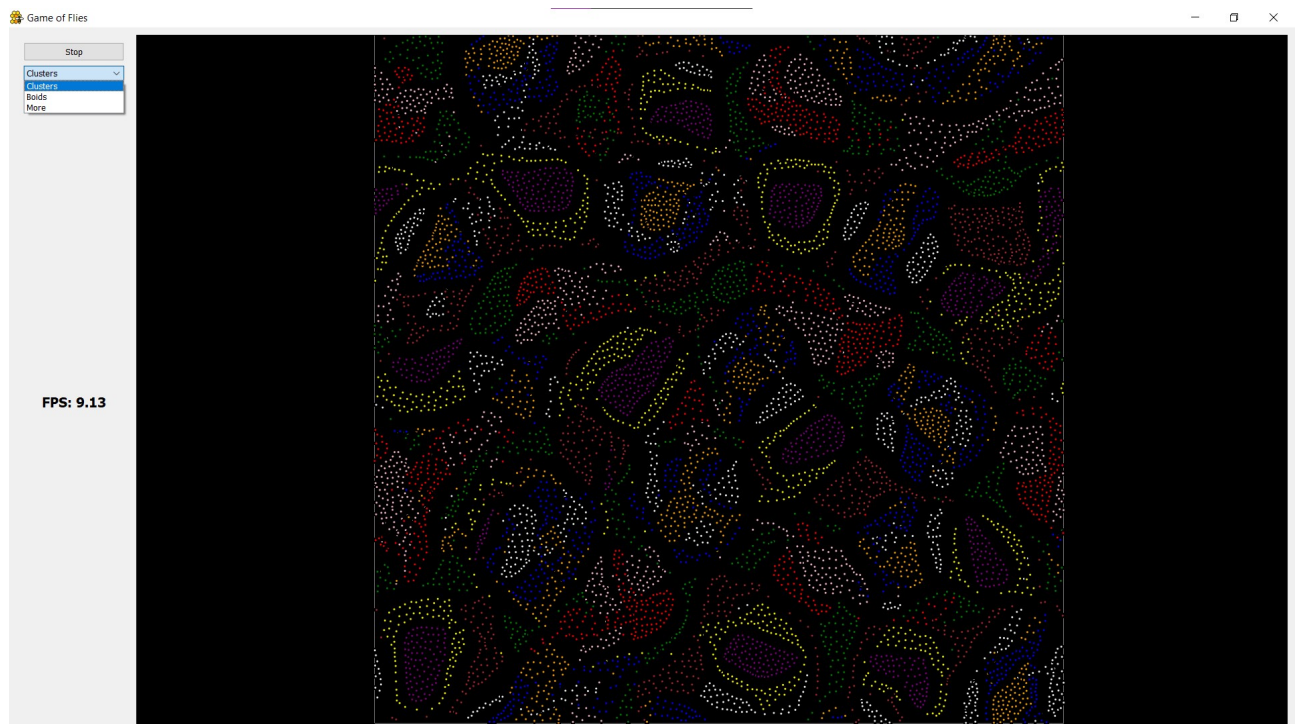


Figure 1: Current state of the GUI : Real-Time updated Vispy visual embedded inside pyqt5 GUI

2 Contributions

Here is a table summarizing the progress made on the project:

Team Member	Work Done
Vinit Doke	3D Visualisation and UI
Tanyut Sharma	Numba and CUDA Parallelisation
Mihir Agre	Numba and CUDA Parallelisation

3 Git Logs

Here are the recent Git logs for the project:

3.1 Vinit Doke

```
commit 21a102b539c2f9f3ab28f2323449f608748bf323 (HEAD -> cuda_optimized, origin/cuda_optimized)
Author: vinitdoke <54439587+vinitdoke@users.noreply.github.com>
Date: Sat Apr 1 00:31:21 2023 +0530
```

completed post sim render script

```
commit b563e7473407bf6e5b7de79fa012bb4d0382551d
Author: vinitdoke <54439587+vinitdoke@users.noreply.github.com>
Date: Tue Mar 28 00:03:41 2023 +0530
```

New UI in pyqt5 with star/stop button, FPS counter and more

```
commit 2f3a7a035e889623c52032b9bceef1619fedb14b
Author: vinitdoke <54439587+vinitdoke@users.noreply.github.com>
Date: Mon Mar 27 18:46:30 2023 +0530
```

Boundary and 2D/3D swicth based on limits' 3rd dimension

```
commit c929abe937265e9a372b0bb369bfb556a0a94f99
Author: vinitdoke <54439587+vinitdoke@users.noreply.github.com>
Date: Wed Mar 22 19:01:37 2023 +0530
```

Color Plotting, Boundary, set_instance function

3.2 Tanyut Sharma

```
commit 8ac149299a87d64b5c086bf8fc92f20e56670d5b
Author: TanyutSharma <65652483+TanyutSharma@users.noreply.github.com>
Date: Thu Mar 30 23:34:49 2023 +0530
```

Bin solution completed

```
commit 39ea45ab5e39c3157f1ea4e1495e97e5ea218c2c
Author: TanyutSharma <65652483+TanyutSharma@users.noreply.github.com>
Date: Mon Mar 27 15:13:59 2023 +0530
```

3d working update

```
commit 88a12323ebe03c3e846bb231b52ea607389fd26c
Author: TanyutSharma <65652483+TanyutSharma@users.noreply.github.com>
Date: Mon Mar 27 14:40:47 2023 +0530
```

parallel numba update

```
commit d0429cf5e7f160a09634237b91fe264c5b896773
Author: TanyutSharma <65652483+TanyutSharma@users.noreply.github.com>
Date: Wed Mar 22 15:59:37 2023 +0530
```

Class-based approach and vispy implementation

3.3 Mihir Agre

```
commit 08df137d7b73f5cbcd1de648893bc88f74debaea
Author: Divimon <115691044+Divimon@users.noreply.github.com>
Date: Sat Mar 25 11:29:01 2023 +0530
```

scalene profile

```
commit b2a8bfe61838bc68e3dc9fe27b84f75dd13da462
Author: Divimon <115691044+Divimon@users.noreply.github.com>
Date: Thu Mar 23 12:05:19 2023 +0530
```

some input corrections

input correction to class simulation

```
commit 324b488368311fe8bc5eadb18dc019658fb5d09e
Author: Divimon <115691044+Divimon@users.noreply.github.com>
Date: Thu Mar 23 11:13:42 2023 +0530
```

Parameter adjusted

f_min

```
commit 42a560456613feefaeb977084b9ed591684a33d3
Author: Divimon <115691044+Divimon@users.noreply.github.com>
Date: Mon Mar 20 23:32:46 2023 +0530
```

Unified_type_state_parameter

state_params- continuous(no buffer in b/w, buffer at last, for more particles to be added)
param_matrix- values random

Imp- random.seed added